ATTACHMENT 4
EXCERPTS FROM EPA'S RESPONSE TO COMMENTS ON DRAFT PERMIT MODIFICATION AND STATEMENT OF BASIS FOR EPA'S PROPOSED REMEDIAL ACTION FOR THE HOUSATONIC RIVER "REST OF RIVER" (RTC)

Response to Comments
on
Draft Permit Modification and Statement of Basis
for EPA's Proposed Remedial Action for the Housatonic River "Rest of River"
GE-Pittsfield/Housatonic River Site

SDMS: 593922

U.S. Environmental Protection Agency
Region 1 (EPA New England)

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October 2016

Response to Comments
on
Draft Permit Modification and Statement of Basis for EPA's Proposed Remedial Action for the Housatonic River "Rest of River" GE-Pittsfield/Housatonic River Site

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For purposes of this Response to Comments, EPA is describing the different iterations of the Resource Conservation and Recovery Act (RCRA) Corrective Action Permit, as follows:

- "Permit" describes the Reissued RCRA Permit incorporated into the Decree as Appendix G to the Decree, effective October 2000, and as modified in December 2007.

- "Draft Permit Modification" describes the June 2014 Draft Modification to the Reissued RCRA Permit issued by EPA for public comment.

- "Final Permit Modification" describes the October 2016 Final Modification to the Reissued RCRA Permit, which is accompanied by this Response to Comments.

The Final Permit Modification provides the Performance Standards and the appropriate Corrective Measures necessary to meet the Performance Standards to address polychlorinated biphenyls (PCBs) and any other hazardous waste, constituents or substances that have migrated from the GE facility to surface water, sediment, floodplain and bank soil, and biota in the Rest of River. The Final Permit Modification also includes the identification of the applicable or relevant and appropriate requirements under federal or state law requirements that are applicable or relevant and appropriate (ARARs) that must be met by the Corrective Measures, and the basis for waiver of any ARARs.

As explained further in this Response to Comments, EPA has made the following determinations. The remedy as outlined in the Final Permit Modification is protective of human health and the environment, complies with, or appropriately waives, all federal and state requirements that are applicable or relevant and appropriate to the remedy, and is cost effective. In addition, the remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable. The remedy also has been determined to be the least environmentally damaging practicable alternative to prevent contamination from impairing wetlands and aquatic habitats. To the extent that the remedy involves occupancy or modification of a floodplain, EPA has determined that there is no practicable alternative to doing so, and it is the least damaging practicable alternative. In addition, the remedy will not result in an unreasonable risk of injury to human health or the environment.

I.B Public Participation Prior to EPA's Proposed Remedial Action

Throughout the duration of the Rest of River project, EPA has kept the local community and other interested stakeholders up to date on various project investigations and activities. In 1998, EPA established a Citizens Coordinating Council (CCC) for EPA, the Commonwealth and GE to share with the public information on the GE-Pittsfield/Housatonic River Site (the Site), including the Rest of River area. EPA continues to hold regular meetings with the CCC to update it on the Rest of River as well as the other activities at the overall Site.

Throughout the Rest of River process, EPA has held an informal public input period for many deliverables generated for the Rest of River process and continues to place documents for the entire Site on its website and to maintain repositories throughout the affected communities.

During the Rest of River process, EPA has periodically issued public Fact Sheets regarding the activities, including on the following topics:

Berkshire Athenaeum Public Library
Reference Department
1 Wendell Avenue
Pittsfield, MA 01201
413-499-9480
www.pittsfieldlibrary.org/

Cornwall Free Library
30 Pine Street
Cornwall, CT 06753
860-672-6874
www.cornwallfreelibrary.org/

Housatonic Valley Association (HVA)
150 Kent Road
P.O. Box 28
Cornwall Bridge, CT 06754
860-672-6678
www.hvatoday.org/

Connecticut Department of Energy & Environmental Protection
79 Elm Street
Hartford, CT 06106-5127
860-424-3000
www.ct.gov/dep

Copies of the Final Permit Modification also may be obtained by writing or calling Kelsey O'Neil at EPA, 5 Post Office Square, Boston, MA 02109; email: oneil.kelsey@epa.gov; telephone (617) 918-1003.

II. Alternative Evaluation/Remedy Selection

II.A Introduction

Section II.G. of the Permit states:

> In accordance with the compliance schedule set out in Attachment B, the Permittee [GE] shall submit a CMS Report. At a minimum, the Permittee shall provide the following information for each corrective measure approved for evaluation in the CMS Proposal (taking into account that the corrective measures ultimately selected will be implemented as a remedial action pursuant to Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Decree, as provided in section II.J):

1. General Standards for Corrective Measures
    a. Overall Protection of Human Health and the Environment
    b. Control of Sources of Releases
    c. Compliance with Applicable or Relevant and Appropriate Federal and State Requirements [ARARs]

2. Selection Decision Factors
    a. Long-Term Reliability and Effectiveness
    b. Attainment of Interim Media Protection Goals
    c. Reduction of Toxicity, Mobility or Volume of Wastes
    d. Short-Term Effectiveness
    e. Implementability
    f. Cost

3. Recommendation

    The Permittee shall conclude the CMS Report with a recommendation as to which corrective measure or combination of corrective measures, in the Permittee's opinion, is best suited to meet the general standards outlined in Special Condition II.G.1 above in consideration of the decision factors in Special Condition II.G.2 above, including a balancing of those factors against one another.

GE (the Permittee) submitted a CMS in March 2008 and, in response to EPA comments, submitted a Revised CMS in October 2010.

Section II.J of the Permit describes the requirements for EPA's selection the Corrective Measures, the proposal of a Draft Permit Modification and issuance of a Final Permit Modification. Specifically Section II.J states, in pertinent part:

> Based on the information that the Permittee submits pursuant to this Permit and any other relevant information in the Administrative Record for the modification of this Permit, EPA will propose Performance Standards, and [the] appropriate corrective measures necessary to meet the Performance Standards, to address PCBs and any other hazardous waste and/or hazardous constituents that have migrated from the GE Facility to the surface waters, sediments, and floodplain soils in the Rest of River area. This proposal will also include a proposed identification of the applicable or relevant and appropriate requirements ("ARARs") under federal and state law that must be met by such corrective measures, and where EPA proposes to waive any such ARARs, the basis for such waiver under CERCLA and the NCP. EPA will propose these Performance Standards, corrective measures and ARARs as a draft modification to this Permit [Draft Permit Modification] in accordance with 40 C.F.R. §§ 124.5-124.12 and 270.41 and Paragraph 22.n. of the Consent Decree.
>
> EPA will notify the Permittee of its intended final decision on the proposed Permit modification in accordance with Paragraph 22.o of the Consent Decree, and the Permittee shall have the right to seek administrative dispute resolution with respect to that notification in accordance with Paragraphs 22.o. and 141.b(i) of the Consent Decree. [See Section I.D of this Response to Comments for a summary of the outcome of the administrative dispute resolution.] Upon completion of that dispute process (if invoked), or after the expiration of 30 days following EPA's notification (if the Permittee does not invoke such dispute resolution), EPA will issue a modification of this Permit [Final Permit Modification] which will set forth the selected Performance Standards and corrective measures for the Rest of River area, along with the associated ARARs and the basis for waiver of any ARARs under CERCLA and the NCP.

Based, in part on GE's Revised CMS and other information in the Administrative Record, EPA conducted a thorough evaluation of remedial alternatives pursuant to the remedy selection criteria in the Permit. This evaluation is described in EPA's May 2014 Comparative Analysis of Remedial Alternatives for the General Electric (GE) – Pittsfield/Housatonic River Project, Rest of River (Comparative Analysis), and summarized in EPA's June 2014 Statement of Basis that accompanied the Draft Permit Modification for public comment.

Section II.B through II.F below responds to general comments related to EPA's remedy selection (e.g., Performance Standards and Corrective Measures) for the sediment, riverbanks and Floodplain soil. Section III.F responds to comments related to EPA's selection of the Treatment/Disposition method and associated Performance Standards and Corrective Measures.

II.B Comparative Analysis for Sediment and Floodplain Remedy

Comments 737, 739, 746: GE asserts the following: EPA has purported to evaluate its proposed sediment/floodplain remedy (SED 9/FP 4 MOD) against other remedial alternatives under the Permit's nine remedy selection criteria in its Statement of Basis and Comparative Analysis. It concludes that, of all remediation alternatives, its proposed alternative "is best suited to meet the General Standards [of the Permit] in consideration of the Selection Decision Factors." In fact, EPA has not conducted such an evaluation under the Permit criteria for several key aspects and components of the proposed remedy, contrary to the Permit's requirement. In addition, for the aspects and components of the remedy that EPA has evaluated, its evaluation of remedial alternatives is not adequately supported and is thus arbitrary and capricious. These deficiencies are discussed in Comments 738 – 745. In addition, for several components of its proposed remedy, the Region has not even attempted to evaluate its proposal (or potential alternatives) under the Permit criteria. Thus, these components of the proposed remedy constitute an effort to make an end run around the Permit remedy selection criteria and, as such, conflict with the Permit. The components are discussed individually in Comments 740 – 745. For the aspects of the proposed sediment/floodplain remedy that the Region has evaluated, the evaluation presented in its Comparative Analysis and Statement of Basis, including its conclusion that its proposed alternative (SED 9/FP 4 MOD) is best suited to meet the Permit's General Standards in consideration of the Selection Decision Factors, is inadequately supported and contrary to the overall evidence. Each of the Permit criteria, and deficiencies in EPA's evaluation of each criterion, are discussed individually in Comments 747 – 756.

EPA Response 737, 739, 746: As demonstrated more specifically in Responses 738, 740 – 745, and 747 - 756, EPA's evaluation of remedial alternatives and selection of remedial components was undertaken in accordance with the Permit criteria and is supported by the Administrative Record.

Comment 747: GE asserts the following about the consideration of overall protection of human health and the environment. EPA's comparison of remedial alternatives based on their overall protectiveness of human health and the environment constitutes a misapplication of that General Standard. The underlying conclusion that alternatives that address the largest volume of sediment and floodplain soil provide the highest level of human health and environmental protection is erroneous, because it fails to consider other factors that affect the overall protectiveness of a remedy – e.g., the long- and short-term adverse impacts of remedy implementation on health and

the environment, the effectiveness of other means of risk reduction including institutional controls, and the ability to achieve comparable health and environmental goals with smaller remedies (e.g., less removal).

EPA rejects capping without removal and thin-layer capping as not protective. In fact, capping without removal can be an appropriate and protective part of the remedy in the deeper portions of Woods Pond and Rising Pond, and thin-layer capping can be effectively used in quiescent impoundments (such as in Reaches 7 and 8) to accelerate natural recovery.

EPA refers to attainment of the federal and state water quality criteria in its discussion of protectiveness. While these criteria are pertinent to the discussion of ARARs, their attainment is not an appropriate measure for assessing protectiveness, since those criteria are not based on an assessment of risks at this Site and do not take into account the necessary balancing of adverse impacts with residual risks.

EPA erroneously indicates that the more a remedy relies on institutional controls over longer time frames and larger areas, the less protective it is. In fact, by disfavoring institutional controls, EPA favors additional removal with greater ecological impacts, which, in turn, is less protective of the environment.

Overall, while EPA acknowledges that the standard of overall protection "requires a balancing of the short-term and long-term adverse impacts of the alternatives with the benefits achieved by each alternative," it does not provide a supportable balancing. It fails to recognize that much less extensive removal alternatives than proposed (with less extensive adverse impacts) can provide protection of health; and it does not recognize or describe the serious adverse environmental impacts of its proposed alternative or the tenuous ecological benefits. Instead, EPA simply concludes that restoration of the affected habitats can be achieved and that short-term impacts can be successfully mitigated. Thus, contrary to EPA's assertions, the proposed alternative does not "provide the best overall protection of human health and the environment."

EPA Response 747: EPA disagrees with GE's specific assertions, its characterization of EPA's analyses, and its conclusions. Based in part on GE's evaluation in the Revised CMS, EPA performed a thorough comparative analysis of the alternatives with respect to Overall Protectiveness of Human Health and the Environment ("Overall Protectiveness"), analyzing the key tradeoffs among different alternatives. Section 2.2 of EPA's Comparative Analysis provides EPA's detailed evaluation of this criterion, analyzing the key tradeoffs among the different alternatives. In addition, EPA's analysis of the Overall Protectiveness of Human Health and the Environment is only part of EPA's overall evaluation of the Permit criteria, on which EPA based its determination of the selected remedy as best suited to meet the Permit's General Standards in consideration of the Permit's Selection Decision Factors, including a balancing of those factors against one another. The modifications to the remedy between the Draft Permit Modification and Final Permit Modification are relatively minor and would not alter the conclusions reached by EPA in its evaluation of Overall Protectiveness.

EPA agrees that EPA's Comparative Analysis states the standard "requires a balancing of the short-term and long-term adverse impacts of the alternatives with the benefits achieved by each alternative." In fact, as EPA states in the introductory paragraph of Section 2.2 of the

Comparative Analysis, "The evaluation of whether a particular remedial alternative would provide overall human health and environmental protection relies heavily on the evaluations under several other Permit criteria, including but not limited to the following: (1) attainment of IMPGs, (2) compliance with ARARs, (3) long-term reliability and effectiveness, and (4) short-term effectiveness." (EPA responds to specific comments on the other Permit criteria below in Responses 748-755).

GE includes only minimal discussion of the selected remedy's reduction in risks to human health or the environment, and similarly GE minimizes discussion of other benefits of the selected remedy. In particular, GE omits virtually any reference, evaluation or comparison of how each alternative attains the IMPGs, which are risk-based metrics of the protection of human health and the environment. In essence, GE focuses primarily on the adverse effects of the proposed remedy and ignores the quantifiable risk reduction and attainment of IMPGs.

With respect to GE's assertion that a review of ARARs such as the Water Quality Criteria are not relevant to Overall Protectiveness, EPA disagrees. For example, the Water Quality Criteria listed as ARARs are indeed risk-based. While they were not part of the site-specific risk assessments, they do apply, and are an indication of risk and of Overall Protectiveness. Nonetheless, even if the evaluation of Water Quality Criteria were not considered relevant to Overall Protectiveness, it would not affect EPA's comparative analysis of Overall Protectiveness (and of course, the Water Quality Criteria remain ARARs to be met or waived during the remediation).

With respect to institutional controls, GE is incorrect. The Draft and Final Permit Modifications each rely extensively on institutional controls and continuing obligations to address the PCB contamination that will remain in floodplain and sediment. See Final Permit Modification Sections II.B.2.j through k and II.B.6. Alternatively, a significantly more extensive remedy would have been required to meet unrestricted use standards and preclude the need for institutional controls. At the same time, as Response 225 in Section III.G explains further, "EPA agrees that institutional controls should not substitute for more active response measures that actually reduce, minimize, or eliminate contamination unless such measures are not practicable, as determined by the remedy selection criteria. … EPA believes, however, that institutional controls have a valid role in remediation … [and] are a necessary supplement when some waste is left in place." Preamble to the National Contingency Plan, 55 Fed. Reg. 8706 (1990). EPA has determined, through its analysis of Permit criteria, that other measures are practicable.

Lastly, in support of its conclusions on Overall Protectiveness, GE references specific topics that it has raised substantively elsewhere (such as capping without removal, thin-layer capping, habitat restoration, institutional controls, and the amount of PCB removal). EPA responds substantively to those comments where GE has raised the substantive comment. See Section III of this Response to Comments.

Comment 748: GE states as follows. In comparing remedial alternatives based on control of releases, EPA relies on several points, none of which supports its selection of SED 9/FP 4 MOD. First, it relies on reductions in the annual PCB mass passing Woods Pond and Rising Pond Dams. However, remedial alternatives with substantially less removal would result in comparable annual PCB loads passing Woods Pond and Rising Pond Dams.

Additionally, EPA states that its proposed alternative would "nearly double the solids trapping efficiency of Woods Pond," which it says is "a mechanism to reduce downstream migration of PCBs" and would reduce "the release of PCBs downstream" in the event of "a serious breach or failure of the dam." However, sediment trapping efficiency is not equivalent to PCB trapping efficiency, there is very little difference between the proposed alternative and the alternative of partial shallow dredging and full capping of Woods Pond in terms of PCB transport past the dams, and the modest increase in sediment trapping efficiency resulting from the proposed alternative would not translate to any reduction in risk. Further, the potential for a failure or serious breach of Woods Pond is not realistic due to GE's monitoring and maintenance of the dam.

EPA relies on releases due to extreme flood events, arguing that in reaches subject to thin-layer capping, the thin-layer cap would not adequately control releases in an extreme flood event. However, even though thin-layer caps are not designed to be isolation caps, the EPA model, which includes an extreme flood event (as well as numerous other high flow events of lesser magnitude), predicts that, in the Reach 7 and 8 impoundments, the thin-layer capping material would remain stable over most of the capped area even during such events, and would mix with the existing sediments, thus significantly accelerating the reduction in PCB concentrations.

EPA Response 748: EPA disagrees with GE's specific assertions, characterization of EPA's analyses, and its conclusions. Based in part on GE's evaluation in the Revised CMS, EPA performed a thorough comparative analysis of the alternatives with respect to Control of Sources of Releases, analyzing the key tradeoffs among different alternatives. That analysis is demonstrated in Section 2.3 of EPA's Comparative Analysis, pages 16-19. In addition, EPA's analysis of the Control of Sources of Releases is only part of EPA's overall evaluation of the Permit criteria, on which EPA based its determination of the selected remedy as best suited to meet the Permit's General Standards in consideration of the Permit's Selection Decision Factors, including a balancing of those factors against one another. The modifications to the remedy between the Draft Permit Modification and Final Permit Modification are relatively minor and would not alter the conclusions reached by EPA in its evaluation of Control of Sources of Releases.

In support of its conclusions on Control of Sources of Releases, GE references specific topics that it has raised substantively elsewhere (such as the PCB mass passing Woods Pond and Rising Pond Dams, the trapping efficiency of Woods Pond and Rising Pond, the likelihood of dam failure/breach, and thin-layer capping). EPA disagrees with GE's substantive assertions and responds substantively to those comments where GE has raised the substantive comment. For example, see Section III.C.3 for responses related to Woods Pond, Section III.C.4 for responses related to thin-layer capping/Reach 7 Impoundments and Section III.C.5 for responses related to Rising Pond.

Comment 749: GE asserts as follows. EPA's evaluation of ARARs for the various alternatives also fails to provide a justifiable basis for selecting SED 9/FP 4 MOD. EPA recognizes that none of the alternatives would achieve the federal and state water quality criterion of 0.000064 µg/L in Massachusetts, but asserts that its proposed alternative and several other large-scale removal alternatives "would likely restore water quality in significant segments of the river (greater than 50% of the impoundments) in Connecticut." That conclusion is not justified given the high

uncertainty in the model extrapolations to Connecticut, which prevents the drawing of fine distinctions among alternatives regarding achievement of specific PCB concentrations at these low levels.

The Region also claims that SED 9/FP 4 MOD "is the least damaging practicable alternative," as required by several location-specific ARARs, because "it uses a less intrusive method of sediment remediation and balances the extent of remediation with avoidance, minimization, and mitigation in locations designated by the Commonwealth of Massachusetts as sensitive areas." That claim is unfounded. First, SED 9/FP 4 MOD is not the least damaging practicable alternative, because there are practicable alternatives that would be protective and have less adverse ecological impacts. Second, the so-called "less intrusive method of sediment remediation" (which is apparently a reference to the remediation of Reach 5A sediments largely from within the river channel), if feasible, could be used with any alternative. Third, the proposed alternative has definitely not balanced the extent of remediation with avoidance, minimization, and mitigation in sensitive areas.

EPA cites [the Massachusetts Endangered Species Act, or] MESA and claims that it will require (unspecified) measures to avoid, minimize, or mitigate impacts to state-listed species, and that such measures will "limit the impact to an insignificant portion of the local populations of affected species," as required by the regulations. EPA provides no support for this assertion or counter-assessment to GE's detailed MESA analysis in the RCMS. Indeed, EPA states that "a final MESA evaluation will not be completed until the remedy design phase." EPA's unsupported conclusion is contrary to the evidence that, for at least nine state-listed species, the takes resulting from the proposed alternative would impact a significant portion of the local populations – which would preclude implementation of the remedy under the MESA regulations (unless they are waived as ARARs). EPA further states that it will "work with the Commonwealth" to "ensure that an adequate long-term net benefit plan for the affected state-listed species is designed and implemented." However, the requirement for such a plan does not come into play where the take would impact a significant portion of the local population (since such a take is prohibited altogether) and, in any event, does not constitute an ARAR under CERCLA and is unauthorized in this case as an effort to recover additional NRD.

Finally, EPA fails to mention that its proposed alternative would not meet specific provisions of several other ARARs as discussed in several other Specific Comments. Overall, EPA's discussion of ARARs does not provide a basis for selecting its proposed alternative over others.

EPA Response 749: Except as specified below in this Response, EPA disagrees with GE's specific assertions, characterization of EPA's analyses, and its conclusions. Based in part on GE's evaluation in the Revised CMS, EPA performed a thorough comparative analysis of the alternatives with respect to Compliance with Federal and State ARARs ("Compliance with ARARs"), analyzing the key tradeoffs among different alternatives. The analysis is demonstrated in Section 2.4 of EPA's Comparative Analysis, pages 19-20. In addition, EPA's analysis of the Compliance with ARARs is only part of EPA's overall evaluation of the Permit criteria, on which EPA based its determination of the selected remedy as best suited to meet the Permit's General Standards in consideration of the Permit's Selection Decision Factors, including a balancing of those factors against one another.

Note that based in part on GE's comments on the Draft Permit Modification, EPA has waived, or designated for potential waiver, three additional ARARs that had not been waived in the Draft Permit Modification. Specifically, EPA in this Final Permit Modification is waiving the Massachusetts Waterways regulation ARAR for dredging in an ACEC, and is potentially waiving the ARARs for temporary management of hazardous waste and solid waste in an ACEC during the cleanup. In addition, see EPA Response to Comments Section IV. Those changes, as well as other remedy modifications made for the Final Permit Modification, are not significant enough to alter the conclusions EPA reached in its Comparative Analysis evaluation of Compliance with ARARs.

In support of its conclusions on Compliance with ARARs, GE references specific topics that it has raised substantively elsewhere (such as compliance with the Water Quality Criteria in Connecticut, the determination as to the least damaging practicable alternative, and MESA) EPA responds substantively to those comments where GE has raised the substantive comment. See Section III.B.2 and Section IV of this Response to Comments.

In addition, EPA disagrees with GE's views regarding the less intrusive method of sediment remediation; EPA's proposal to use such a less intrusive method (i.e., remediation generally from within the river channel) is in fact one component of reducing damage of a practicable alternative. Moreover, even if that component could be used as a component of other alternatives, the combination of different elements in EPA's selected remedy to remediate the unacceptable risks while reducing any adverse effects of the remediation makes EPA's selected remedy the alternative that achieves the project purposes with the least damage to the ecological resources.

Finally, EPA disagrees with GE's discounting of the balancing EPA has performed in arriving at the selected remedy. The selected remedy properly balances the need for protection of human health and the environment and the extent of the remediation with the need for avoidance, minimization, and mitigation for state-listed species. EPA's approach is supported by the Commonwealth's Natural Heritage and Endangered Species Program (NHESP), which assisted EPA in developing the selected remedy's approach to avoid, minimize and mitigate effects on Core Areas. See NHESP's July 31, 2012 letter to EPA, which is Attachment B to the Final Permit Modification.

Comment 750: GE asserts as follows. Under the long-term reliability and effectiveness criterion, EPA's Comparative Analysis first discusses the magnitude of residual risk. That discussion focuses primarily on the reductions in fish fillet PCB concentrations resulting from the various alternatives. However, alternatives with substantially less removal than SED 9/FP 4 MOD could achieve comparable or nearly comparable reductions in fish fillet PCB concentrations. In addition, EPA relies on the extent to which the alternatives would achieve the direct-contact IMPGs in the floodplain and sediment EAs. However, even accepting EPA's PCB toxicity values and exposure assumptions, less extensive removal alternatives than SED 9/FP 4 MOD would achieve levels within EPA's acceptable cancer risk range and below an acceptable non-cancer hazard index for direct contact.

EPA next addresses the adequacy and reliability of the technologies involved, and in doing so makes a number of misstatements. First, EPA's blanket statement that thin-layer capping "is not

expected to be a reliable or effective component for this site fails to recognize the appropriateness of that technology for certain areas, such as the Reach 7 impoundments and Rising Pond. Second, EPA's assertion that "restoration is expected to be fully effective and reliable in returning [the affected] habitats, including vernal pool habitat, to their pre-remediation state," and that therefore "the likelihood of effective restoration is equal under any of the alternatives," is incorrect. Third, EPA's suggestion that institutional controls are unreliable and may not be effective is misguided since institutional controls can be an effective part of a remedy, and in this case, fish consumption advisories would need to remain in place in Massachusetts indefinitely under any alternatives to address future fish consumption.

EPA also addresses the long-term impacts of the alternatives on habitats and biota, but that discussion is unsupported and wrong in many respects. In contrast to the exhaustive assessment of habitat impacts in the RCMS, EPA has failed to quantify the impacts of SED 9/FP 4 MOD on any of the floodplain habitats, marking those as "TBD". Moreover, its qualitative discussion of the habitat impacts greatly underestimates the severity and duration of those impacts. The impacts of the RCMS alternatives on the various habitat types were described in detail in the RCMS, and the impacts of SED 9/FP 4 MOD on those habitats are discussed specifically in other comments. EPA's description plays down those impacts and asserts that, in any event, the impacts would all be short-term because restoration would be able to return all the habitats to their pre-remediation conditions and functions – which is untrue.

EPA stated, "There may be a temporary loss of woody debris and shade in Reaches 5A and 5B." In fact, such loss would be certain and long-lasting, since all mature trees on the riverbank and other floodplain areas subject to remediation would be removed, those on the riverbank would never be replaced, and those replanted in the floodplain would take at least 50 to 100 years to reach a mature condition.

EPA states, the impact of invasive species can be mitigated "via active control of invasive species." In fact, the large-scale removals that are part of SED 9/FP 4 MOD in both the river and floodplain, as well as the movement of vehicles and soil along the access roads and in the staging areas, would make the affected areas highly susceptible to colonization by invasive species in preference to native species; and in these circumstances, it would be very difficult, if not impossible, to adequately control the establishment and spread of the invasive species.

EPA states, "[P]roven techniques are available to provide adequate bank stabilization with minimal loss of this type of habitat." This is untrue as recognized by the Commonwealth and as discussed in other specific comments; even with the use of bioengineering techniques, the riverbank habitat loss from bank stabilization would last as long as the bank stabilization measures are in place.

EPA states, even though "it is not practical to replant large trees" on the banks, "normal growth will result in mature trees that overhang the river and essentially restore the vegetative character to its preremediation conditions." EPA does not and cannot explain how, if it is not practical to replant large trees on the banks, there could be a return of mature trees that overhang the river and re-establishment of pre-remediation vegetative conditions. In fact, that would not occur.

EPA states, "[O]ver time [stabilized riverbanks] are expected to" return to their current condition or level of function. In fact, as discussed above, the contrary is true; stabilized riverbanks will ***not*** return to their current condition or level of function.

EPA states that following the removal of mature trees from floodplain wetland forests, the replanted community "would progress as a maturing forest," and the relocation or loss of forest wildlife would be only "temporary" since their return "would be encouraged through proper restoration that reestablishes the functions of the ecosystem." As discussed in other specific comments, it would take at least 50 to 100 years for a replanted forested community to reach a mature condition comparable to current conditions – or potentially longer due to cumulative stresses from floods, changes in microclimate, changes in hydrology, and colonization by invasive species.

EPA states, "Implementation of effective restoration techniques would reestablish vernal pool functions that would allow sensitive vernal pool species . . . to return to the vernal pools following completion of remediation." As discussed in other specific comments and as recognized by the Commonwealth, it is erroneous to conclude that implementation of restoration methods would re-establish vernal pool conditions and functions. The evidence demonstrates that vernal pool creation or re-creation has a very low success rate and that, in most cases, vernal pool functions cannot be adequately replaced.

EPA states that restoration methods "will reestablish functions and values and minimize the potential for long-term negative impacts from the remediation." Once again, this blanket statement is incorrect.

In addition, EPA has failed to adequately evaluate the impacts of SED 9/FP 4 MOD on state-listed species. It has made no estimate of the number of such species that would be affected by that alternative or provided any substantive response to GE's MESA analysis in the RCMS. Rather, it simply suggests that use of the Core Area concept would ameliorate those impacts. As discussed in other specific comments, although the Core Area concept may reduce the impacts on such species to some degree, it would not prevent substantial adverse impacts of SED 9/FP 4 MOD on numerous state-listed species.

EPA Response 750: EPA disagrees with GE's specific assertions, characterization of EPA's analyses, and its conclusions. Based in part on GE's evaluation in the Revised CMS, EPA performed a thorough comparative analysis of the alternatives with respect to Long-Term Reliability and Effectiveness, analyzing the key tradeoffs among different alternatives. EPA's analysis is demonstrated in Section 2.5 of EPA's Comparative Analysis, pages 20-35. In addition, EPA's analysis of Long-Term Reliability and Effectiveness is only part of EPA's overall evaluation of the Permit criteria, on which EPA based its determination of the selected remedy as best suited to meet the Permit's General Standards in consideration of the Permit's Selection Decision Factors, including a balancing of those factors against one another. The remedy modifications made by EPA from the Draft Permit Modification to the Final Permit Modification are not significant enough to alter the conclusions EPA reached in its Comparative Analysis evaluation of Long-Term Reliability and Effectiveness.

To make its assertions on Long-Term Reliability and Effectiveness, GE references specific topics that it has raised substantively elsewhere (including fish consumption risks, the direct contact Interim Media Protection Goals (IMPGs), thin-layer capping (TLC), habitat restoration, bank stabilization, trees, Vernal Pools, reestablishing functions and values, and the Core Area concept). EPA responds substantively to those comments where GE has raised the substantive comment. For example, see Section III.B.2 for responses related to habitat restoration (including trees and invasive species), Section II.F for responses related to direct contact IMPGs; Section III.C.4 for responses related to thin-layer capping/Reach 7 Impoundments; Section III.G for responses related to Institutional Controls; and Section III.B.2 for responses related to MESA.

Comment 751: GE asserts as follows. EPA's discussion of IMPG attainment for the remedial alternatives is taken largely from the RCMS with the addition of an evaluation of SED 9/FP 4 MOD for some, but not all, IMPGs. For the human health IMPGs based on direct contact, EPA notes that, for the floodplain EAs, SED 9/FP 4 MOD would achieve the IMPGs based on a "human health risk target of $1x10^{-5}$ or $1x10^{-4}$ for RME receptors (depending on the impact to core habitat areas . . .), or an HI of 1." As discussed in other specific comments, alternatives with considerably less floodplain removal could likewise achieve the RME IMPGs based on either a $1x10^{-5}$ or $1x10^{-4}$ cancer risk and a non-cancer HI of 1 in all floodplain EAs. For direct contact with sediments, EPA recognizes that numerous remedial alternatives, including some with considerably less removal than SED 9/FP 4 MOD, would achieve the RME IMPGs based on a $1x10^{-5}$ cancer risk and a non-cancer HI of 1 in less than 10 years.

For the human health IMPGs based on fish consumption, EPA recognizes that none of the remedial alternatives would achieve the RME IMPGs in the Massachusetts portion of the River within the model projection period (over 50 years), and so it relies on attainment of the probabilistic CTE IMPG based on a non-cancer HI of 1 for adults. Various alternatives with much less sediment removal would likewise achieve that IMPG.

With respect to the ecological IMPGs, EPA relies mainly on the analyses presented in the RCMS for the alternatives evaluated there, and so GE's assessment in the RCMS would apply to those alternatives. For SED 9/FP 4 MOD, EPA has estimated IMPG achievement for several receptor groups (namely, benthic invertebrates, fish, piscivorous birds, and threatened and endangered species). For these receptors, alternative remedies that involve capping of surface sediments and less removal would achieve comparable attainment. For the remaining receptor groups, EPA has not estimated IMPG attainment for SED 9/FP 4 MOD, and thus does not have a supportable basis for favoring that alternative under this criterion. EPA does assert that, for amphibians, its vernal pools approach "will ensure that remediation of vernal pools will not result in more harmful impacts than the current exposure to PCBs." As discussed in other specific comments, that is incorrect, EPA states that SED 9/FP 4 MOD would protect those receptors by substantially reducing PCB concentrations in the sediments and soils that are the source of the PCBs in their aquatic and terrestrial dietary components. However, less extensive removal alternatives would do the same.

In any event, as the Commonwealth has noted, any effort to achieve the ecological IMPGs would be far outweighed by the inevitable ecological damage to the unique ecosystem in the PSA that would result from such an effort. In summary, the IMPG attainment factor does not provide a justifiable basis for favoring EPA's proposed alternative.

EPA Response 751: Except as specified below in this Response, EPA disagrees with GE's specific assertions, characterization of EPA's analyses, and its conclusions. Based in part on GE's evaluation in the Revised CMS, EPA performed a thorough comparative analysis of the alternatives with respect to Attainment of IMPGs, analyzing the key tradeoffs among different alternatives. EPA's analysis is demonstrated in Section 2.6 of EPA's Comparative Analysis, pages 35-44. In addition, EPA's analysis of Attainment of IMPGs is only part of EPA's overall evaluation of the Permit criteria, on which EPA based its determination of the selected remedy as best suited to meet the Permit's General Standards in consideration of the Permit's Selection Decision Factors, including a balancing of those factors against one another. The remedy modifications made by EPA from the Draft Permit Modification to the Final Permit Modification are not significant enough to alter the conclusions EPA reached in its Comparative Analysis evaluation of Attainment of IMPGs.

To make its assertions on Attainment of IMPGs, GE references specific topics that it has raised substantively elsewhere (including the direct contact IMPGs, fish consumption IMPGs, ecological IMPGs, purported impacts of attempting to meet ecological IMPGs). EPA responds substantively to those comments where GE has raised the substantive comment. For example, see Section II.F for responses related to direct contact IMPGs and ecological impacts, and Section III.B.2 for responses related to ecological IMPGs.

Also, in response to GE's assertions about Vernal Pools, EPA, based in part on GE's comments, has revised the approach for remediating Vernal Pools so that the first option for remediation is the application of a sediment amendment, such as activated carbon. Use of a sediment amendment is less intrusive than sediment excavation in Vernal Pools, and would have fewer potential impacts. The Final Permit Modification provides for excavation of Vernal Pools only if EPA determines that the placement of the sediment amendment cannot meet the relevant Performance Standard.

Additionally, GE characterizes incorrectly the Commonwealth's position. Based on its recent statements, the Commonwealth is clearly in support of the EPA remedy. As the Commonwealth stated in its 2014 comments on the Draft Permit Modification, "the Commonwealth supports EPA's Proposed Cleanup Plan for Rest of River. … [T]he Proposed Cleanup Plan is protective of human health while employing a remediation framework developed in consultation with the Commonwealth and the State of Connecticut that is directed at preserving the dynamic character of the river ecosystem and avoiding, minimizing and mitigating remedy impacts to the affected wildlife and their habitats, with a particular focus on protecting state-listed species." In its letter endorsing the Proposed Cleanup Plan, the Commonwealth also explained in detail the differences from their 2011 comments, which GE references, to the current remedy.

> The Commonwealth's 2011 comments to EPA on the Revised CMS outlined a conceptual remediation approach that emphasized the need to carefully consider the potential impacts of the remediation on the Rest of River ecosystem when identifying and evaluating remedy alternatives. Comments by the State of Connecticut also underscored the value and importance of having EPA consult closely with the two affected states in the Rest of River remedy selection process.

> Later in 2011, EPA invited both states to actively participate in a series of technical discussions with EPA that focused on educating each other on interests and concerns of the respective parties, and identifying shared remediation goals, priorities and processes, including as they relate to minimizing the impacts of potential remediation approaches on this unique Housatonic River ecosystem. An important milestone in this ongoing consultative process was EPA's issuance of its Status Report to the public in May 2012 entitled, "Potential Remediation Approaches to the GE Pittsfield/Housatonic River Site 'Rest of River' PCB Contamination." The Status Report outlined a conceptual framework for the remediation of Reach 5 river bed and banks, Woods Pond, downstream Impoundments in Reaches 7 and 8, the floodplain and Vernal Pools, Backwaters and called for the off-site disposal of contaminated soil and sediments. At that time, the Commonwealth expressed its support for the Status Report remedy because it was reasonably responsive to our interests and concerns about the need for a more balanced approach to designing and implementing a remedy for the Rest of River ecosystem.
>
> EPA subsequently discussed the Status Report remedy with GE during 2013, while continuing to seek the input of the Commonwealth and the State of Connecticut during EPA's development of its draft Statement of Basis and Draft Reissued RCRA Permit based on the Status Report. The latter consultations with the two states also resulted in refinements and clarifications to the proposed remediation approach to Rest of River consistent with the Status Report.

October 27, 2014, Commonwealth of Massachusetts Comments on EPA's Proposed Cleanup Plan for Rest of River (June 2014).

These comments from the Commonwealth clearly demonstrate Massachusetts' support for the proposed remedy, as opposed to GE's characterization.

Comment 752: GE asserts as follows. In discussing the reduction of toxicity, mobility, or volume of wastes, EPA claims that SED 9/FP 4 MOD "surpasses all other alternatives" in reducing PCB toxicity and mobility because it would involve the application of [activated carbon, or] AC. That claim is disingenuous. The idea of adding AC was not raised until after the RCMS was submitted. To the extent that application of AC is warranted, after pilot testing, in certain areas (e.g., portions of Reach 5B and the backwaters) that are not subject to removal/capping, it could be implemented as part of any alternative and thus does not provide a basis for selecting SED 9/FP 4 MOD.

EPA also relies on the fact that, by deepening Woods Pond, SED 9/FP 4 MOD would increase the solids trapping efficiency of the Pond. However, solids trapping efficiency is not equivalent to PCB trapping efficiency, and the deepening of Woods Pond in SED 9/FP 4 MOD would have very little effect in reducing downstream PCB transport and would not result in any reduction in risks.

EPA Response 752: Except as specified below in this Response, EPA disagrees with GE's specific assertions, characterization of EPA's analyses, and its conclusions. Based in part on GE's evaluation in the Revised CMS, EPA performed a thorough comparative analysis of the

alternatives with respect to Reduction of Toxicity, Mobility or Volume of Wastes, analyzing the key tradeoffs among different alternatives. EPA's analysis is demonstrated in Section 2.7 of EPA's Comparative Analysis, pages 44-46. In addition, EPA's analysis of Reduction of Toxicity, Mobility or Volume of Wastes is only part of EPA's overall evaluation of the Permit criteria, on which EPA based its determination of the selected remedy as best suited to meet the Permit's General Standards in consideration of the Permit's Selection Decision Factors, including a balancing of those factors against one another. The remedy modifications made by EPA from the Draft Permit Modification to the Final Permit Modification are not significant enough to alter the conclusions EPA reached in its Comparative Analysis evaluation of Reduction of Toxicity, Mobility or Volume of Wastes.

To make its assertions on Reduction of Toxicity, Mobility or Volume of Wastes, GE references a specific topic that it has raised substantively elsewhere (trapping efficiency of Woods Pond). EPA responds substantively to that comment where GE has raised the substantive comment. See responses in Section III.C.3 for issues related to the trapping efficiency for Woods Pond.

Additionally, GE is accurate in that the alternative, and its use of a sediment amendment like activated carbon, was added after EPA's series of technical discussions with Massachusetts and Connecticut. The use of a sediment amendment like activated carbon is part of the overall balanced approach of EPA, Massachusetts and Connecticut to address the unacceptable threats posed by the PCB contamination, while also taking steps to avoid, minimize and mitigate effects on the ecosystem. Notwithstanding the timing, the overall Comparative Analysis point is still valid that this treatment approach is not part of the other alternatives considered and in fact surpasses all other alternatives in reducing PCB toxicity and mobility. Contrary to GE's assertion, application of a sediment amendment may not be appropriate for all reaches of the River. The effectiveness of the amendment depends on a variety of factors including contaminant concentrations and distribution, substrate composition, and flow velocity.

Comment 753: GE states as follows. Short-term effectiveness includes consideration of the adverse impacts from remedial construction activities on the environment, the local community, and remediation workers. With respect to environmental impacts, EPA first addresses the potential that sediment removal activities would cause some resuspension of PCB-containing sediments into the water column and consequent increases in PCB levels in downstream surface water and aquatic biota. As EPA recognizes, the alternatives with the greater amounts of sediment removal, including SED 9/FP 4 MOD, would result in the most PCB resuspension.

EPA also addresses the adverse short-term impacts of the remediation activities on the various aquatic and terrestrial habitats. In virtually every case, EPA downplays these impacts by claiming that many of the impacts "can be mitigated by appropriate restoration activities." This conclusion cannot be supported. Due to its extensive remediation requirements and substantial habitat impacts, SED 9/FP 4 MOD would have more severe, long-lasting, and irreparable negative impacts on aquatic, riverbank, and floodplain habitats and the biota that inhabit them than alternatives with less extensive remediation.

In discussing the GHG emissions that would result from the various alternatives, EPA uses GE's estimates from the RCMS for the alternatives evaluated therein and has developed its own GHG estimates for SED 9/FP 4 MOD. EPA's estimate for the latter alternative (a total of 171,000

tonnes) is consistent with GE's estimate (a total of 170,000 tonnes). As shown by these estimates, SED 9/FP 4 MOD would result in greater GHG emissions than all but two of the other alternatives evaluated.

EPA also notes that all alternatives would involve an increase in truck traffic, with its attendant impacts. To address this factor, EPA compares the total number of truck trips for removal of excavated material and delivery of capping/backfill material, using GE's estimates from the RCMS for the alternatives evaluated therein and EPA's own estimates for SED 9/FP 4 MOD. EPA's estimates for SED 9/FP 4 MOD – a total of 150,500 truck trips or about 11,200 per year – are roughly comparable to GE's estimates for that alternative using the same assumptions, although GE's estimates are slightly higher – a total of approximately 155,000 truck trips (about 11,900 per year). This large number of truck trips exceeds those for most other alternatives and would cause considerable disruption to the affected communities, including increases in the likelihood of accidents, noise levels, vehicle emissions, and nuisance dust.

EPA compares the risk of accident-related injuries due to the increased off-site truck traffic, again using GE's estimates from the RCMS and EPA's own estimates for SED 9/FP 4 MOD. Those estimates indicate that the proposed alternative would result in 5.36 non-fatal injuries and 0.25 fatality over the life of the project. This is more than would result from most other alternatives.

EPA compares the risk of accident-related injuries to remediation workers, again using GE's estimates from the RCMS and EPA's own estimates for SED 9/FP 4 MOD. Those estimates indicate that the proposed alternative would result in 9.2 non-fatal worker injuries and 0.1 fatality over the life of the project. This is higher than the estimates for alternatives with many fewer labor-hours, lower than those with many more labor-hours, and comparable to other alternatives.

Overall, SED 9/FP4 MOD would have greater adverse short-term impacts than most of the other alternatives, including all of those with less extensive remediation.

EPA Response 753: EPA disagrees with GE's characterization of EPA's Comparative Analysis. EPA did take into account the estimates of adverse effects in the Short-Term Effectiveness criterion as part of EPA's remedy selection. GE recites the metrics of adverse effects of cleanup activities, but does not place those metrics in context. Of the seven alternatives with active remediation, the selected remedy, for most metrics, has more adverse effects than four alternatives, fewer effects than two alternatives, and in absolute terms, has roughly one-third the adverse effects of the alternative with the most PCB excavation.

Based in part on GE's evaluation in the Revised CMS, EPA performed a thorough comparative analysis of the alternatives with respect to Short-Term Effectiveness, analyzing the key tradeoffs among different alternatives. EPA's analysis is demonstrated in Section 2.8 of EPA's Comparative Analysis, pages 47-55. Also, importantly, GE did not point out that EPA's analysis of each sub-criterion within the Short-Term Effectiveness criterion is only part of EPA's overall evaluation of the Permit criteria, on which EPA based its determination of the selected remedy as best suited to meet the Permit's General Standards in consideration of the Permit's Selection Decision Factors, including a balancing of those factors against one another.

The remedy modifications made by EPA from the Draft Permit Modification to the Final Permit Modification are not significant enough to alter the conclusions EPA reached in its Comparative Analysis evaluation of Short-Term Effectiveness.

To make its assertions on Short-Term Effectiveness, GE references habitat restoration, a specific topic that it has raised substantively elsewhere. EPA responds substantively to that comment where GE has raised the substantive comment. For example, see Section III.B.2 for responses related to habitat restoration. Also see Responses related to truck traffic, accidents, and greenhouse gases in Section IX.

Comment 754: GE asserts as follows. In its discussion of implementability, EPA repeats a number of assertions that are erroneous. These include statements that "[r]estoration can reliably reestablish pre- remediation conditions for these [affected] habitats over the timeframes of the various alternatives," and that, "although thin-layer capping has been used at other sites, it is not expected to be a reliable or effective component for this site."

EPA also states that "[n]o regulatory restrictions are known that would affect the implementability of any of the alternatives under evaluation." However, EPA contends elsewhere that regulatory restrictions, notably the prohibition on location of waste facilities within an [Area of Critical Environmental Concern], would constitute an obstacle to the implementability of on-site disposal at two of the three identified sites. EPA fails to acknowledge that the prohibitions on certain activities within an ACEC would also apply to EPA's proposed alternative. Specifically, the state regulatory prohibition on siting a hazardous or solid waste facility in an ACEC would apply to the staging areas and rail loading facility under the proposed alternative, and the state regulatory prohibition on dredging in an ACEC would likewise apply to that alternative. Overall, there are no implementability issues that would favor SED 9/FP 4 MOD over other alternatives.

EPA Response 754: Except as specified below in this Response, EPA disagrees with GE's specific assertions, characterization of EPA's analyses, and its conclusions. Based in part on GE's evaluation in the Revised CMS, EPA performed a thorough comparative analysis of the alternatives with respect to Implementability, analyzing the key tradeoffs among different alternatives. EPA's analysis is demonstrated in Section 2.9 of EPA's Comparative Analysis, pages 56-58. In addition, EPA's analysis of each sub-criterion within the Implementability criterion is only part of EPA's overall evaluation of the Permit criteria, on which EPA based its determination of the selected remedy as best suited to meet the Permit's General Standards in consideration of the Permit's Selection Decision Factors, including a balancing of those factors against one another. The remedy modifications made by EPA from the Draft Permit Modification to the Final Permit Modification are not significant enough to alter the conclusions EPA reached in its Comparative Analysis evaluation of Implementability.

To make its assertions on Implementability, GE references specific topics that it has raised substantively elsewhere (e.g., habitat restoration and thin-layer capping). EPA responds substantively to those comments where GE has raised the substantive comments. For example, see Section III.B.2 for responses related to habitat restoration and Section III.C.4 for responses related to thin-layer capping/Reach 7 Impoundments. Additionally, based on this comment and others received, EPA, in the Final Permit Modification, has modified its determinations

regarding ARAR compliance in the ACEC. Specifically, EPA in this Final Permit Modification is waiving the Massachusetts Waterways regulation ARAR for dredging in an ACEC, and is potentially waiving the ARARs for temporary management of hazardous waste and solid waste in an ACEC during the cleanup. In addition, see EPA Response to Comments Section IV. The modifications to the remedy between the Draft Permit Modification and Final Permit Modification are relatively minor and would not alter the conclusions reached by EPA in its evaluation of Implementability.

Comment 755: GE asserts as follows. EPA has presented cost estimates for the sediment/floodplain remediation alternatives, excluding the estimated costs for treatment and/or disposition (TD) of the removed material (which are discussed separately). For all alternatives except SED 9/FP 4 MOD, EPA's cost estimates are based on GE's cost estimates in the RCMS, although EPA states that it "generally believes that GE may have under-estimated all costs.". EPA provides no support whatsoever for that assertion. GE has made its best estimate of the costs of each alternative, using cost estimating methodologies that were discussed with EPA without its objection and providing detailed backup in the RCMS; it has no way to evaluate EPA's unsupported claim that GE "may have under-estimated all costs."

For SED 9/FP 4 MOD, EPA made its own estimate – which is $326 million for the sediment and floodplain remediation excluding TD. GE's estimate for that remediation, again excluding TD, is $364 million. With off-site disposal (as required by EPA's proposal), GE's cost estimate for the proposed alternative is $678 million (with transport by rail) or $732 million (with transport by truck). As discussed in other specific comments, the substantial incremental costs of that alternative compared to less extensive alternatives are not proportional to or justified by the minimal incremental benefits, and thus SED 9/FP 4 MOD is not cost-effective.

EPA Response 755: EPA disagrees with GE's specific assertions, characterization of EPA's analyses, and its erroneous conclusions. Based in part on GE's evaluation in the Revised CMS, EPA performed a thorough comparative analysis of the alternatives with respect to cost, analyzing the key tradeoffs among different alternatives. EPA's analysis is demonstrated in Section 2.10 of EPA's Comparative Analysis, pages 58-59. In addition, EPA's analysis of the Cost criterion is only part of EPA's overall evaluation of the Permit criteria, on which EPA based its determination of the selected remedy as best suited to meet the Permit's General Standards in consideration of the Permit's Selection Decision Factors, including a balancing of those factors against one another.

For comparative analysis purposes, the cost estimates are used to compare different alternatives against each other. For the sediment/floodplain alternatives, the EPA and GE estimates ($326 million and $364 million, respectively), are roughly comparable to each other, and the differences between them are relatively small when viewed in comparison to the other sediment/floodplain alternatives. In fact, moreover, both estimates reinforce that the estimated remedy costs of the selected remedy are squarely in the mid-range of costs for different remediation alternatives. In terms of total cost, out of the eight alternatives reviewed, the selected remedy is less expensive than three, and more expensive than four alternatives; based on Present Worth, the selected remedy is less expensive than four alternatives and more expensive than three alternatives. See Comparative Analysis, Table 22 at page 59. Consequently, in terms of the Comparative Analysis, the relatively minor differences in cost would not significantly

affect the outcome of the comparative analysis within the cost criterion, or in the overall evaluation of the Permit criteria. In addition, the remedy modifications made by EPA from the Draft Permit Modification to the Final Permit Modification are not significant enough to alter the conclusions EPA reached in its Comparative Analysis evaluation of cost.

See Section III.F.2 for an explanation of the differences in cost estimated for treatment/disposal alternatives.

Comment 756: GE states as follows. For the reasons discussed in Specific Comments 746 - 755, EPA's overall conclusion that "SED 9/FP 4 MOD is best suited to meet the General Standards in consideration of the Selection Decision Factors" is not supportable and is thus arbitrary and capricious.

EPA Response 756: EPA disagrees with GE. EPA, upon evaluation of the comments received on the Draft Permit Modification, has determined that the selected remedy in the Final Permit Modification is best suited to meet the General Standards in consideration of the Selection Decision Factors, including a balancing of those factors against one another.

Comment 759: GE asserts the following: Under the process established by the CD and the Permit, the CMS Report was intended to serve as the primary basis for EPA's remedy proposal. The Permit imposes detailed requirements for the CMS Report, including the specification of detailed information that must be provided and specific criteria that must be evaluated for each remedial alternative (Permit Special Condition II.G). Further, the Permit requires that EPA approve, conditionally approve, or disapprove the CMS Report prior to the remedy proposal (Permit Special Condition II.H), and the CD requires that EPA will issue a remedy proposal only upon "satisfactory completion of the CMS Report" in accordance with the Permit (CD ¶ 22.n). In addition, the Permit and the CD provide GE with the right to administrative dispute resolution to challenge any EPA decision on the CMS Report (Permit Special Condition II.N; CD ¶ 141.a). These provisions all demonstrate that the information and evaluations provided in the CMS Report were intended to serve as the primary foundation for EPA's remedy proposal; they would have little meaning if EPA could simply put the CMS Report on the shelf and base its remedy proposal on its own separate evaluations. This does not mean that EPA must agree with the conclusions and recommendations in the CMS Report, but it does mean that the information and evaluations in that report (after any administrative dispute resolution) are to provide the necessary foundation for the remedy proposal.

In this case, as discussed above, GE prepared a detailed CMS Report and (in response to EPA's comments) an even more detailed Revised CMS Report (RCMS), as well as various ancillary reports required by EPA. However, in its January 17, 2014 letter on the RCMS, which was styled as a "conditional approval," EPA simply stated that it "does not necessarily agree" with the assertions, analyses, conclusions, or recommendations in the RCMS. It did not specify which ones it disagreed with, did not require revision of that report, and did not modify the report. As a result, the RCMS was not used as the basis for the remedy proposal, as required by the Permit and the CD. In addition, EPA's action deprived GE of its right under the Permit and the CD to administrative dispute resolution on the substance of EPA's determination on the RCMS, because EPA provided no substantive determinations for GE to dispute.

Instead, EPA developed its own proposed remedy, which is different from any of the RCMS alternatives. In doing so, EPA developed and relied upon many types of fundamental information and evaluations that it and/or the Permit required GE to include in the RCMS, but that are not, for the proposed remedy, included in the RCMS. These include a detailed description of alternative SED 9/FP 4 MOD, an evaluation of that alternative under the Permit criteria, and a description and evaluation of the off-site rail transport option (TD 1 RR).

EPA Response 759: EPA disagrees with GE's contentions on several bases. First, the Revised CMS is indeed a significant piece of the information used to propose and select the remedy. As can be seen from the references to the Revised CMS in EPA's Comparative Analysis and in the 2014 Statement of Basis supporting the Draft Permit Modification, the Revised CMS has been a significant factor. In fact, the Comparative Analysis and its attachments include approximately 60 separate references to the Revised CMS, and the Statement of Basis also includes multiple references.

Second, however, the Permit process dictates that other significant pieces of information also be evaluated in addition to the Revised CMS. As discussed in Section II.A of this Response to Comments and as stated in the Permit, EPA is to select the remedy "[b]ased on the information that the Permittee [GE] submits pursuant to this Permit and any other relevant information in the Administrative Record for the modification of this Permit . . ." (emphasis added). Clearly the Permit contemplates that EPA would not base its remedy evaluation and selection solely on the Revised CMS.

For example, to fulfill its responsibility to evaluate the alternatives in light of the nine Permit criteria, EPA prepared a thorough, detailed Comparative Analysis, which is in the Administrative Record. Moreover, the Permit issuance regulations at 40 C.F.R. Part 124 provide for EPA to prepare a Statement of Basis to briefly describe the derivation of the conditions of the draft permit and the reasons for them. See 40 C.F.R. § 124.7. EPA submitted the Statement of Basis for public review along with the Draft Permit Modification, and it is in the Administrative Record.

Additionally, EPA disagrees with GE's characterization of issuance of EPA's January 17, 2014 conditional approval of GE's Revised CMS. This EPA conditional approval was consistent with the requirements in Section II.H of the Permit, which states that "after the Permittee [GE] submits the CMS Report, EPA will either approve, conditionally approve or disapprove the Report." GE elected not to exercise its right in the Decree and the Permit to dispute this conditional approval letter. See Section XXIV of the Decree and Section II.N. of the Permit.

Finally, GE's characterization of the proposed remedy as newly created by EPA neglects to take into account how much of the proposed remedy is in fact based on the components of remedy alternatives that were in fact evaluated in the Revised CMS. SED 9 refers to Sediment Alternative 9, which was described and evaluated in Section 6.9 of GE's Revised CMS. FP 4 refers to Floodplain Alternative 4, which was described and evaluated in Section 7.4 of GE's Revised CMS. FP4 MOD includes the modification to address concerns raised by GE and the Commonwealth of Massachusetts in 2011 that alternatives could cause negative impacts on habitat for threatened and endangered species. In light of GE's and Massachusetts's concerns, EPA and Massachusetts developed a modified approach that includes, consistent with GE's

concerns, significantly less PCB contaminant removal in particular Core Areas for threatened and endangered species.

Overall, a large portion of the proposed remedy was in fact evaluated in GE's Revised CMS, and the parts that were not, were developed consistent with concerns that were raised following submittal of the Revised CMS.

Comment 760: GE asserts the following: In addition to the issues discussed in Comment 759, EPA has failed to provide in its remedy proposal package certain information and evaluations that it required GE to include in the RCMS and that are critical to the outcome. These include the following:

- EPA's September 9, 2008 comments on GE's initial CMS Report, as well as its January 15, 2010 conditional approval letter for GE's proposal to evaluate additional remedial alternatives, required that the RCMS present comprehensive MESA analyses, including evaluations of the impact of each alternative on state-listed species and habitats, how each alternative would comply with the MESA regulations, and the procedures to be followed to minimize adverse effects to state-listed species. As in other specific comments, EPA has not correctly described the MESA regulations and has conducted no assessment of the impacts of its proposed remedy on the state-listed species in the area.

- The Permit requires consideration of the long-term and short-term adverse habitat impacts of the alternatives, and EPA's September 9, 2008 letter required GE to give more consideration to measures to avoid, minimize, or mitigate those impacts. Yet EPA has not attempted to quantify the impacts of its proposed alternative on any of the specific floodplain habitat types.

- EPA's September 2008 comments required that the RCMS include a detailed description of the restoration requirements, including process and methods, for each alternative, including an illustration of how they would apply to certain example areas. As discussed in other specific comments, EPA's discussion of restoration is cursory and inadequate and does not include a discussion of any example areas.

- EPA's September 2008 comments required that the RCMS include the assumptions regarding staging areas, access roads, and infrastructure. EPA has not provided such assumptions for its proposed remedy.

- EPA September 2008 comments required that the RCMS provide a thorough description of the operation, maintenance, and monitoring (OM&M) requirements for each alternative. EPA has not provided such a description for its proposed remedy.

- EPA's September 2008 comments required that the RCMS provide a detailed analysis of riverbank stabilization methods, which must include areas, slopes, and bank height used to estimate the bank component of the remedy. Because EPA has not selected the locations for the bank remediation component of its proposed remedy, it has not provided this information. In addition, those comments required that the RCMS include information on short- and long-term bank alteration and its effects on obligate bank species, as well as information on

alternate approaches to eliminate or reduce negative effects on those species. EPA has not provided such an analysis.

- EPA's September 2008 comments required that the RCMS describe how work in vernal pools could avoid impacts to the species indigenous to those pools. As discussed in other specific comments, EPA has not done that (and could not do so, because work in vernal pools could not avoid such impacts).

- EPA's September 2008 comments required that the RCMS identify locations for off-site disposal of excavated material. EPA has not done that either.

In summary, by developing and issuing a proposed remedy that is different from the RCMS alternatives and not based on the RCMS without modifying or requiring a modification of the RCMS – or at least specifying the changes that would make the RCMS approved and conducting the necessary evaluations – EPA acted contrary to the Permit and the CD.

EPA Response 760: EPA disagrees with GE. EPA acted in accordance with the Decree and Permit in developing and issuing the proposed remedy, and in conditionally approving GE's Revised CMS.

First, as described more fully in Response 759, GE has neglected to point out how much of the proposed remedy in fact is based on the components of the remedy alternatives, which GE itself evaluated in the Revised CMS.

Second, it was entirely reasonable for EPA to evaluate the Revised CMS and to conditionally approve it, as EPA did in January 2014. The Permit provides for conditional approval as one of the EPA responses to a GE submittal under the Permit.

Third, EPA was also reasonable in determining the amount of information to provide in its remedy proposal package. EPA's remedy proposal package included the Draft Permit Modification and the Statement of Basis, as well as other information supporting that package in the Administrative Record, including the Comparative Analysis. In developing the remedy proposal, EPA considered the information submitted by GE in response to EPA's letters referenced in GE's comment, and the information, including the information provided by GE on each of the bulleted items in its comment, was available for public review as part of the Administrative Record along with other CMS-related documents. EPA's judgments are consistent with the Permit, Decree and permit proposal regulations at 40 C.F.R. Part 124, and included sharing an Administrative Record of information on which the public could provide comments. Moreover, it was fair of EPA to include in its remedy proposal other information beyond the Revised CMS that was relevant to the remedy proposal. (As the Permit provides, EPA is to select the remedy, "[b]ased on the information that the Permittee [GE] submits pursuant to this Permit and any other relevant information in the Administrative Record for the modification of this Permit …". Permit, Section II.J.)

Comments 310, 341: One commenter suggested that GE must listen to local environmental groups who have spent substantial time studying this issue, while other commenters thought the citizens of Pittsfield are the real "stakeholders" in the proposed cleanup project and should have

a significant say in creating and approving a cleanup plan that is practical, fair, and preserves the river's ecosystem.

EPA Response 310, 341: EPA considered input and comments from environmental groups, the residents of Pittsfield, and all other stakeholders prior to issuing both the Draft and Final Permit Modification as well as at numerous other stages in the Rest of River process. During the design of the remedy, EPA will continue to solicit the public's views on GE's work plans. EPA's direction to GE on the remedy will take into account information EPA receives from the public. See EPA's Responses on State and community involvement at Section VIII of this Response to Comments.

II.C Comments in Support of the Remedy

II.C.1 Supporting Comments from State Government

Comments 21, 50: Joseph Larson, an emeritus professor of environmental conservation at the University of Massachusetts, Amherst, speaking on behalf of the Massachusetts Fisheries and Wildlife board, asserted the following:

The Division of Fisheries and Wildlife, which is supervised by our Board, is the largest landowner in the affected area of the Housatonic. The land and wetlands in our care were acquired by gift or purchase for donors and funds, where the expectation, backed by our pledge, is that these areas would be preserved in perpetuity for their natural and recreational values. They are officially recognized by the state and other authorities for its unique and rich natural resources. It is also an area that is highly valued for outdoor recreation by residents of Massachusetts. It annually attracts people from across the state and from other states in the nation.

Our Board recognizes that the PCB contamination poses a public health risk that must be addressed. We have provided extensive assistance to the EPA in the form of division staff time, field studies, and scientific analysis. We are also aware that there is no silver bullet solution that applies to every area that is contaminated with PCBs. Each area in the nation where PCB contamination exists has required the development of a unique approach that cannot be simply copied for any other contaminated area.

The remediation plan, including mass removal of PCBs from Woods Pond, presented by EPA, has been crafted to responsibly address public health risks while at the same time responsibly maintaining as much as possible of the natural and recreational values of this section of the Housatonic. It's been a difficult balancing act, but it is a Housatonic plan, and it has our full support.

EPA Response 21, 50: EPA acknowledges the support from the Massachusetts Fisheries and Wildlife Board.

Comment 315: Massachusetts Department of Public Health/Bureau of Environmental Health (MDPH/BEH) appreciates EPA's efforts to propose a remedial plan for Rest of River that will be conducted in a manner that prioritizes protection of public health balanced with a preservation of the natural ecology.

EPA Response 315: EPA acknowledges the support from the Massachusetts Department of Public Health.

Comment 484: The Commonwealth wishes to express our appreciation of EPA's willingness to consider and address many of the Commonwealth's concerns and priorities for the remediation of this unique ecosystem that is located in an ACEC and includes one of the richest and most diverse array of state-listed species protected under MESA.

EPA Response 484: EPA acknowledges the appreciative comment from the Massachusetts Executive Office of Energy and Environmental Affairs.

Comment 485: For the reasons outlined below, the Commonwealth [EEA] supports EPA's Proposed Cleanup Plan for Rest of River. Consistent with the conceptual remedy outlined in EPA's May 2012 Status Report supported by the Commonwealth, the Proposed Cleanup Plan is protective of human health while employing a remediation framework developed in consultation with the Commonwealth and the State of Connecticut that is directed at preserving the dynamic character of the river ecosystem and avoiding, minimizing and mitigating remedy impacts to the affected wildlife and their habitats, with a particular focus on protecting state-listed species. As discussed in greater detail below, EPA's proposed cleanup plan includes:

- The removal of a large mass of PCBs from rest of river through the dredging of Woods Pond;
- A remediation approach for the riverbanks that addresses risks to human health while minimizing the disturbance of riverbanks consistent with the objectives of the Status Report; including establishing a hierarchy of for reconstructing disturbed banks that identifies the use of bioengineering techniques as the most preferred option;
- A remediation approach for floodplain areas and vernal pools based on the Commonwealth's mapping off core state-listed species habitat and the use of an adaptive management approach, to be implemented in consultation with the Commonwealth, which will guide the remediation of ecologically important vernal pools;
- Approaches to integrate the cleanup with potential dam removal or impoundment use and maintenance within Reach 7;
- Development and implementation of a restoration program to address impacts of the remediation to the full range of wildlife species and their habitats;
- The off-site disposal at existing off-site licensed landfills of contaminated soil and sediment generated by the remediation, including maximizing the use of rail to transport such contaminated material; and
- The use of broader adaptive management approach that will guide the phased implementation of the remedy and take into account new information, changing conditions, and the availability of innovative technologies.

In short, the above summary of the key components of EPA's Proposed Cleanup Plan reflects the extent to which EPA has been responsive the Commonwealth's concerns and interests.

EPA Response 485: EPA acknowledges the Massachusetts Executive Office of Energy and Environmental Affairs' support for the remedy.

Comment 487: While the Commonwealth [EEA] acknowledges that in its January, 2011 comment letter it proposed that no river banks be excavated in Reach 5, we support the more specific approach to remediating the Reach 5 river banks set forth in the Proposed Cleanup Plan, which is consistent with the Status Report and responsive to the Commonwealth's concern about ensuring that the fundamental, dynamic character of the river remains intact following the necessary remediation of eroding banks. A particular focus of the Commonwealth's input on GE's implementation of this permit provision will be to ensure that the hierarchy for reconstructing disturbed banks is applied consistent with the ecological preservation objectives first identified in the Status Report.

EPA Response 487: EPA acknowledges the clarification and the support from the Massachusetts Executive Office of Energy and Environmental Affairs.

Comment 487.a: The State of Connecticut commented that the Statement of Basis and draft modification to the RCRA Permit include important measures to support attainment of environmental goals in Connecticut. By controlling downstream transport of PCBs, monitoring the environment and biota in Connecticut, focusing efforts on the eventual restoration to levels where fish consumption advisories are not necessary, and providing a means to address incremental cost to Connecticut citizens due to the impact of PCBs on their regulated activities, the remedial proposal takes important steps towards achieving Connecticut's goals of: (1) eliminating downstream transport of PCBs into Connecticut to the maximum extent practicable; (2) limiting impacts to future generations through eliminating the need for a fish consumption advisory; (3) allowing a healthy river to re-establish in Connecticut; and (4) providing economic surety for the citizens of Connecticut.

EPA Response 487.a: EPA acknowledges the State of Connecticut's support for the remedy. EPA notes that while one mechanism from the draft permit has changed (modifying GE's responsibilities for the PCB contamination identified in the context of Legally Permissible Future Projects or Work from payment of incremental costs to performance of actions needed to address the PCB contamination), EPA believes that the Final Permit Modification is as good or better than the Draft Permit Modification regarding the four goals of the State of Connecticut.

II.C.2 Supporting Comments from Local Governments, Citizens, and Non-Governmental Organizations

Comment 56: Several Commenters had the following positive comments in support of certain components of the remedy: These include no onsite landfill, removal of contamination from the river and floodplain, removal of sediment from the behind dams, understanding of the concern over transportation/disposal of contaminated materials and the preference for rail transportation adaptive management and continuing investigation of alternative technologies, and long-term monitoring.

EPA Response 56: EPA acknowledges the support for certain components the remedy from the commenters, including the Housatonic Rest of River Municipal Committee, Berkshire Regional Planning Commission (BRPC), Housatonic Valley Association and Citizens for PCB Removal.

Comment 131: The abundance and diversity of benthic organisms and fish populations in the first two miles of cleanup have rebounded in just the short time since that cleanup was completed. This indicates that the natural systems of the river can rebound.

EPA Response 131: EPA acknowledges and agrees with BRPC that the successes of the first two miles of cleanup indicate the ability of natural systems of the river to rebound.

Comment 345: I wish to thank EPA and its staff for the work done on the draft Permit and for many years of public education and outreach. The professionalism and level of assistance has been truly impressive. EPA has been an excellent source of information, assistance and guidance during this process.

Comment 357: I commend the EPA for its thorough study of the river, possible remediation strategies regarding the river's PCB contamination, and consideration of alternative approaches, with attention to environmental impacts and related restoration. I strongly believe that remediation of the PCBs must be done.

EPA Response 345, 357: EPA acknowledges the supportive comments.

II.D The Proposed Remediation is Insufficient

Comments 19, 20, 40, 41, 49, 65, 69, 74, 188, 189, 194, 230, 326, 328, 336, 344, 349, 372, 375, 376, 378, 379, 388, 402, 412, 413, 427: Many comments were received voicing concern that the proposed remedy is not sufficiently extensive to effectively remediate the PCB contamination in the river and floodplain. The commenters noted that PCBs are known to be a serious problem and the remedy will leave too much of the PCB mass, and inappropriately high PCB concentrations, in the environment. Some commenters noted that humans and ecological receptors in the area will continue to receive low-level PCB exposure, with consequent health and ecological risk. One commenter remarked that this would be the least-extensive remedy ever implemented at a PCB site and another expressed support for the most extensive of the various alternatives evaluated. One commenter stated that the proposed plan was developed by a small group of self-appointed environmental experts. One commenter noted that future generations will recognize the importance of a more extensive cleanup. One commenter asked why Region 2 supported a stringent cleanup of the Hudson whereas Region 1 proposed a weakened incomplete approach for the Housatonic.

EPA Response 19, 20, 40, 41, 49, 65, 69, 74, 188, 189, 194, 230, 326, 328, 336, 344, 349, 372, 375, 376, 378, 379, 388, 402, 412, 413, 427: While many commenters suggested the remedy did not go far enough in removing PCBs, many other comments, including from GE, objected that the remedy required too much remediation. For example, many commenters who live near Reach 5A are opposed to any remediation in this reach, whereas other commenters preferred no remediation in all of Reach 5, and only dredging of Woods Pond.

EPA based the Final Permit Modification on an exhaustive set of information gathering, alternatives analysis and technical discussions. EPA evaluated a wide range of alternatives to address the unacceptable risks posed by GE's PCB contamination. The Permit in the Decree describes nine criteria for consideration when selecting the remedy: three overarching "General Standards," including: (1) Overall Protection of Human Health and the Environment; (2) Control

of Sources of Releases; and (3) Compliance with ARARs, and six additional "Selection Decision Factors," including: (1) Long-Term Reliability and Effectiveness; (2) Attainment of Interim Media Protection Goals; (3) Reduction of Toxicity, Mobility, or Volume of Wastes; (4) Short-Term Effectiveness; (5) Implementability; and (6) Cost. Permit II. G. EPA evaluated all the corrective action alternatives against these criteria, and any other relevant information in the Administrative Record. These factors are often referred to in short-hand as the "nine criteria" or the "nine criteria analysis." As discussed in Section II.A above, EPA determined that the selected remedy is best suited to meet the Permit's General Standards in consideration of the Permit's Selection Decision Factors, including a balancing of those factors against one another. The Selected Remedy is a balanced remedy that is in the public interest and is protective of human health and the environment. EPA's rationale for the extent of remediation in the Final Permit Modification is documented in its Statement of Basis and Comparative Analysis, as supplemented by this Response to Comments. For additional information, see response in Section II.B of this Response to Comments. With respect to comparison of this remedy decision to other sites such as the Hudson River, each remedy decision is site-specific and depends on particular factors and criteria for evaluation.

Comment 74: The Proposed Plan does not meet either EPA standards or the expectations of the National Remedy Review Board.

EPA Response 74: EPA disagrees with the commenter. As explained throughout this Response to Comments, the proposed remedy as well as the remedy selected in the Final Permit Modification are in accordance with the process established in the Decree for issuance of the decision pursuant to the Permit, and are consistent with the remedy selection criteria evaluation process outlined in the Permit. Additionally, the proposed and selected remedy are consistent with the advice provided to the Region by the National Remedy Review Board (NRRB), with which the Region consulted repeatedly during the investigation and alternatives analysis, and to which the Region responded to their suggestions. See Response 197, Section X of this Response to Comments for more detail on the discussions with the NRRB.

Comments 19, 40, 41, 49, 65, 69, 74, 188, 189, 194, 196, 198, 230, 326, 328, 336, 344, 375, 376, 378, 379, 388, 402, 412, 413, 427: Several commenters mentioned that EPA understated the toxicity of PCBs and more recent studies shows PCBs are toxic at lower levels than previously believed, and that the results of EPA's Ecological Risk Assessment were ignored.

EPA Response 19, 40, 41, 49, 65, 69, 74, 188, 189, 194, 196, 198, 230, 326, 328, 336, 344, 375, 376, 378, 379, 388, 402, 412, 413, 427: As discussed in Section II.F below, EPA used appropriate toxicity values for PCBs that are strongly supported by the scientific community and were established through independent peer review. EPA also appropriately considered the risks posed to ecological receptors that were documented in EPA's peer-reviewed Ecological Risk Assessment (ERA).

Comment 481: The failure by US Fish and Wildlife and by Massachusetts Division of Fisheries and Wildlife to present their own data which clearly demonstrates the interplay between releases from the source of PCBs with the simultaneous re-occupation of the Study Area by beaver, denied Project Designers and Peer Reviewers a basic understanding of the resulting depositional outcomes of PCBs in the Floodplain.

The continued failure of these two agencies to inform EPA and GE of the effect of extensive beaver population in the Study Area as documented in the maps & data gathered and compiled by the Massachusetts Division of Fisheries and Wildlife for the Upper Housatonic Area of Critical Environmental Concern, denied Project Designers and Peer Reviewers access to the obvious, that floodplain Core Areas containing PCBs under control by beavers are a 'source', not a 'sink' for PCBs at all times, but intensely so in episodes of hard rain or of high water flow. Due in part to the significant beaver activity that continually disturbs the floodplains, thus making the floodplains a source of PCBs, we should cleanup most of the PCBs.

Comment 483: Many of the floodplain and Core Areas not scheduled for remediation under the proposed plan are inundated during high water events and characterized by heavy beaver activity. This will result in PCBs from these areas being transported back into the river after it is remediated.

EPA Response 481, 483: The presence of beavers and their disturbance to the river and floodplain system will be addressed in designing and implementing the remedy. EPA will take this issue into consideration when reviewing and approving GE's work plans. However, EPA does not believe that revising the remedy to require a significant increase in removal of PCB-contaminated floodplain soil and sediment, such as Combination 6 (SED 8/FP 7), is the proper remedy or proper response to beaver activity. For additional information, see response in Section II.B of this Response to Comments for how EPA selected the floodplain/sediment remedy.

Comment 522: My main concern is that total dredging is proposed for Fred Garner Park in Pittsfield to Woods Pond in Lenox but no dredging is proposed from Woods Pond Dam downstream to the Connecticut border. If that is correct, I would like an explanation why.

EPA Response 522: The remedy does include sediment removal in Reach 7 Impoundments and Reach 8. For additional information on these components of the remedy, see responses in Sections III.C.4 and 5 of this Response to Comments. For information regarding the remedy for flowing reaches in Reach 7 and Reaches 9-16, see Section III.C.6.

II.E The Proposed Remediation is too Extensive and the River/Floodplain will be Destroyed

Comments 1, 81, 83, 91, 101, 177, 180, 334, 340, 347, 360, 367, 368, 511: A large number of commenters expressed concern that the current nature of the river and floodplain would be destroyed by the remediation and that the Rest of River area would not recover following remediation. This includes a number of residents who live along or near the river in vicinity of Reach 5A. The Canoe Meadows Wildlife Sanctuary was specifically mentioned as one area that could be irreparably damaged. One commenter believed that EPA is aware of the habitat destruction and lack of recovery that the remediation will allegedly cause, and another suggested leaving the PCB contamination in place until a remedy that will not impact the ambient habitat(s) is developed. Other commenters remarked that the floodplain supports an old-growth forest that took thousands of years to develop, and that it is this resource that will be irreversibly damaged by the remediation. Commenters stated that the benefits of the remediation do not justify the

damage to the ecosystem and that EPA should be looking at less invasive and destructive options.

Comments 532, 577, 580, 592: GE commented that the proposed remedy will cause irreparable harm to the unique Rest of River ecosystem and EPA's proposed remedy is based on the underlying assumption that alternatives that result in the removal of the largest volume of sediment and floodplain soil provide the highest level of human health and environmental protection. That assumption is incorrect, since it fails to consider other key factors that affect the overall protectiveness of a remedy, such as the long- and short-term impacts of remedy implementation on health and the environment, the effectiveness of other means of risk reduction including institutional controls, and the ability to achieve comparable health and environmental goals with smaller remedies (e.g., less removal). Even accepting EPA's PCB toxicity values, the proposed remedy goes beyond what is necessary to protect human health. The specific health bases given by EPA for the proposed remediation are to prevent unacceptable risks from PCB exposure through human consumption of fish and waterfowl from the River and through human direct contact with river sediments and floodplain soils. Even accepting EPA's toxicity values, a less extensive remedy would provide human health protection from PCB exposure via both of these pathways.

EPA may not order a remedy that would cause harm greater that the benefit it purports to provide. The Permit requires, as a General Standard, an evaluation of whether a remedial alternative would provide "overall" protection of human health and the environment (Permit Special Condition II.G.1); EPA guidance makes clear that "overall" protection of the environment requires a balancing of the short-term and long-term adverse environmental impacts of remediation with the residual risks. In this case, EPA's proposed remedy as a whole would cause greater ecological damage to the environment than any ecological benefit and thus would not provide "overall" protection of the environment.

EPA Response 1, 81, 83, 91, 101, 177, 180, 334, 340, 347, 360, 367, 368, 511, 532, 577, 580, 592: As discussed above in Section II.B, EPA based its remedy selection on an analysis of the remedy selection criteria set forth in the Permit. As part of this analysis, EPA considered the effects of potential remediation on the current nature of the river and floodplain and associated habitat value when selecting its remedy. EPA also considered the risks posed by PCBs present in the river system on human health and the environment. As discussed in Section II.F below, the PCBs present an unacceptable risk to human health and ecological receptors and that the PCB contamination must be remediated. This conclusion takes into account independently peer-reviewed risk assessments.

EPA considered the impacts of potential remediation alternatives and the potential harm to the environment when evaluating alternatives. EPA, in consultation with the Commonwealth, crafted a remedy that minimizes short-term impacts to key habitat areas and ensures that disturbed areas will be restored after remediation. See Section III.B.2 of this Response to Comments for a detailed response to concerns about potential damage to the habitat and to the current nature of the river and floodplain. Additionally, EPA disagrees with the statement that even accepting EPA's toxicity values, a less extensive remedy would provide human health protection from PCB exposure via direct contact. For more details see Responses 590 and 591 below.

Comment 615. GE asserts as follows: Several specific elements of EPA's proposed remedy are arbitrary and capricious or otherwise unlawful. These elements include the proposed remedies for Woods Pond, the Reach 7 impoundments, Rising Pond, and the backwaters (as well as other proposed remedy components). It should be noted that the EPA's removal volume estimates for these remedy components were based on those presented in the May 2012 Status Report; GE has developed updated volume estimates based on EPA's description of its actual proposed remedy. As a result, GE's volume estimates for some of these areas may be higher or lower than those presented by EPA.

EPA Response 615: As discussed in Section II.B above, EPA based its remedy selection on a thorough analysis of alternatives based on the remedy selection criteria set forth in the Permit. In addition, see Section III.C for responses to specific comments on Woods Pond, the Reach 7 Impoundments, Rising Pond, and the Backwaters.

Comments 80, 107, 346, 348, 366: Several commenters noted that they were disappointed that EPA did not accept the Commonwealth of Massachusetts January 2011 position, including the recommendation that the remedial alternatives presented to date would cause "irreparable harm to this unique, diverse and vital ecosystem that has been designated by the Commonwealth as an Area of Critical Environmental Concern (ACEC)"; that Commonwealth's position was ignored in order to appease 50 or less conservationists; and the Commonwealth's plan was very responsible and that the river and the surrounding habitat be left alone and that instead Woods Pond in Lenox be dredged on a periodic basis to remove PCBs.

EPA Response 80, 107, 346, 348, 366: It is important to note that the Commonwealth of Massachusetts supports the proposed remedy, and in its 2014 comments explained the distinction between its January 2011 comments and its support for the proposed remedy. See, for example, Response 751. While in 2011 the Commonwealth did express concerns about potential impacts of the remediation on the ecosystem when commenting on GE's Revised CMS (See Letter (with attachment) from Richard K. Sullivan, Jr., Kenneth I. Kimmell and Mary Griffin (MA EOEEA) to Susan Svirsky (USEPA), January 31, 2011, Re: Housatonic River Rest of River; Comments on Housatonic River - Rest of River, Revised Corrective Measures Study Report, October 2010), EPA and Massachusetts subsequently addressed those concerns through a series of technical discussions culminating in the 2012 status report that outlined a conceptual framework for the remedy, which explicitly focuses on avoiding, minimizing and mitigating impacts to Core Areas. As discussed more fully in Response 751, in its 2014 comments on the Draft Permit Modification, the Commonwealth—specifically the Executive Office of Energy and Environmental Affairs and its Department of Environmental Protection ("MassDEP") and Department of Fish and Game—expressly stated its support for the proposed remedy, which is "protective of human health while employing a remediation framework developed in consultation with the Commonwealth and the State of Connecticut that is directed at preserving the dynamic character of the river ecosystem and avoiding, minimizing and mitigating remedy impacts to the affected wildlife and their habitats, with a particular focus on protecting state-listed species." See also Response 751 above.

In addition, the Massachusetts Fisheries and Wildlife Board ("MassFWB"), which oversees the Commonwealth's Division of Fisheries and Wildlife (the largest landowner in the Rest of River area), also supports the proposed remedy. The MassFWB recognizes that the PCB contamination

at Rest of River "poses a public health risk that must be addressed." While noting that there is no "silver bullet solution" for sites contaminated with PCBs and that crafting the Rest of River remedy has been a "difficult balancing act," the MassFWB acknowledged that the proposed remedy "has been crafted to responsibly address the public health risks while responsibly maintaining the natural and recreational values of this section of the Housatonic."

Comments 102, 338: One commenter stated that the plan for capping and covering up the problem is ridiculous-it makes more sense to just leave the problem alone and clean up Woods Pond. There should also be a plan to prevent any contaminants from going over the dam. Dredging the Pond makes sense but there should be a system in place to be able to monitor and capture more PCBs before they go further down river. Another commenter stated the river should not be remediated except for a few hot spots such as Woods Pond sediment behind the dam.

EPA Response 102, 338: As discussed in Section II.F below, the PCBs present unacceptable risks to human health and ecological receptors and that the PCB contamination must be remediated to address those risks. This conclusion is based in part on independently peer-reviewed risk assessments. As discussed above and in Section II.B above and as described in the Statement of Basis and Comparative Analysis, EPA evaluated several remedial options, including one similar to the remedy proposed by the commenters (Combination Alternative 8.) As described in these documents, EPA did not select Combination Alternative 8 as the remedy in part because it was not protective of human health and the environment in the long-term, including not adequately meeting IMPGs for humans or ecological receptors and not meeting federal and state water quality criteria for freshwater aquatic life. (See Statement of Basis page 28.) In addition, remediating only Woods Pond would not address the PCB contamination and associated risks to human health and the environment in Reach 5 and the Backwaters located above Woods Pond.

EPA agrees that any plan should prevent, to the extent practicable, the mobilization and transport of contaminants downstream over Woods Pond Dam. In fact, the remedy in the Final Permit Modification reduces downstream transport of PCBs over Woods Pond Dam by 89%. For comparison, Combination Alternative 8 reduces downstream transport of PCBs over Woods Pond Dam by 62%. Statement of Basis page 30.

Comment 77: The costs and benefits of the remediation versus not remediating have not been sufficiently explained to the public.

EPA Response 77: EPA has conducted extensive outreach on the proposed remediation to explain the rationale for the proposed remedy and pros and cons of the proposed remedy compared to several alternatives, including no action. In June 2014, EPA widely distributed the Proposed Remedial Action (Draft Permit Modification) and an associated Statement of Basis describing the rationale for the proposed cleanup. This was followed by EPA presentations to the public on the proposed remedy on June 18, and June 24, 2014, and a presentation prior to a public hearing on September 23, 2014. In addition, EPA has made available on its web site and in the Administrative Record the May 2014 Comparative Analysis, which provides additional detail of the costs and benefits of evaluated alternatives, included no action. Additional outreach

activities on Rest of River include numerous CCC meetings, peer-review panel public meetings, the workshops and charrette, and a public meeting on GE's CMS.

Comment 103: EPA should not propose remediation plans without fully understanding the impacts of those plans.

EPA Response 103: EPA evaluated the effect of the proposed remediation in selecting the remedy. See Section II.B and Section II.D above.

Comment 364: A more intelligent approach to the river would be to make GE invest all the money they would have spent on a clean up to devise a way of cleaning the river without clear cutting forests and rip rapping the banks.

EPA Response 364: As discussed in Section II.F below, the PCBs present unacceptable risks to human health and ecological receptors and the PCB contamination must be remediated to address those risks. This conclusion is based in part on independent peer-reviewed risk assessments. As discussed above and in Section II.B above and as described in the Statement of Basis and Comparative Analysis, EPA evaluated several remedial options to address these unacceptable risks. Based on this analysis, EPA selected a balanced remedy that is protective of human health and the environment. EPA's rationale for the extent of remediation in the Final Permit is documented in its Statement of Basis and Comparative Analysis, as supplemented by this Response to Comments. The selected remedy reduces the cutting of forests (e.g., limited bank disturbance in Reach 5B) and precludes the riprapping of banks, except in limited areas where it is necessary to for the protection of adjacent infrastructure. Final Permit Modification at II.B.2.

Comments 3, 369, 512, 531: A number of commenters felt that currently available human health data do not justify the proposed extent of the remediation. One commenter felt that the danger to human health has not been substantiated with actual data and another commenter claimed that the human health risks from PCBs are exaggerated and have not been demonstrated, and there are no studies to confirm a serious health risk solely by PCB other than extrapolated over exposures of lab animals showing skin irritations. One commenter suggested that the ecological risks are exaggerated, that there are no studies that have demonstrated impacts to wildlife from PCBs due to the confounding effects of other contaminants. Accordingly, the arbitrary cleanup levels proposed (5 ppm) are in the river and floodplain and another commenter stated that the cleanup is not justified by the ecological risks.

Comment 350: At an average concentration of 15 ppm total PCBs, removal of 250,000 CY of material, as proposed for Reach 5A, would equate to removal of 3.75CY of PCBs, or about 0.75 CY per mile. If the 3.75 cubic yards were in a small area that would be cause for concern but the EPA feels it's better to take all the PCBs out of the Housatonic and concentrate them in a smaller area at an undisclosed location.

EPA Response 3, 350, 369, 512, 531: As discussed in Section II.F below, the PCBs present unacceptable risks to human health and ecological receptors and the PCB contamination must be remediated to address those risks. This conclusion is based in part on independent peer-reviewed risk assessments. Also, note that the 5 milligrams per kilogram (mg/kg) cleanup standard

referenced apparently refers to the Performance Standard for eroding riverbank in Reach 5A. This 5 mg/kg standard was selected as a reasonable measure to prevent recontamination of the river through erosion of contaminated riverbanks in Reach 5A, with the primary goal being to reduce fish tissue concentrations and the downstream transport of PCBs. See also Response 82 below and Section III.C.1 of this Response to Comments. The removed material will be disposed of off-site at an existing licensed facility.

Comment 14: The disruption caused by the remediation is not justified by being able to eat fish in 100 years. Individuals will not catch and eat fish from the river anyway because they can buy fish at local markets.

EPA Response 14: Consistent with the National Contingency Plan (NCP), EPA's long-term goal of reducing PCB fish-tissue concentrations to acceptable risk-based concentrations requires that EPA assume that fish and waterfowl could be consumed in amounts typical for a river with no use restrictions. Although the long-term goal may not be achieved in the near future, the cleanup plan and associated Performance Standards require that GE implement actions that are expected to significantly reduce the PCB concentrations in fish and waterfowl, thus allowing for limited consumption. In addition, the reduction of PCBs in fish tissue resulting from the cleanup will significantly reduce the health risk for those individuals who elect to catch and consume fish above the recommended consumption advisory levels.

Comment 98: The PCBs have been buried for many years and should just be left undisturbed. Remediation will cause them to become airborne or sent downstream.

C**omment 190:** Today, the PCBs in the riverbed are safely sequestered in the sediment so our neighborhood receives zero to infinitesimal actual exposure.

EPA Response 98, 190: EPA disagrees. There are currently significantly elevated levels of PCBs present in the surficial floodplain soil and sediment, providing an exposure pathway to human and ecological receptors, including fish and waterfowl. Figure 4-8 of GE's RCRA Facility Investigation Report shows the PCB concentrations in six-inch depth intervals throughout Rest of River, and definitively demonstrates that PCB concentrations are not buried. In addition, PCB concentrations in aquatic biota (e.g., benthic invertebrates and fish), which integrate their exposure to PCBs in both sediment and water, as well as, through bioaccumulation in the food chain, also clearly demonstrate the ongoing exposures to very high concentrations of PCBs in Rest of River. In addition, data collected and the modeling demonstrate that PCBs are continuously released from their current locations in the sediment bed and riverbank and are transported downstream. See Figure 1, Attachment 7 to the Comparative Analysis. SED 2 is Monitored Natural Recovery (MNR). Even after 52 years, there is 13 kg/year of PCBs passing over Woods Pond and approximately 6 kg/year of PCBs deposited in the floodplains.

With regard to remediation causing airborne PCBs, when the 1 ½ Mile Reach Removal was conducted, a notification level was set at 0.05 micrograms per cubic meter ($\mu g/m^3$) and an action level was set at 0.1 $\mu g/m^3$ based on 24-hour average for PCB concentrations in air. Monthly air monitoring performed between 2002 and 2006 indicated that there were no exceedances of the action level, and one sample that exceeded the notification level.

For Rest of River, EPA anticipates that GE will be required to use engineering controls and best management practices to minimize the potential for airborne PCBs. In addition, GE will be required to propose an air monitoring plan with health based action levels. While there may be an increase in airborne PCB concentrations in areas close to the remediation for a short period of time, GE will be required to meet action levels for airborne PCBs. If these levels are exceeded, then GE will be required to initiate additional evaluations and engineering controls. In addition, the River is being remediated progressing generally from upstream to downstream to address PCBs that may migrate during cleanup work.

Comment 528: It is not necessary to remediate the river, the river has already remediated itself. Repeated flooding and resuspension of contaminated sediments has removed the contamination, transporting it downstream and out to the ocean.

EPA Response 528: EPA disagrees with the commenter that the river has already remediated itself. As noted in Response 98, 190, the many samples collected from river sediment show elevated concentrations of PCBs in both surficial sediments and at depth. In addition, the continuing erosion of contaminated river banks provides a significant ongoing source of PCBs to the river, while flooding continues to deposit contaminated sediment on the floodplain and re-suspend contaminated sediment for transport downstream. This has resulted in the necessity for human consumption advisories for fish and other biota in MA and CT since the 1970s, which continue today. One of the General Standards that must be met by the remedy is the Control of Sources of Releases, thus EPA believes it is necessary to implement the Final Permit Modification to control downstream transport, as well as to satisfy the other Permit criteria.

Comment 584: GE asserts the following. The Housatonic River model does not extend into Connecticut, and predictions of future PCB levels in fish in the Connecticut impoundments are based on extrapolations from the EPA model using a number of simplifying assumptions and factors without confirmatory data. The results of those extrapolations are too uncertain and unreliable to support distinctions among alternatives regarding achievement of specific PCB concentrations at the low levels that exist in fish in Connecticut. In any event, those extrapolations do not show significant differences between the proposed remedy and smaller removal remedies in reducing fish PCB concentrations in Connecticut.

EPA Response 584: GE developed a model (CT 1-D model) as part of the CMS to predict fish tissue concentrations in Connecticut in order to compare the effectiveness of remedial alternatives. GE Revised CMS at 3-45. GE concluded that even given the large uncertainty in the CT 1-D methodology, the level of combined accuracy/precision was considered acceptable and that the model can be used to develop future predictions in the Connecticut portion of the river. GE Revised CMS, Appendix J at J-15. According to GE's CT 1-D model, the selected remedy reduces PCB concentrations by a factor of ten compared to MNR. (Statement of Basis Page 33 and Table 4. and at Comparative Analysis at 22 & Table 4.) Compared to GE's preferred alternative cited in its Revised CMS (SED 10), the selected remedy reduces fish tissue in Connecticut concentrations by a factor of five. EPA Statement of Basis at 33 & Table 4; Comparative Analysis at 22 & Table 4. The model was used for its intended purpose, which is comparing between remedial approaches, and in this case was relevant to EPA proposing a remedy approach that was more likely to result in appropriate reductions in fish tissue contamination as compared with other alternatives preferred by GE.

II.F PCB Toxicity and Risk Assessments

Comments 42, 43, 44, 68: We know from extensive research on human health and ecological systems that PCBs are incredibly toxic at low levels. Every year we learn new dangers from PCBs. Just last year the World Health Organization determined that PCBs are a known human carcinogen.

Continued research in the peer review literature indicates that community members surrounding PCB-contaminated sites have elevated concentrations of PCBs in their bodies. The commenter provided an attachment with an extensive list of journal articles on the toxicity of PCBs. The entire community around the Housatonic River is likely exposed to PCBs at levels that are causing biological responses, including depressed immune systems, learning disabilities in children, and abnormal development of the fetus.

Low levels of PCBs interfere not only with fish reproduction, amphibian reproduction, bird reproduction, but also with bird behavior and bird songs. The soil invertebrates, insects, worms, and the minute crustaceans that live not only in the river, but also in the soils, are subject to these same adverse effects.

A thorough cleanup of the Housatonic is necessary not just because the animals in the Housatonic system are being impacted by PCBs, but also because PCBs are impacting all other animals on earth, including human beings.

Comment 578: GE asserts as follows: The best scientific evidence demonstrates that the PCB toxicity values that EPA used in its HHRA, which are based on studies of laboratory animals, substantially overstate both the carcinogenic potential and the non-cancer impacts of PCBs in humans. In fact, comprehensive reviews of human studies have concluded that: (a) there is no credible evidence that PCBs have caused cancer in humans, even in highly exposed PCB workers; and (b) there is no credible evidence that exposure to PCBs at environmental levels has caused adverse non-cancer effects. Moreover, laboratory studies have demonstrated clearly that human cells are many times less sensitive to the effects of PCB than the cells of the laboratory test animals used in the studies on which EPA's toxicity values are based [GE Attachment J].

EPA Response 42, 43, 44, 68, 578: The proposed remedy is necessary to protect human health and the environment from PCB contamination released by GE's Pittsfield facility. EPA selected a balanced remedy that is protective of human health and the environment. EPA's rationale for the extent of remediation in the Final Permit Modification is documented in its Statement of Basis and Comparative Analysis, as supplemented by this Response to Comments. Independent Peer-reviewed risk assessments have concluded that PCBs and other contaminants of concern pose unacceptable risks to human health and the environment in Rest of River.

Contrary to GE's arguments, the Human Health Risk Assessment (HHRA) and Ecological Risk Assessment (ERA) show that the PCB contamination in the Housatonic River poses unacceptable risks to human health and the environment. EPA performed the HHRA and the ERA using the best available science and the risk assessment process outlined in the NCP, 40 C.F.R. Part 300, and agency guidance. The EPA Rest of River HHRA and ERA were more comprehensive, detailed, and inclusive of public input than is typical for hazardous waste sites. See Response 231, Section II.F of this Response to Comments for more detail on the discussions with the ERA and HHRA process.

Unlike most CERCLA/RCRA sites, the Rest of River HHRA and ERA were reviewed by review panels comprised of independent risk assessment experts. Decree ¶¶ 22.c, d. The panel members were selected not by EPA but by a selection contractor mutually agreed upon by GE and EPA. Before the peer reviewers commenced their panel discussion at each peer review, GE and members of the general public, including the States, were provided opportunities to submit written comments and make oral presentations to both peer review panels. Decree, Appendix J, Step 1 and Step 3. Appendix J to the Decree outlines peer-review processes for Rest of River, and includes specific details about the public's ability to provide oral presentations at the peer review meetings, including, "GE will have a minimum of one hour to present such oral comment." Decree, Appendix J, Step 3. While critical of some specific aspects of the assessments, the peer reviewers' comments were generally supportive of both the HHRA and the ERA.

GE had many opportunities to review and comment on the risk assessments as they were developed.

GE asserted that EPA's toxicity values for PCBs used in the HHRA are too conservative while other commenters believe they are not conservative enough. EPA's HHRA uses published toxicity values for each contaminant of concern. These toxicity values quantify the relationship between the average daily doses calculated in the exposure assessment and the potential cancer risks and non-cancer health effects. GE claims that these values substantially overstate the cancer and non-cancer human health risks of PCBs while other commenters believe the toxicity values substantially understate health effects. While GE and others may disagree with the values selected, neither has shown any credible evidence that EPA abused its discretion in setting these values or that the values lack a rational basis.

In fact, the HHRA PCB toxicity values are based on sound, peer-reviewed scientific inquiry. The HHRA used toxicity values published in EPA databases and reports. Specifically, the HHRA used, where possible, toxicity values published in EPA's Integrated Risk Information System ("IRIS"). These IRIS values have undergone extensive scientific peer review. For contaminants of concern for which toxicity values are not published in IRIS, provisional values were obtained from the Health Effects Assessment Summary Tables (HEAST). EPA derived these IRIS and HEAST toxicity values in accordance with all applicable EPA guidance.

EPA's process for evaluating human epidemiological and animal evidence to determine the carcinogenicity and cancer potencies of chemicals, including PCBs, is set forth in Agency guidelines (USEPA, 1976, 1984, 1986c, 1994, 1996a). The guidelines were developed within the Agency, published in the Federal Register for external comment, and peer reviewed by a panel of expert scientists in the fields of carcinogenesis, toxicity, exposure, and related scientific disciplines from universities, environmental groups, industry, labor, and other governmental agencies. EPA responded to comments on the draft guidelines and made changes based on a review of the comments submitted by these groups and individuals. The guidelines were also submitted for review to EPA's Science Advisory Board, an external scientific review panel. Agency guidelines for assessing carcinogens are consistent with the scientific approaches that are used by national and international agencies (e.g., the National Toxicology Program [NTP, 1984] and the International Agency for Research on Cancer (IARC, 1987) for evaluating the carcinogenicity of chemicals.

EPA's process for evaluating human epidemiological and animal evidence to determine the noncancer toxicity of chemicals, including PCBs, is set forth in the Agency's guidelines (USEPA, 1986a-b, 1991, 1992, 1993a, 1996b, 1998) and the background document on non-cancer toxicity provided on IRIS (USEPA, 1993b). The guidelines cover a variety of health endpoints, including Developmental Toxicity (USEPA, 1986b, 1991); Reproductive Toxicity (USEPA, 1996b); Neurotoxicity (USEPA, 1998); Female Reproductive Risk (USEPA, 1986a); and Male Reproductive Risk (USEPA, 1986a). The guidelines were developed within the Agency, published in the Federal Register for external comment, and peer reviewed by a panel of expert scientists from universities, environmental groups, industry, labor, and other governmental agencies working in various fields associated with non-cancer toxicity, including developmental toxicity, neurological toxicity, endocrine effects, etc. EPA responded to comments on the draft guidelines and made changes based on a review of the comments submitted by these groups or individuals. The guidelines were also submitted for review to EPA's Science Advisory Board, an external scientific review panel.[2]

[2] References for this response:

International Agency for Research on Cancer (IARC, 1987). "IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, Supplement 7, Overall Evaluations of Carcinogenicity: An Updating of IARC Monographs Volumes 1-42." Lyon, France.

NTP. 1984. Report of the Ad Hoc Panel on Chemical Carcinogenesis Testing and Evaluation of the National Toxicology Program, Board of Scientific Counselors. Available from: US Government Printing Office, Washington, D.C. 1984-421-132:4726.

USEPA 1976. Interim procedures and guidelines for health risk and economic impact assessments of suspected carcinogens. Federal Register 41:21402-21405.

USEPA. 1984. Proposed guidelines for carcinogen risk assessment. Federal Register 49:46294. November 23.

USEPA. 1986a. The Risk Assessment Guidelines for 1986. Office of Health and Environmental Assessment, Washington, D.C. EPA/600/8-89/043, July

USEPA. 1986b. Guidelines for the Health Assessment of Suspect Developmental Toxicants. Federal Register 51 (185) 34028-34040, 24 September 1986.

USEPA. 1986c. Guidelines for carcinogen risk assessment. Federal Register 51:33992-34003.

USEPA. 1991. Guidelines for Developmental Toxicity Risk Assessment. Federal Register 56 (234) 63798-63826, 5 December 1991

USEPA. 1992. Guidelines for Exposure Assessment. Federal Register 57 (104) 22888-22938, 29 May 1992

USEPA. 1993a. Workshop Report on Developmental Neurotoxic Effects Associated with Exposure to PCBs. U. S. EPA, Risk Assessment Forum, Office of Research and Development, Washington, D.C. EPA/630/R-92/004, May, 1993.

EPA issued its initial HHRA in June 2003 and in July 2003 GE submitted comments to the peer review panel that, *inter alia*, argued that EPA's toxicity values were overly conservative. The initial HHRA and the comments on the HHRA received from the public (including GE) were subjected to peer review by a panel of independent risk assessment experts. The peer review panel was specifically charged with evaluating the toxicity assessment. While the peer reviewers generally agreed with the toxicity assessment in the initial HHRA, EPA chose to exercise its option to revise and reissue the document to explicitly address comments from the peer reviewers.

The revised HHRA, issued in February 2005, included an expanded discussion of toxicity values, and summarized additional toxicity studies.

Notwithstanding the studies cited by GE, the overall scientific consensus remains: PCBs can cause cancer and many other health impacts. Notably, EPA has not revised the IRIS toxicity factors for PCBs at any point since the HHRA was issued. Additionally, since that time, the World Health Organization officially reclassified PCBs in general as a known human carcinogen in contrast with a probable human carcinogen. Thus, the Agency's toxicity values used in the HHRA remain well-supported.

Comment 85: One scientist commented that it is not possible to show causality in an epidemiological study, yet he also claims that PCBs cause high blood pressure.

Comments 86, 88: The health risks due to current conditions are not supported by Mass DPH's studies in Pittsfield. Studies conducted by the Massachusetts Department of Public Health showed no higher levels of PCBs in Pittsfield residents (specifically Lakewood and Allendale teachers) than are present nationally.

Comment 104. Justification of the remediation for cancer prevention is unconvincing, particularly since it has never been demonstrated that there is a direct causal link between PCB exposure and cancer. I have certainly had much more than average PCB exposure from my years along the river, and yet it did not show up in my blood to a level higher than the national average.

USEPA. 1993b. Reference Dose (RfD): Description and Use in Health Risk Assessments. Background Document 1A. USEPA, National Center for Environmental Assessment (NCEA), Office of Research and Development, Washington, D.C. March 15, 1993.

USEPA. 1994. "Report on the Workshop on Cancer Risk Assessment Guidelines Issues." Office of Research and Development, Risk Assessment Forum, Washington, D.C. EPA/630/R-94/005a.

USEPA. 1996a. Proposed guidelines for carcinogen risk assessment. Federal Register 61 (79) 17960-18011. April 23.

USEPA. 1996b. Guidelines for Reproductive Toxicity Risk Assessment. Federal Register 61 (212) 56274-56322. 31 October 1996.

USEPA. 1998. Guidelines for Neurotoxicity Risk Assessment. Federal Register 63 (93) 26926-26954, 14 May 1998.

Comment 359: For forty years PCBs have been studied as a possible carcinogen, and after forty years the results are inconclusive.

Comment 579: GE asserted that at the Housatonic River Site, the lack of adverse human health effects of PCBs is borne out by empirical evidence showing no elevated cancer rates or elevated blood PCB levels among individuals in communities along the Housatonic River.

EPA Response 85, 86, 88, 104, 359, 579: EPA's guidance requires action to protect human health and the environment when risks exceed certain levels, as opposed to taking action only when confirmed health effects in a given population are confirmed. PCB toxicity and site – specific risk assessments are discussed in Section II.F below.

In addition, note that recently the World Health Organization officially reclassified PCBs in general as a known human carcinogen as opposed to a probable human carcinogen. In 2012, the World Health Organization's (WHO) International Agency for Research on Cancer (IARC), changed the carcinogenicity category of PCB-126, one of the 209 different PCB molecules, from Group 2A – Probably Carcinogenic to Humans, to Group 1 – Carcinogenic to Humans. And in 2013, IARC changed the category for PCBs in general and all dioxin-like PCB congeners to Group 1 – Carcinogenic to Humans. Polychlorinated biphenyls and polybrominated biphenyls / IARC Working Group on the Evaluation of Carcinogenic Risks to Humans (2013: Lyon, France), as published in IARC Monographs on The Evaluation of Carcinogenic Risks to Humans, Volume 107. 2015.

Comment 181: I question whether the PCBs in the river are doing major damage to my health in comparison to other substances in our environment.

EPA Response 181: This Final Permit Modification is not designed to address other substances in the environment outside of those related to the GE-Pittsfield/Housatonic River Site and Rest of River. The primary contaminant in Rest of River is PCBs; and PCBs have been classified as a known/probable carcinogen in humans, and to cause other negative health effects. See other responses in this Section II.F.

Comments 545, 757: In a lawsuit brought by GE in the early 1990s challenging EPA's adherence to its IRIS toxicity values in the absence of a rulemaking proceeding, GE and EPA reached a settlement agreement, which was filed in the court (Settlement Agreement in General Electric Company v. Browner, No. 93-6151251, D.C. Circuit, Oct. 25, 1993). That agreement and a subsequent EPA guidance document issued to the EPA regions, entitled Use of IRIS Values in Superfund Risk Assessment (EPA, 1993), require that, if an outside party questions the use of IRIS values and presents alternative toxicological information that may be used in place of the IRIS values, EPA must "consider all credible and relevant evidence before it."

In its comments on the HHRA for the Rest of River, GE presented evidence that PCBs do not cause cancer or adverse non-cancer effects in humans and that the laboratory animals on which EPA's IRIS toxicity values are based are more sensitive to these PCB effects than humans (AMEC & BBL Sciences, 2003, Attachments J and K). In addition, it presented alternative quantitative toxicological information on the non-cancer Reference Dose (RfD) for PCB, showing that the RfD in IRIS (20 ng/kg-day) was at least an order of magnitude more stringent

than warranted by the scientific evidence (due to the use overly conservative uncertainty factors), and thus should be increased by 10 times to 200 ng/kg-day (id**.,** Attachment N). However, the EPA Region did not consider this alternative information, but simply relied on the IRIS toxicity values, including the RfD, in its HHRA. That conflicts with the above- referenced Settlement Agreement and guidance.

More recent evidence further supports GE's position that the PCB RfD should be changed. A recent paper by Carlson et al. (2012) [a copy of which GE provided with its comments] shows that new in vitro data indicate that the rhesus monkeys used in the study on which the current IRIS RfD is based are substantially more sensitive to PCBs than humans and that the current RfD should actually be adjusted to 18,000 ng/kg-day (900 times higher than the current RfD). The Region should consider this information as well.

EPA Response 545, 757: The comment refers to an EPA document, Use of IRIS Values in Superfund Risk Assessment (1993). This document does indicate that "toxicological information other than that in IRIS may be brought to the Agency by outside parties. Such information should be considered along with the data in IRIS in selecting toxicological values; ultimately, the Agency should evaluate risk based upon its best scientific judgment and consider all credible and relevant information available to it." Moreover, the complete language of the EPA guidance document advises that "while all credible and relevant information must be considered, departing from the IRIS value is generally discouraged where the information submitted consists of data previously evaluated in developing that value."

In Appendix N of its July 2003 comments on the draft Human Health Risk Assessment (HHRA) and in its presentation to the peer-review panel, GE raised this same comment and summarized its analysis regarding the stringency of the Aroclor 1254 Reference Dose. Virtually all of the peer-review panelists concurred that EPA applied toxicity values appropriately. Upon reviewing GE's comments and the peer reviewers' findings, EPA continued to use the IRIS RfD for Aroclor 1254 in the HHRA. In the final HHRA, EPA explains why it chose to use the IRIS RfD for Aroclor 1254 based on the type of PCBs present at the Rest of River Site and also in light of toxicological and epidemiological evidence from the scientific literature published since the RfD was established. In addition, see Response 42 *et al*. and Response 85 *et al*. above in this section on EPA's position on the toxicity of PCBs.

Finally, EPA followed the process outlined in the Decree, which was agreed to by GE and EPA, for developing the HHRA.

Comment 62: What is the chemical half-life of the most heavily chlorinated PCB congeners?

EPA Response 62: EPA assumes that this question concerns the rate at which PCBs in the environment are broken down by the processes of photolysis and biochemical degradation into comparatively less-toxic chemicals, as opposed to the rate at which PCB concentrations in environmental media may change as PCB molecules are transferred to, and potentially transported by, other media. For example, in the Housatonic River PCBs adsorbed onto sediment may desorb into the water column and be transported downstream or be transported as part of the bedload and/or suspended solids, and PCBs in the water column may volatilize at varying rates into the overlying atmosphere. These processes do not result in any change in the

toxicity of the individual PCB molecules or the total PCB mass in the environment (although they can potentially change local PCB concentrations), and therefore they do not apply to the issue of half-life of particular congeners.

Strictly speaking, the concept of half-life applies to processes that follow first-order (or exponential) decay, as is the case with radioactive isotopes where the rate of decay is independent of the concentration of the isotope and other environmental factors. In the case of PCBs in the environment, and particularly PCBs that are found in natural soils and sediments, the rate of decay is dependent in part on factors such as initial concentration, matrix (e.g., soil or sediment) characteristics, climate, micro-organisms present, presence or lack of oxygen (i.e., aerobic/anaerobic conditions) and numerous others (Carberry, J.G. 1994. *Enhancement of bioremediation by partial preoxidation*. pp. 543-597. In: Remediation of Hazardous Waste Contaminated Soils. D.L. Wise and D.J. Trantolo (Eds.) CRC Press.). As a result, the biochemical degradation of PCBs may not be represented properly by the concept of half-life (e.g., Hopf, N.B., A.M. Ruder and P. Succop. 2009. *Background levels of polychlorinated biphenyls in the U.S. population*. Sci. Total Environ. 407: 6109-19.). Nonetheless, there is some indication that PCB degradation at least approximates first-order decay in some situations and the rate of PCB degradation has been quantified in terms of half-life in a variety of technical publications (e.g., Doick, K.J., E. Klingelmann, P. Burauel, K.C. Jones and K.T. Semple. 2001. *Long-term fate of polychlorinated biphenyls and polycyclic aromatic hydrocarbons in an agricultural soil*. Environ. Sci. Technol. 39: 3663-70).

PCB degradation processes in the environment typically progress more slowly for the more highly chlorine-substituted PCB congeners and therefore these congeners are generally considered to have longer half-lives. However, even within the more heavily chlorinated PCB congeners, often considered to be those congeners with seven or more chlorine substitutions, the rate of decay varies considerably depending upon the actual number of chlorines and their position on the biphenyl ring structure. All of these considerations, as well as the large number of individual congeners that could be considered "heavily chlorinated" make it impossible to provide a definitive response to the question of half-life, but in general half-lives on the order of a few to several decades have been reported for the more heavily chlorinated congeners (Erickson, M.D. 2001. *PCB properties, uses, occurrence, and regulatory history*. pp. xi – xxx. In: PCBs: Recent Advances in Environmental Toxicology and Health Effects. L.W. Robertson and L.G. Hansen (Eds.). University Press of Kentucky, Lexington; Sinkkonen, S. and J. Paasirvirta. 2000. *Degradation half-times of PCDDs, PCDFs and PCBs for environmental fate modeling*. Chemosphere 40: 943-9.). In addition, it is important to understand that the extremely elevated PCB concentrations identified in some areas of the Rest of River would require multiple such half-life periods before concentrations reach levels that would permit unrestricted use of the river and floodplain.

Comment 64: Although the State of Massachusetts claims that populations on fish and ducks in the system are stable, they are nonetheless highly contaminated, and therefore unacceptable.

EPA Response 64: EPA agrees that fish and wood ducks and mallard ducks in the Rest of River have highly elevated and unacceptable concentrations of PCBs in their tissues.

In the EPA's Ecological Risk Assessment, fish in the Rest of River were determined to be at "low to moderate" risk from exposure to PCBs. Wood ducks in the Rest of River were determined to be a "high" risk from exposure to PCBs.

However, because both fish and migratory waterfowl (e.g., wood ducks) are a food source for fishers and hunters, EPA's Human Health Risk Assessment concluded that the elevated concentrations of PCBs in these two groups were sufficiently high to pose a risk to humans using either group as food. In fact, consumption of fish from the river was the highest risk route of exposure investigated in the HHRA. As indicated by the fishing and hunting advisory currently in place for the Rest of River area, the Commonwealth agrees that PCB concentrations in fish and ducks in the Rest of River are unacceptable. As a result, remediation of the Rest of River, to the extent it is related to reduction of PCB concentrations in fish and ducks, is proposed by EPA as a means of reducing human health risks.

Comment 82: The background risk for getting cancer during one's lifetime is roughly 40% and the risk of dying from cancer is one in four for men and one in five for women, yet EPA's cleanup standard for Rest of River is based upon EPA's ***mathematical calculation*** that will reduce the risk of cancer to between ***1 in 10,000 to 1 in a million*** -- a completely unrealistic standard. It is important to note that there is no scientific evidence that supports a standard of 5 parts or 25-50 parts per million; there are just the EPA's risk calculations.

EPA Response 82: The NCP directs EPA to select remedies that result in human cancer risks that fall within the risk range of 1 in 1,000,000 (expressed as 1×10^{-6}) to 1 in 10,000 (1×10^{-4}) and that do not pose unacceptable non-cancer risks. Where the cumulative risk to an individual exceeds this range, i.e., greater than 10^{-4}, action is generally warranted, and EPA's "point of departure" for remedy selection is at the more stringent, or protective, (i.e., 10^{-6}) end of the risk range. EPA followed this guidance when selecting Performance Standards. The Performance Standards set for floodplain soil in the Final Permit Modification are based on the more stringent of either the non-cancer risks or the cancer risks of 10^{-5} (Primary Standard) or 10^{-4} (Secondary Standard). None of the Floodplain Performance Standards to protect human health are based on the 10^{-6} (one in a million) cancer risk. Also, note that the 5 mg/kg cleanup standard referenced in the comment apparently refers to the Performance Standard for eroding riverbank in Reach 5A. This 5 mg/kg standard was not selected based directly on risk assessments, but rather was selected as a reasonable measure to prevent recontamination of the river through erosion of contaminated riverbanks in Reach 5A, with the primary goal being to reduce fish tissue concentrations and the downstream transport of PCBs. See also Section III.C.1 of this Response to Comments.

Comment 175: Cleanup standards for Exposure Areas 61-66, which seem to be utility rights of way, have the highest numerical cleanup standards of all areas and uses. Because utility areas are often frequented by local adults and children who hike, dog walk, bike, motor bike, and ride ATVs, these areas should be reclassified as General Recreation, older child (high use).

EPA Response 175: The commenter is correct that Exposure Areas 61-66 are evaluated using the utility worker scenario. During the HHRA process EPA observed that distinct activities could occur at different locations within an exposure area. In these cases, a risk assessment was conducted for the activity as a whole and for the exposure area as a whole. For the Phase 2

Direct Contact Human Health Risk Assessment, EPA retained three areas for evaluation where utilities are located and where trails were identified within the utility corridor. Accordingly, these areas have been assigned separate EAs that cover only trails and walking paths. These are Exposure Area (EA) 4, 12, and 37b:

- EA 4 is a high-use area located south of Pomeroy Avenue and includes the portion of utility corridor 61 where a trail was identified. EPA and GE personnel observed dirt bike riding, riding ATVs, hiking, walking, dog walking and wild crop gathering in EA 4. Based on the types of higher exposure activities observed, EA 4 was evaluated for the young child, older child, and adult receptors. Utility worker exposure is evaluated in EA 61.

- EA 12 includes two maintained utility easements. The first easement extends north to south from the Holmes Road bridge crossing over the Housatonic River and extends south to the City of Pittsfield waste water treatment plant and crosses portions of numerous state-owned and privately owned areas. The second easement extends east to west and crosses a state-owned area. EPA and GE personnel observed dirt bike riding, riding ATVs, walking, hiking, biking, dog walking and wild crop gathering. Based on the types of higher exposure activities observed, EA 12 was evaluated for the young child, older child, and adult receptors. Both utility worker and recreational exposure occur at these easements; however, recreational exposure is evaluated for EA 12 because it would result in the higher exposure. Utility worker exposure on the second easement is also evaluated in EA 63 to separately address the safety of utility workers.

- EA 37b is located north of New Lenox Road and covers a portion of Utility Corridor 66. EA 37b is a high-use subarea of the larger EA 37 where hikers, bird watchers, and hunters were observed using the utility easement. EA 37b was evaluated as the general recreational scenario for the older child, and adult receptors. Utility worker exposure is evaluated separately in EA 66.

These EAs have Performance Standards (referred to as cleanup standards in the Draft Permit Modification) set for General Recreation as recommended by the commenter. As shown in the table below, these Performance Standards are much more stringent than the Performance Standards for utility corridors. In addition, floodplain soil in frequently used subareas, which include portions of EA's 4, 12, and 37b, require the top 3 feet of soil be excavated and replaced to achieve the Performance Standard presented in Table 2 of the Final Permit.

Except as described above, EPA and GE did not observe evidence of active trails or paths on EA 61-66. Therefore, these areas were evaluated as utility right of ways and Performance Standards were set to be protective of utility workers.

The table below compares the Performance (Cleanup) Standards for the EAs where active trails and paths were identified to the Performance Standards for utility corridors.

Exposure Area	Primary Performance Standard (mg/kg)	Secondary Performance Standard (mg/kg)
4, 12, 37b (General Recreational)	14	27
61-66 (Utility Worker)	169	242

EPA believes the Final Permit Modification is protective in areas with trails and paths since the areas identified as trails/paths have separate EAs with Performance Standards based on a high use recreation exposure scenario. In addition, for the remaining areas of the utility corridors, the Performance Standards for the protection of utility workers also need to be met.

Comment 231: Have the human health and ecological risk assessments completed in 2003 been updated with new numbers and information?

EPA Response 231: As discussed in the responses above in this Section II.F, in June of 2003 EPA issued the HHRA for public comment and review by the HHRA peer-review panel. Following the peer-review process established in the Decree, EPA released the Responsiveness Summary to the Peer Review of the HHRA in March of 2004. Based on recommendations from the peer review, EPA issued an updated HHRA in February of 2005. In addition to issuing the updated HHRA, an 11 page summary was publically released that described the changes and additions included in the March 2005 updated HHRA. Finally in June of 2005, EPA issued the Responsiveness Summary to Public Comments on New Information for the HHRA.

EPA followed a similar process for the ERA. In July of 2003 EPA issued the ERA for public comment and review by the ERA peer review panel. Following the peer-review process established in the Decree, EPA released the Responsiveness Summary to the Peer Review of the ERA in June of 2004. Based on recommendations from the peer review, EPA issued an updated ERA in November of 2004. In addition to issuing the updated ERA, a 10 page summary was publicly released that described the changes and additions included in the November 2004 updated ERA. Finally in March of 2005, EPA issued the Responsiveness Summary to Public Comments on New Information for the ERA.

Comment 232: The HHRA assumed a maximum exposure of 50 fish meals per year and an average exposure of 7 meals per year. Is this information from a survey of local fishermen? These exposure assumptions will not protect subsistence fishers.

EPA Response 232: The estimated fish meals per year used in the HHRA exposure assessment was not based on a survey of local fisherman because it was considered inappropriate to estimate fish consumption from an area where a fish consumption prohibition had been, and remains, in effect. The assumption was that any local fish consumption survey would provide data that was biased low compared to fish consumption from an uncontaminated river. It is EPA's policy to evaluate fish consumption at a rate that would be applicable to an uncontaminated river; to do otherwise would inappropriately minimize the amount of cleanup necessary to achieve target post-remediation risk levels.

The fish consumption rate was derived, as described in the HHRA, on a fish consumption study for a river in Maine that was considered similar to the Housatonic River and not under a fish

consumption warning that could reduce local consumption rates. The maximum and average consumption rates used in the HHRA were based on this survey.

Subsistence fishing was not evaluated in the HHRA. EPA attempted to locate subsistence fishing populations in both the Massachusetts and Connecticut portions of the river and none was found. EPA noted in the HHRA that if subsistence fishing populations were identified in the future, additional evaluation would be necessary.

EPA continues to believe the assumptions used for fish consumption in the HHRA are appropriate.

Comments 84, 585, 586, 587, 588, 589: The following are asserted by GE or another commenter: EPA used unrealistic exposure assumptions in the Human Health Risk Assessment. For example, EPA assumed that a person will be walking barefoot up to his ankles in sediment Monday, Wednesday and Friday every week of the months of April through November and continue doing that for 93 years. That is the kind of nonsense that drives the cleanup standards that become the justification for the need to cleanup to five parts per million instead of 25 to 50 or even more parts per million.

Many of the HHRA's RME exposure assumptions that underlie the EPA-approved IMPGs based on direct contract are unrealistic and unsupported and overstate exposures and risks. This was demonstrated in detail in GE's comments on the initial and revised drafts of the HHRA and in GE's initial IMPG Proposal.

For many of the floodplain EAs that EPA determined fall into a general recreational scenario, EPA has assigned an assumed frequency of use that is implausibly high and inconsistent with empirical data on actual frequency of use. For 62 EAs that EPA has designated as "high use" recreational areas, EPA assumes that an individual would use those areas 90 days per year and would continue to do so for 47 years. For other EAs, designated as "medium use" or "low use" recreational areas, EPA has assumed an exposure frequency of 60 days per year or 30 days per year, respectively, for the same duration. These exposure frequencies are unrealistic, particularly given that many of these areas are subject to physical constraints, such as wetlands, dense vegetation, and steep slopes.

The unrealistic nature of the exposure frequencies assumed in the HHRA was demonstrated by an empirical Floodplain User Survey conducted from April through October 2002, which revealed that most floodplain areas receive little or no recreational use, and therefore many of the exposure frequencies used in the HHRA substantially overestimate use. The Floodplain User Survey, for example, found 24 EAs for which EPA assigned a recreational exposure frequency of 90 days per year but at which the survey showed either no recreational users or six or fewer total recreational visits over the season, despite the extensive coverage of the survey. Clearly, if the frequency of use assumed by EPA in those EAs were occurring, the survey would have observed more usage.

Additional unrealistic and overstated exposure assumptions in the HHRA, other than those listed in paragraph above, include: (a) overstated exposure frequencies for the dirt biking and sediment exposure scenarios; (b) assumed daily soil ingestion rates that are based on pre-1997 studies and

are twice as high as those developed based on more recent studies with improved protocols; and (c) the HHRA's assumption that individuals would obtain 100% of their total daily soil ingestion from the floodplain (as opposed to other areas, such as home, work, school, other recreational areas) even for floodplain recreational activities that are relatively short in duration.

To illustrate the impact of using the overstated exposure assumptions noted in Specific Comments 587 and 588, GE has determined what the cleanup standards would be if those assumptions were replaced with more reasonable (but still conservative) assumptions. For that purpose, GE has used the alternate RME IMPGs that GE identified in its initial IMPG Proposal, which were based on more realistic assumptions for the exposure parameters discussed above; but it has adjusted them so that the toxicity inputs are based on EPA's PCB toxicity values. GE has applied these cleanup standards to the floodplain EAs using the same approach used by EPA – i.e., applying the more supportable Primary and Secondary Cleanup Standards to the same EAs to which EPA applied its Primary and Secondary Cleanup Standards. The results of this exercise show that application of these more supportable cleanup standards to the floodplain EAs would require removal of approximately 10,000 cubic yards of soil, compared to the 75,000-80,000 cubic yards of removal required by EPA's proposed remedy.

EPA Response 84, 585, 586, 587, 588, 589: Commenters (a private citizen and GE) assert that exposure assumptions in the HHRA are unrealistic and overstate exposures and human health risks. In fact, the exposure assumptions properly estimate levels of exposure for human populations, including persons most at risk. Under the NCP, "acceptable exposure levels" must "represent concentration levels to which the human population, including sensitive subgroups, may be exposed without adverse effect during a lifetime or part of a lifetime, incorporating an adequate margin of safety." See 40 C.F.R. § 300.430(e)2(i)(A)(1). In accordance with this regulation and Agency guidance, the HHRA evaluated the central tendency exposure risks for persons with "average" exposure, as well as reasonable maximum exposure ("RME") for "high-end" or "maximally exposed" persons. HHRA Section 7.1.

The exposure assumptions used in the HHRA were established following the procedures outlined in EPA guidance. For example, EPA's 1995 *Guidance for Risk Characterization* states that the "high end [RME] descriptors are intended to estimate the exposures that are expected to occur in small, but definable, "high end" segments of the subject population." EPA's 1992 *Guidelines for Exposure Assessment* defines the RME as "… a plausible estimate of the individual risk for those persons at the upper end of the risk distribution. The intent of this description is to convey an estimate of risk in the upper range of the distribution, but to avoid estimates which are beyond the true distribution." EPA's 1990, *Risk Assessment Guidance for Superfund* notes that "The intent of the RME is to estimate a conservative exposure case (i.e., well above the average case) that is still within the range of possible exposures." The RME risk serves as the point of departure in remedy selection as outlined in the NCP. The CTE exposure was also evaluated consistent with EPA's Risk Characterization Policy and Handbook to provide the risk manager with additional information to consider while making decisions.

The basis for and derivation of each exposure assumption used in the HHRA is described in detail in both the initial and revised Phase 2 Direct Contact Risk Assessment HHRA (Volume IIIA, Appendix B). All exposure assumptions, including assumptions about recreational use, dirt biking and sediment exposure scenarios, and soil ingestion rates, were derived from site-specific

information when available or Agency guidance. See Final HHRA, Volume IIIA, Appendix B, Section 4. In particular, incidental ingestion rates and recreational exposure assumptions are based on information discussed in Subsections 4.5.2 and 4.5.3.

The exposure assumptions used in the initial HHRA were among the subjects reviewed by the Peer Review Panel. As summarized on page 16 of the HHRA Responsiveness Summary, five of the seven members of the Peer Review Panel for the HHRA commented that the approach, including the selection of exposure scenarios, receptors, exposure parameters, and risk estimates used to estimate risk from direct contact, was reasonable and consistent with EPA policy.[3] EPA agrees with the majority of the Peer Review Panel members that the assumptions used to estimate risk from direct contact were reasonable and consistent with EPA policy.

Comments 590, 591: GE asserts that even accepting EPA's exposure assumptions, a less disruptive remedy than proposed by EPA would still achieve levels within EPA's acceptable cancer risk range and below an acceptable non-cancer hazard index for direct contact, and thus would adequately protect health. For example, Alternative SED 10/FP 9, which would involve removal of approximately 26,000 cubic yards of floodplain soil and 235,000 cubic yards of sediment, would achieve the EPA-approved RME IMPGs based on a 10^{-4} cancer risk and a non-cancer HI of 1 in all of the floodplain and sediment EAs, and would achieve the EPA-approved RME IMPGs based on a 10^{-5} cancer risk and a non-cancer HI of 1 in the majority (over 65%) of the direct-contact floodplain EAs and in all but one of the sediment EAs.

It is significant that EPA accepts 10^{-4} cancer risks for fish consumption and for direct contact exposure in Core Area 1, but not for direct contact in other EAs. EPA has provided no health basis for that distinction. Since a smaller removal alternative such as SED 10/FP 9 would achieve cleanup levels based on a 10^{-4} cancer risk and a non-cancer HI of 1 in all EAs, it would provide protection of human health from potential risks due to direct contact.

EPA Response 590, 591: EPA disagrees with GE's assertion. First, EPA notes that attainment of IMPGs, including direct contact IMPGs, is only one of the decision factors that EPA balanced in selecting the remedy, and GE only discusses the least stringent cancer risk IMPG for protection of human health from the direct contact pathway and completely ignores the attainment of ecological IMPGs. Second, GE argues in essence that EPA should select the least costly alternative that would achieve the least stringent human health risk levels allowable under the NCP, and that EPA erred in selecting a remedy that achieves more stringent levels.

The NCP provides that the most stringent cancer risk level (10^{-6}) is the "point of departure for determining remediation goals for alternatives when ARARs are not available or are not sufficiently protective because of the presence of multiple contaminants at a site or multiple pathways of exposure." (40 C.F.R. § 300.430(e)(2)(i)(A)(2)). The preamble to the NCP explains that this "point of departure," …expresses EPA's preference for remedial actions that result in

[3] One reviewer considered the selection of exposure parameters reasonable, but thought that the combination of exposure parameters resulted in overly conservative risk estimates for most of the scenario/receptor combinations. Another reviewer commented that individual exposure parameters were too high and the combination of exposure parameters resulted in extreme estimates of risk, rather than risk to an RME.

risks at the more protective end of the risk range, but this does not reflect a presumption that the final remedial action should attain such a risk level. Factors related to exposure, uncertainty and technical limitations may justify modification of initial cleanup levels that are based on the 10-6 risk level. The ultimate decision on what level of protection will be appropriate depends on the selected remedy, which is based on the criteria described in § 300.430(e)(9)(iii). (55 Fed. Reg. 8666-01, 8718–19 (March 8, 1990)).

Thus, EPA begins its evaluation at the most stringent end of the risk range (10^{-6}), and adjusts that target downward only where necessary given site-specific factors.

With respect to the specific cancer risk IMPG raised by GE, which again is the least stringent allowable cancer risk level, the SED 10/FP 9 proposal favored by GE achieves the 10^{-5} cancer risk level in fewer of the floodplain areas than the proposed remedy, which achieves the 10^{-5} risk level in all of the frequently used subareas and from 71% to 100% of the floodplain/sediment exposure areas, depending upon the extent of remediation conducted in NHESP Core Areas 2 and 3, to be decided on a case-by-case basis.

Other alternatives may achieve less stringent IMPGs as GE claims. But the Final Permit Modification best meets the Permit's general standards, in consideration of the selection decision factors, including a balancing of those factors against each other. The proposed remedy achieves a non-cancer hazard index of one, provides more protection against cancer risks, and ensures long-term protection of the environment from risks posed by PCBs.

This conclusion is supported by the Administrative Record, including without limitation the Comparative Analysis.

Comments 607, 612, 613: GE asserts that in contrast to the adverse ecological impacts of the proposed remedy, the ecological risks identified by EPA are tenuous and uncertain at best. EPA guidance specifies that the purpose of ecologically based remediation is "the recovery and maintenance of healthy local populations and communities of biota," not to protect "organisms on an individual basis." However, many of the studies and conclusions in EPA's ERA on which the ecological IMPGs were based focused on effects on individual animals, rather than local populations and communities, and used highly conservative and, in some cases, unsupportable assumptions and inputs that overstate risks.

The absence of any discernible adverse impacts of PCB exposure on the local wildlife populations and communities in the Rest of River is evidenced by the presence of numerous, diverse, and thriving plant and animal populations in the PSA, including numerous state-listed rare species, that continue to reproduce and inhabit the PSA despite the presence of PCBs in the area for over 70 years. As stated by the Commonwealth in its January 2011 comments on the RCMS, despite the "legacy of contamination" in the River and floodplain resulting from the PCB releases "from the 1930s through the 1970s," the "Housatonic River Watershed encompasses a rich and unique ecosystem supporting many rare plant and animal species and their associated habitats, including wetlands, floodplains, vernal pools, surface waters, and forested areas."

The current thriving Rest of River ecosystem demonstrates the uncertainty that there are any residual risks from PCBs to local populations and communities of wildlife in the Rest of River,

and consequently the uncertainty of the benefits of remediation to address those potential risks. As the Commonwealth noted, "any potential benefits associated with remediation to achieve ecological IMPGs would be far outweighed by the short and long-term damage to the meandering character of the Housatonic River ecosystem and to the associated state-listed species and their habitats," and "in virtually all instances the actual and inevitable damage to this existing, unique ecological resource will far exceed the theoretical benefit of lower PCB concentrations."

Comment 614: GE asserts the following: EPA's proposed remedy does not include remediation that is directed specifically to attaining any ecological protection goals, except for amphibians in vernal pools. However, EPA asserts that the remedy developed on supposed human health grounds will also reduce ecological risks. Alternative remedies involving much less extensive removal could achieve comparable reduction in human health risks and would have fewer adverse ecological impacts. As recognized by the Commonwealth, any uncertain theoretical ecological benefits of the remedy are far outweighed by the certain, substantial, and inevitable ecological damage. In these circumstances, EPA's proposed remedy would not provide "overall" protection of the environment, would cause more harm than necessary, and is therefore arbitrary and capricious.

EPA Response 607, 612, 613, 614: GE incorrectly characterizes the ecological risks posed by PCBs in the Rest of River area. In fact, PCBs pose significant risks to the health of local populations of organisms, such as amphibians, wood ducks and piscivorous birds, and piscivorous mammals. The risks posed in the Primary Study Area ("PSA")—the roughly 11-mile portion of the river from the confluence, two miles below the GE facility, to Woods Pond Dam—and downstream areas between the PSA and the Derby-Shelton Dam in Connecticut were thoroughly evaluated in EPA's ERA.

The ERA characterized and, where appropriate, quantified the risks to biota that are exposed to PCBs and other contaminants of concern that are found in the sediment, surface water, riverbank and floodplain soil, and tissue in the Rest of River area. Using a weight-of-evidence approach, EPA considered several lines of evidence and evaluated whether significant risk is posed to the environment. July 2003 ERA at ES-12. Risks to several types of biota were assessed: benthic invertebrates, amphibians, fish, birds (including insectivorous and piscivorous birds), mammals (including piscivorous and omnivorous/carnivorous mammals), and threatened and endangered species. Where possible and/or appropriate, three lines of evidence were evaluated for each species: field studies, site-specific toxicity studies, and a comparison of exposure and effects.

The weight-of-evidence assessments indicated that aquatic life and wildlife in the PSA are experiencing unacceptable risks as a result of exposure to PCBs and other contaminants of concern. Confidence in this conclusion is high for benthic invertebrates, amphibians, and piscivorous mammals, based on multiple lines of supportive evidence. Downstream of the PSA, PCBs could potentially be causing adverse effects to benthic organisms in depositional areas as far as Reach 8, amphibians in floodplain areas as far as Reach 8, trout in Reaches 7 and 9, mink as far as Reach 10, and river otter as far as Reach 12. 2003 ERA at pages ES-43, ES-50.

In July 2003, EPA issued the initial draft of the ERA and solicited comment from GE and the general public. GE's 2004 comments on initial ERA included arguments similar to those above.

For example, GE asserted that "[o]verall, the evidence does not show adverse impacts on local populations and communities of ecological receptors despite 70 years of PCB exposure." Comments of the General Electric Company on USEPA's Ecological Risk Assessment for the Housatonic River Site, Rest of River, January 13, 2004, at 76 of Presentation to Peer Review Panel. However, the risk assessment considered substantial evidence which showed that unacceptable adverse impacts were occurring and would continue to occur without remediation activities. This evidence includes the adverse effects observed in site-specific field and laboratory studies conducted for the ERA (e.g., the mink feeding study) as well as the comparison of the numerous known adverse effect levels published in the scientific literature with site-specific contaminant concentrations. 2003 ERA, Risk Characterization Sections 3.4, 4.4, 5.4, 6.4, 7.4, 8.4, 9.4, 10.4, 11.4.

GE also argued in 2004 (and continues to argue) that the ERA improperly focused on effects to individual organisms instead of local populations and communities. While EPA disagreed with GE's premise, it agreed to clarify that, in accordance with EPA guidance (EPA 1997 Ecological Risk Assessment Guidance for Superfund), "impacts at lower levels of organization (e.g., adverse effects on survival of individuals) are often used to infer possible impacts at higher levels of organization (e.g., persistence of local populations)." EPA Responsiveness Summary to the Peer Review of the ERA at 30 and 31. The final ERA, issued in November 2004, explained that "[a]lthough many of the endpoints presented are linked to organism-level effects (e.g., survival and reproduction), these endpoints are expected to be strong indicators of potential local population-level effects," and "[e]xtrapolation from organism-level to population-level effects may be logically achieved based on the predictive nature of the endpoint and/or through the use of process-based models." Final ERA at page 2-68 (citing Ecological Risk Assessment and Risk Management Principles for Superfund Sites. OSWER Directive 9285.7-28P. 1992. Framework for Ecological Risk Assessment. Risk Assessment Forum, Washington, DC. EPA/630/R-92/001).

The initial ERA and the public comments (including GE's 2004 comments) were subject to peer review by a panel of independent risk assessment experts. Although the peer reviewers did provide critical comments on some aspects of the ERA, their comments were generally supportive of the ERA's conclusions and methodology. EPA Responsiveness Summary to the Peer Review of the ERA.

With respect to the Commonwealth's position, the Commonwealth has concurred on EPA's selected remedy, and has explained in detail its position. See also Response 80 *et al*. in Section II.E. above.

In short, the ERA shows that PCBs in Rest of River pose significant and unacceptable risks to the ecosystem and biota. Accordingly, EPA has selected a remedy that will address those significant and unacceptable risks.

Comment 608: GE states that to demonstrate ecological risks to amphibians, the ERA relied on a site-specific wood frog field study. That study showed that PCBs had no effects on survival, hatching success, or metamorphosis of frogs. The only effects reported in the study were a calculated increase in malformations in wood frog metamorphs and a supposed skewing in sex ratio, neither of which has a direct relationship to the sustainability of the local wood frog population. The lower-bound IMPG (3.3 mg/kg) was based on the calculated 20% effect level

(EC20) for metamorph malformations (i.e., the sediment concentration associated with a 20% incidence of such malformations). However, use of an EC20 value for metamorph malformations from this study to set an effects threshold for amphibians is not appropriate because these frogs have a reproductive strategy in which they produce many more offspring than will ultimately survive and in which the loss of some individuals is compensated for by increased survival in other individuals (density dependence). Thus, these frogs can well tolerate a 20% or greater effect, even if the malformations led to mortality; and consequently a 20% incidence of malformations would not be expected to affect the local wood frog population. (EPA itself recognized that the EC20 for sex ratio was not biologically relevant.)

EPA Response 608: EPA agrees with GE that the derivation of the lower-bound IMPG for amphibians (3.3 mg/kg PCB) was based on EPA's field study of wood frogs (calculated using the methodology recommended by the Peer Review Panel) summarized in the ERA (Final ERA, Appendix E at E-145); however EPA disagrees with GE's characterization of the amphibian risk assessment and the IMPG.

It is accepted practice in a typical assessment of ecological risk to conduct studies using surrogate or representative species (e.g., wood frogs and leopard frogs) to estimate risks to the larger taxonomic group (e.g., amphibians), as it is impossible to study all effects to all taxa within a group as a practical matter. See EPA's 2002 Framework for Ecological Risk Assessment, EPA/630/r-92/001. As discussed in Appendix E of the ERA, this procedure was followed for the amphibian portion of the ERA, in which the results of field studies of wood frogs and leopard frogs were combined with other lines of evidence to reach the conclusion that there is significant risk to local populations of amphibians in the Housatonic River. Final ERA, Appendix E. The majority of the Peer Review Panel agreed with EPA's conclusion. Responsiveness Summary to Peer Review of the ERA, at 184.

Additionally, to clarify, EPA's assessment of risk to this taxonomic group was not based solely on a site-specific wood frog field study. In fact, risk to amphibians was demonstrated using three lines of evidence (field studies, laboratory studies, and review of the effects of PCBs on amphibians documented in the scientific literature) as documented in the ERA, not solely the site-specific field study for wood frogs. EPA also modeled the effect of the metamorph sex ratio and malformations on local population dynamics for wood frogs. The modeling supported the weight of evidence of risk to amphibians from PCBs, specifically, that PCBs have an impact on wood frog population growth and abundance and hasten population decline, reduce population numbers, and increase the likelihood of local extinction. Final ERA, at 4-66.

EPA does recognize that populations of frogs and other amphibians have reproductive strategies that can withstand losses of individuals during development. EPA's wood frog study was designed to assess the potential impact of PCBs on different amphibian life stages, including reproduction, growth, and maturation, based on known or expected toxicological effects of PCBs on amphibians documented in the scientific literature. However, many of those effects (or combinations of effects) from PCB exposure are biologically relevant at the local population level. The lower-bound IMPG for amphibians was based on two sensitive and biologically relevant endpoints (metamorph malformation and sex ratio), which act in concert to limit the viability of local wood frog populations in the ERA, the term used was "MATC" or Maximum Acceptable Threshold Concentration"; the IMPGs in the Final Permit Modification were

developed based on the MATC. The sediment lower-bound IMPG of 3.3 mg/kg PCB was established, which corresponds to a 20% incidence of malformation (which would lead to either death or sterility in the adult, among other issues), rather than the more conservative 20% incidence rate for metamorph sex ratio observed at the lower PCB concentration of 0.61 mg/kg. A Peer Review Panel member noted that Ouellet (2000) suggests that malformation rates greater than 5% are biologically relevant. The stochastic population modeling conducted by EPA and presented in the ERA supports the conclusion that these effects are biologically relevant. It should be noted that the objective of the IMPG, while derived from data on one species, is to provide adequate protection for all amphibian species, including those that may be more sensitive to PCBs than the wood frog (e.g., leopard frogs, salamanders).

Therefore, based on the weight of evidence available for the amphibian risk endpoint, EPA disagrees with GE's assertion that wood frogs can tolerate a 20% or greater effect level, and maintains that EPA is correct in using this IMPG in the Performance Standard for Vernal Pools.

Comment 609: GE states that to demonstrate risks to insectivorous and piscivorous birds, EPA required that the IMPGs be based on a calculated effect level of less than 20% based on a 1974 literature study of chickens, which have been shown to be many times more sensitive to PCBs than wild bird species. In addition, for piscivorous birds, EPA required that the IMPG be based on a modeled food intake rate for a group of bird species that does not include piscivorous birds.

EPA Response 609: Regarding the ecological risk assessments for insectivorous birds and piscivorous birds, GE mischaracterizes the risk assessment process that was followed for the Rest of River. First, EPA did not "require" that any specific effect level be used for any of the endpoints examined in the final ERA, nor did EPA "require" that any IMPG be based on a particular modeled food intake rate. EPA's only requirement was that the risk assessment follow sound scientific procedure and established EPA guidance. Effects and exposure levels used for any of the endpoints were selected by the risk assessors and subsequently peer-reviewed by an independent panel of risk assessment experts. In their review of the July 2003 ERA, Peer Review Panel members commented favorably on the decision criteria used to select effects metrics for wildlife, which included the two bird endpoints. Responsiveness Summary to the Peer Review Comments on the ERA, at Section 2.

Laboratory studies were not available to characterize effects of PCBs to the surrogate species used in the avian risk assessments, and the field studies had significant limitations which prohibited their being taken into account in deriving an IMPG. Therefore, a threshold range was derived using toxicity data from the scientific literature, in accordance with the decision criteria established in the ERA. A threshold range provides a range of doses that would be protective of the most sensitive bird species (the lower end of the range) as well as the most tolerant bird species (the upper end of the range). The threshold range for insectivorous and piscivorous birds selected for the assessment conducted in the ERA was 0.12 to 7.0 mg/kg body weight/day based on reproductive studies conducted on white leghorn chickens and American kestrels, respectively. (The studies were as follows: Lillie, R.J., H.C. Cecil, J. Bitman, and G.F. Fries. 1974. *Differences in response of caged white leghorn layers to various polychlorinated biphenyls (PCBs) in the diet*. Poultry Science 53:726-732; Fernie, K.J., J.E. Smits, G.R. Bortolotti, and D.M. Bird. 2001. *Reproductive success of American kestrels exposed to dietary polychlorinated biphenyls*. Environmental Toxicology and Chemistry 20:776-781). The Peer

Review Panel members were supportive of the approach and the data used to derive the threshold range for these endpoints. Responsiveness Summary to the Peer Review Comments on the ERA.

With regard to piscivorous birds, EPA acknowledges the fact that the dataset from which the modeled food intake rate taken into account to calculate the piscivorous bird IMPG was derived did not include the osprey. As noted in the final ERA (Volume 6, page H-25), there were insufficient data to generate an allometric equation for Falconiformes, of which osprey are members, so the equation for Charadriiformes was used. However, this latter group includes many piscivorous birds, and was therefore deemed by EPA to be acceptable, lacking an alternative. Again, the independent ERA Peer Review Panel did not express concerns with this accepted approach to establishing effect levels for groups with limited experimental data.

The analysis of how the proposed remedy (as well as the other alternatives) attains the ecological IMPGs is documented in EPA's Comparative Analysis. Even though EPA did not include specific Performance Standards requiring attainment of IMPGs for these receptors, the remedy will reduce risks by significantly reducing exposure of these receptors to PCBs in sediment, surface water and biota. (Comparative Analysis at pp. 39-41).

Comment 610: To demonstrate risks to piscivorous mammals (mink), EPA relied on a study of ranch-bred mink that were fed fish from the Housatonic River at various PCB concentrations. Based on a statistical analysis of the data from this study, EPA derived a 20% effect level for kit survival at 6 weeks (0.984 mg/kg in fish), and required that concentration to be defined as the lower-bound IMPG. However, that concentration is below a dose at which no effects were found in the study, and the study showed no consistent dose-response relationships. Additionally, the investigators did not necropsy the kits that died prior to 6 weeks but simply assumed that their death was caused by PCBs, even though necropsies on kits that died later showed that their deaths were due to infections, not PCBs.

EPA Response 610: EPA disagrees with GE's statements about the study of PCB toxicity to mink. These same points were raised over a decade ago in GE's comments on the ERA; EPA responded thoroughly at that time, and EPA's approach was supported by a majority of the Independent Peer Review Panelists at that time. Responsiveness Summary to the Peer Review Comments on the ERA, at 69-70; Responsiveness Summary to Public Comments on New Information on the ERA, at 52 to 60.

As was the case with amphibians, a MATC was derived from effects on one species of the taxonomic group (i.e., mink) that must be protective for all species in the group, including those that may be more sensitive (i.e., river otter). The MATC of 0.984 mg/kg PCB corresponds to a concentration that would be expected to cause 20% reduced survival (LC20) of mink kits from 0 to 6 weeks of age, an effect judged by EPA to be biologically relevant. This PCB concentration is higher than the Lowest Observed Adverse Effect Level (LOAEL) of 0.72 mg/kg determined from studies conducted regarding PCB contamination in Saginaw Bay, and nearly four times higher than the LC20 (0.248 mg/kg) derived from those studies. See, Bursian, S. J., Sharma, C., Aulerich, R. J., Yamini, B., Mitchell, R. R., Orazio, C. E., Moore, D. R. J., Svirsky, S. and Tillitt, D. E. (2006), *Dietary Exposure Of Mink (Mustela Vison) To Fish From The Housatonic River, Berkshire County, Massachusetts, USA: Effects On Reproduction, Kit Growth, And Survival*. Environmental Toxicology and Chemistry, 25: 1533–1540. doi:10.1897/05-406R.1. There was

consensus among the Peer Review Panel members regarding the overall scientific validity of the design, conduct, and interpretation of the mink feeding study, although a few had differing opinions with regard to the magnitude of the risk. Responsiveness Summary to the Peer Review Comments on the ERA, at 290 - 292.

With regard to the lack of necropsies performed on kits that died prior to six weeks of age, this question was also clearly explained in Response GE-27 and O-RS-25 in the ERA Responsiveness Summary. In summary, it is standard operating procedure in conducting these studies at Michigan State University to not necropsy young mink kits because of the cannibalistic behavior of maternal mink and other kits toward dead offspring, leaving no carcass to necropsy; other studies reported in the scientific literature also did not necropsy young mink kits. This lack of data in no way invalidates the results of this study, as clearly indicated by the Peer Reviewers' remarks. As discussed in the ERA, the conclusion that these kits died as a result of PCB exposure is supported by data on kit weight, which is known to be depressed by PCB exposure, and the negative relationship between PCB concentration and kit survival. If other contaminants were responsible for the observed kit deaths, the results would be expected to be random with respect to PCB concentration.

Note that EPA did not include Performance Standards for attainment of IMPGs for piscivorous mammals in the Final Permit Modification. The analysis of how the proposed remedy (as well as the other alternatives) attains the ecological IMPGs is documented in EPA's Comparative Analysis.

Comment 611: In addition to requiring use of such overly conservative IMPGs, EPA required GE to apply those IMPGs to designated "averaging areas" that are not consistent with the objective of protecting local populations of wildlife. For example, for most of the ecological receptor groups included in the ERA, the local populations extend over the entire PSA or, in some cases, beyond the PSA. However, for several groups of these receptors, including insectivorous birds (represented by wood ducks), piscivorous mammals (represented by mink), and omnivorous/carnivorous mammals (represented by short-tailed shrews), EPA directed GE to use smaller averaging areas, which ignore the extent of the local populations of these birds and mammals and overemphasize the potential effects of PCBs on individual animals in small areas. Similarly, for amphibians (represented by wood frogs), EPA directed GE to apply the IMPGs to every vernal pool and backwater area in the PSA as a separate averaging area, even though EPA's own ERA identified the wood frog population in the PSA as encompassing those frogs breeding within all of the PSA vernal pools identified as having suitable wood frog breeding habitat. These directives result in an overestimate of the potential impacts of PCBs on the local populations of these wildlife species.

EPA Response 611: As noted in EPA's April 13, 2007 Conditional Approval Letter to the Corrective Measures Study Proposal, the averaging areas used for evaluation of Corrective Measures for floodplain soil must relate specifically to the appropriate habitats, home ranges, and/or foraging ranges for representative species applicable to each IMPG. Averaging over the entire floodplain is only acceptable for species that will be exposed over the entire floodplain.

In EPA's Attachment to its August 29, 2007 letter to GE regarding "Dispute Resolution on EPA's Conditional Approval Letter for GE's Supplement to the Corrective Measures Study

Proposal", the "Revised Conditions Relating to Corrective Measures Study Proposal Supplement, Condition 4" indicates:

> As noted in the species profile for mink in the ERA (WESTON, 2004), mink have home ranges in riverine habitats extending linearly from around 2/3 of a mile to 3-5 miles along shorelines and laterally about 200 meters from the shorelines. Given that approximately 90% of the mink diet is from the aquatic environment and that the tributaries provide little in the aquatic species that comprise the diet, it is reasonable to assume that the mink forage entirely within the 1-mg/kg isopleth. GE shall limit the exposure area for mink in the PSA to the 1-mg/kg isopleth.
>
> As noted in the species profile for mink in the ERA (WESTON, 2004), female mink have been documented to have home ranges as small as 19.3 and 50.4 acres, and linear home ranges as small as 0.7 mile. All of these ranges are well within the extent of a single subreach. GE shall average exposure concentrations over (1) subreaches 5A and 5B, and (2) subreaches 5C, 5D, and 6, resulting in two averaging areas for the PSA exposures for mink.

EPA, August 29, 2007, Dispute Resolution on EPA's Conditional Approval Letter for GE's Supplement to the Corrective Measures Study Proposal.

Analogous to the concepts presented for the mink above, as noted in the species profile for shrew in the 2004 ERA, shrew have home ranges of 0.06 acre to 0.5 acre and do not seasonally migrate, remaining in home range. The ranges are well within the extent of the 1-mg/kg PCB isopleth of a single subreach. Although it is true that short-tailed shrew habitat is widespread throughout the floodplain, it is not appropriate to consider the entire floodplain as a single averaging area for evaluating the effectiveness of corrective measure alternatives in protecting shrew populations. Because the home range of shrews is much smaller than the Rest of River floodplain, such averaging may result in an alternative being considered protective when, in fact, some shrew populations may remain impacted.

In addition, as per the species profile for wood duck in the 2004 ERA, wood duck eat a high percentage of aquatic insects to build up energy reserves needed for egg formation and laying. Wood duck were selected as a representative of the nine species of ducks and geese that potentially occur within the study area, three of which breed in the study area. They nest in wooded areas close to streams, rivers, ponds, and lakes; and nest in tree cavities and will roost in trees. Home range is variable depending on the availability of food. In productive areas, they stay within 1 km of their nesting areas. Which, again, is within the extent of a single flowing subreach for which non-MNR aquatic exposures apply. Woods Pond Backwaters, Woods Pond, and Rising Pond range in size from 45 to 120 acres, with each being more than adequate to support wood ducks, given the general wood duck box deploying density is 1 per acre. Accordingly, averaging of concentrations over the entire PSA to evaluate the effectiveness of corrective measure alternatives in controlling risk to insectivorous birds is inappropriate.

With regard to applying IMPGs to each Vernal Pool and Backwater area in the PSA as a separate averaging area, these areas do require special consideration. Amphibian reproduction and early life stages occur in a very localized area. Some species may be in only certain pools, every pool

is not necessarily used every year for breeding by each species; some areas may not be wet (depending upon variability in rainfall and snowmelt); and some may be experiencing other disturbances. In addition, wood frogs, in particular, are not known to migrate long distances and show fidelity to their natal pools. Therefore, collapse in one pool/backwater area could represent a relevant effect level within the Rest of River floodplain and clean-up standards must be applied to an individual water body (e.g., Vernal Pool or Backwater area).

Comment 758: GE asserts the following: Its initial IMPG Proposal, submitted in September 2005, presented not only a set of IMPGs based on EPA's HHRA and ERA, but also an alternate set of IMPGs based on assumptions, data interpretations, and other inputs that GE determined were more reasonable and supportable. EPA disapproved that proposal in December 2005. In doing so, EPA did not address those alternate IMPGs on their merits, but simply directed GE to revise the IMPG Proposal to eliminate them and to base all IMPGs ***only*** on the assumptions, values, and interpretations set out in EPA's HHRA and ERA.

That directive was not consistent with the Permit because the Permit required only that, in its IMPG Proposal, GE "tak[e] into account" EPA's HHRA and ERA (Permit Special Condition II.C.8). That provision does not require that the proposed IMPGs must necessarily use all of the same exposure assumptions, toxicity values, and data interpretations used in the EPA risk assessments, but rather that they be considered. In developing the alternate IMPGs, GE did "take into account" the HHRA and ERA, because it used the same exposure scenarios and receptors used in the risk assessments and it carefully considered and evaluated the assumptions and other inputs used in those risk assessments, using many of them and providing a rationale for any alternatives used.

Regardless of the validity of GE's conclusion that many of the assumptions, values, and inputs used in the HHRA and ERA are not supported by site conditions or the evidence, there is at least sufficient uncertainty regarding the risks and effects of PCBs that it was arbitrary for EPA to completely prohibit GE from using an alternate set of values in addition to the values based on the HHRA and ERA. Use of such alternate values would provide more information on the potential range of risks and protective levels.

EPA Response 758: EPA disagrees with GE's assertions. EPA's disapproval of GE's alternative IMPGs was reasonable and appropriate, and consistent with the Decree and Permit requirements.

When placed in proper context, the Permit requirements at Section II.C. and Section II.C.8 both make clear that it is reasonable for EPA to have considered the protectiveness of the proposed IMPGs, and for EPA to disapprove GE's proposal on multiple bases:

> The proposed IMPGs shall consist of preliminary goals that are shown to be protective of human health and the environment and that will serve as points of departure in evaluating potential corrective measures in the subsequent Corrective Measures Study.

Permit, Section II.C.

> And

> The IMPG Proposal shall include a justification demonstrating that the proposed IMPGs, if achieved, would ensure protection of human health and the environment, taking into account EPA's Human Health Risk Assessment Report and its Ecological Risk Assessment Report.

Permit, Section II.C.8.

The Decree required EPA to prepare the HHRA and ERA. Then, as described more fully with respect to other responses within this Section II.F, the Decree called for the HHRA and ERA to be subject to independent peer-review processes, with panelists selected in a process with equal roles for EPA and GE. During the independent peer reviews, GE and the public were provided significant opportunity to present their views orally and in writing, including a detailed oral presentation by GE to the panelists. See also Response 42 *et al*. above in this Section II.F.

In its evaluation of whether proposed IMPGs ensured protection of human health and the environment, it was reasonable for EPA to take into account, as provided for in Section II.C.8, the results of the HHRA, ERA and the independent peer reviews. EPA did take those results into account, but did not use the peer review results as the sole basis for disapproval.

As EPA's December 9, 2005 response demonstrates, EPA had multiple reasons to determine that the alternative IMPGs would not ensure protection of human health and the environment. First, EPA pointed out that GE's alternative assumptions for the IMPGs are not consistent with the findings of the HHRA and ERA. Second, EPA pointed out that "GE's presentation of alternative IMPG calculations does not take into account the conclusions of the risk assessments conducted by EPA." Finally, EPA concluded independently that "EPA does not believe that these alternative calculations are protective of human health and/or the environment, and thus are not IMPGs pursuant to the Reissued RCRA Permit." EPA, December 9, 2005, *Re: Interim Media Protection Goals Proposal.*

In summary, it was very reasonable and appropriate for EPA to determine that GE's alternative IMPGs would not ensure protection of human health and the environment, and EPA did not rely solely on the considered findings of the HHRA and ERA peer-review processes. The HHRA and ERA findings were "taken into account" by EPA consistent with the Permit requirements, but were not the sole basis for the EPA disapproval.

III. Performance Standards

III.A Performance Standards and Corrective Measures

Comment 445: EPA has identified a process under Sections II.B. l .b.(2) and II.B.c.(2) of the draft Permit which is referred to as a Performance Standard. These provisions are not Performance Standards but rather Corrective Measures. Referring to these paragraphs as Performance Standards and incorporating footnote #9 into these paragraphs could lead to confusion regarding the function of the estimated amounts of excavation to occur within reaches 5A and 5B of the Rest of River. The estimates for bank excavation are not Performance Standards and this should be clearly stated within the permit. The amount of bank excavation (and other required excavation and capping activities) are dependent upon the environmental

conditions determined using updated environmental data collected post issuance of the permit as well as attainment of other Performance Standards such as the Downstream Transport performance standard and attainment of State-specific fish tissue performance standards (currently identified as benchmarks but should be changed to performance standards).

EPA Response 445: EPA concurs that in general, to be consistent with the Permit, there should be a distinction between Performance Standards and Correctives Measures. Therefore, in the Final Permit Modification, EPA clearly delineates the Performance Standards from the Corrective Measures necessary to meet the Performance Standards, and a definition of Corrective Measures was included.

In the Final Permit Modification, footnote #9 is now in reference to a Corrective Measure. The amount of bank excavation (and other activities) will be based on the requirements to achieve the applicable Performance Standards.

See Response to Comments Section III.B.1 for issues related to the Downstream Transport and Biota Performance Standards.

III.B General Performance Standards

III.B.1 Downstream Transport and Biota Performance Standards

III.B.1.a Downstream Performance Standard

Comment 403: EPA has projected that the proposed remediation will decrease the annual mass of PCBs transported downstream by 89%, but this will still leave an unacceptable 11% of the current downstream transport to continue unabated for hundreds of years into the future. This is not a satisfactory outcome; the remediation should reduce downstream transport to zero.

EPA Response 403: As discussed in response to other comments, EPA based its remedy selection on an evaluation of all the remedy selection criteria, including three General Standards for Corrective Measures – Overall Protection of Human Health and the Environment, Control of Sources of Releases, and Compliance with ARARs, as well as an evaluation and balancing of six Selection Decision Factors − Long-Term Reliability and Effectiveness, Attainment of IMPGs, Reduction of Toxicity, Mobility or Volume of Wastes, Short-term Effectiveness, Implementability, and Cost. Based on this analysis, EPA selected a balanced remedy that significantly reduces, but does not eliminate, the downstream transport of PCBs. For example, the remedy is expected to reduce the downstream transport of PCBs over Woods Pond and Rising Pond by 89% compared to existing conditions. EPA's rationale for the extent of remediation in the Final Permit Modification is documented in its Statement of Basis and Comparative Analysis, as supplemented by this Response to Comments. EPA continues to believe that the remedy in the Final Permit Modification is appropriate and significantly controls sources and reduces the downstream transport of PCBs.

Furthermore, reducing downstream transport to zero would be extremely difficult. EPA evaluated 9 alternative remediation combinations in the Comparative Analysis, including a combination alternative that would remove 2,902,000 cubic yards of contaminated sediment and

soil. Even with that level of removal – over three times the removal of the selected remedy – the estimated downstream transport reduction is not 100%. Comparative Analysis, Tables 3 and 15.

Comment 428: Connecticut strongly supports the provisions of the permit which are designed to decrease downstream transport of PCBs. Connecticut views these provisions as the key to attaining all other goals for the river.

EPA Response 428: EPA acknowledges Connecticut's support of these provisions.

Comment 447: The remedy must maintain the requirements to control transport of PCBs downstream into Connecticut and the adaptive management provisions that allows for adjustments to the remedy in order to achieve these goals. The draft permit should be modified to indicate that an exceedance of the Downstream Transport Performance Standard would be addressed with the authority under paragraph 39a of the Consent Decree and CERCLA.

EPA Response 447: First, the Final Permit Modification remedy does maintain the requirements to control transport of PCBs downstream into Connecticut (e.g., removal of an estimated 990,000 cubic yards of contaminated sediment and soil, containment measures such as Engineered Caps, and the Downstream Transport Performance Standards). Comparative Analysis at Table 3; Final Permit Modification Sections II.B.2.i, and II.B.1.a, respectively. Second, the remedy also maintains the Adaptive Management provisions. Final Permit Modification, Section II.F. Third, the Decree requires GE to achieve and maintain Performance Standards, including the Downstream Transport Performance Standard, and the Decree includes a number of possible avenues for EPA to ensure Performance Standards are achieved and maintained and the remedy remains protective of human health and the environment. Paragraph 39.a is one such potential avenue for an EPA response. However, given that the Decree provisions apply to the Rest of River response action, it is unnecessary to reference one specific Decree standard in the Permit.

Comment 482: EPA's Downstream Transport Performance Standards are designed to fail. The measurement of flow rates is limited to periods of low flow and averaged over periods of time. This hides the effects of episodic hard rain and high flow conditions that transport PCBs out of the unremediated Core Areas and back into the River.

EPA Response 482: EPA disagrees that flow rates specified in the Downstream Transport Performance Standard are limited to low flow and that the standard is inappropriate. As demonstrated in the Administrative Record, the standards are set for average daily flows that capture 98% of the flows. (Memo from Edward Garland, HDR, to Scott Campbell, Performance Standard Flow Based Annual Average PCB Flux Methodology, April 25, 2014). The appropriateness of the Standard is addressed more specifically in Responses 662, 663, and 664.

Comment 662: GE asserts the following: The Downstream Transport Performance Standard in the draft Permit specifies particular annual average values for PCB flux over Woods Pond Dam and Rising Pond Dam. Exceedance of this standard would occur if the annual average PCB flux is greater than the standard (at either Woods Pond Dam or Rising Pond Dam) in three or more years within any five-year period after completion of the remedial construction activities. The annual average flux values specified by this proposed standard were simply derived from model

predictions of the annual average PCB fluxes that would occur at these dams in the future under the proposed remedy. These flux values were not based on an analysis of risk, and EPA has made no showing that the specified PCB flux values are tied to reductions in risk or are otherwise justified under the Permit's remedy selection criteria. As such, they are arbitrary.

EPA Response 662: The Downstream Transport Performance Standard is fully justified under the Permit's remedy selection criteria, and therefore is not in the least arbitrary.

The nine Permit criteria used for remedy selection are specified as three General Standards - 1) Overall Protection of Human Health and the Environment, 2) Control of Sources of Releases, and 3) Compliance with ARARs; and six Selection Decision Factors. The General Standards are considered "threshold criteria," and alternatives that do not meet these threshold criteria do not warrant further consideration. (See the *Advanced Notice of Proposed Rulemaking (ANPR): Corrective Action for Releases From Solid Waste Management Units at Hazardous Waste Management Facilities*, Federal Register, Vol. 61, No. 85, Wednesday, May 1, 1996) As defined in the Final Permit Modification, a Performance Standard means cleanup standards, design standards and other measures and requirements necessary to protect human health and the environment. EPA developed the Downstream Transport Performance Standard to ensure that the Corrective Measures meet the General Standards and that PCB transport downstream does not exceed what is expected following implementation of the remedy. Downstream transport of excessive concentrations of PCBs would endanger human health and the environment, would represent a lack of control of sources of releases, and could also impair attainment of water quality ARARs, thus not meeting the General Standards. The Performance Standard requires that, if exceeded, GE evaluate and identify the potential cause(s) of the exceedance and propose to EPA for review and approval additional actions necessary to achieve and maintain the Performance Standard. This provides a mechanism to ensure that the General Standards are met following implementation of the Corrective Measures and that the remedy remains protective of human health and the environment.

Overall Protection of Human Health and the Environment

Currently there is a consumption advisory for people eating fish in both the MA and CT portions of the Housatonic River and for other wildlife from the river in MA, as well as unacceptable risks to ecological receptors, due to PCBs from the GE facility. These advisories and risks are primarily driven by biota tissue concentrations which in turn are affected by the concentration of PCBs in water and sediment. The Corrective Measures specified in the Final Permit Modification are expected to reduce fish and other biota tissue concentrations, resulting in the reduction of these risks. However, the remedy is not expected to fully eliminate these risks in the near-term, and an excess flux of PCBs downstream will impact the expected risk reductions, and hamper any further risk reductions to concentrations that achieve the Long-Term Biota Standard and/or acceptable concentrations for risks to ecological receptors.

Control of Sources of Releases

The Final Permit Modification specifies that the evaluation of Control of Sources of Releases includes, but is not limited to, the extent to which the alternative "would mitigate the effects of a flood that could cause contaminated sediment to become available for human or ecological exposure." The Downstream Transport Performance Standard will be used to monitor the

effectiveness of the Corrective Measures specified in the Final Permit Modification in controlling exposure to contaminated sediment following flood events, as well as under other flow conditions. It also provides a mechanism to evaluate the cause of downstream transport of contaminated sediment if in fact downstream sediment transport occurs, resulting in human or ecological exposures.

Water Quality ARARs

Chemical-specific ARARs include Federal and State water quality criteria for PCBs. These criteria are the freshwater chronic aquatic life criterion of 0.014 microgram per liter (ug/L) and the human health criterion (based on consumption of water and/or organisms) of 0.000064 ug/L. It is expected that, when the Corrective Measures are implemented and maintained, the criteria for freshwater aquatic life will be achieved in MA and CT.

The criteria for consumption of water and/or organisms is not expected to be achieved in any of the river reaches in MA, however, it is expected that the Corrective Measures would restore water quality consistent with this criterion in 50% or more of the CT reaches. Because this criterion is not expected to be met in MA, EPA is waiving it under both Federal and State ARARs as technically impracticable in MA. The control of the excessive flux of PCBs (as monitored and, if necessary, addressed by the Downstream Transport Performance Standard) is critical in achieving the expected compliance with water quality ARARs.

Nothing in the Permit or Decree prescribes the particular quantitative method by which EPA is to set Performance Standards measuring the effectiveness of the remedy. To the contrary, the Decree requires EPA to develop the model, subject to multiple stages of Peer Review, and including comments from GE, as a first step in evaluating alternatives for cleaning up the River (see Decree, ¶¶ 22.g. h. and i.). The Decree also requires EPA to set Performance Standards, and does not preclude EPA, in its expert judgment, from using the Peer-Reviewed model simulations to establish Performance Standards in the absence of any other means to predict future performance of the Corrective Measures.

Specifically, a more stringent Performance Standard for general downstream transport was initially proposed by EPA in its August 2012 response to the National Remedy Review Board comments: namely achieving and maintaining a maximum of 2.0 kg/year PCB flux rate (mass per time) over Woods and Rising Pond Dams. This initial more stringent proposal was based upon the model work, but was ultimately adjusted after EPA and its consultant, HDR evaluated comments received by GE during the 2012/2013 Technical Discussions. In particular, during the Technical Discussions, EPA, CT DEEP, and GE worked together to craft the structure of the Downstream Transport Performance Standard presented in the Draft Permit Modification and now included in the Final Permit Modification. As a result, the approach set forth in the Final Permit Modification now accounts for variation in average annual flows and applies an uncertainty factor to predicted results. Had EPA relied on the absolute values of the model predictions, the Downstream Transport Standard would be more stringent.

Second, the Downstream Transport Performance Standard is clearly justified under the Permit's remedy selection criteria. In addition to the risk/protectiveness basis, one of the three General Standards for the remedy selection in the Permit is to reduce the bioavailability of PCBs through "control of sources of releases," Permit II.G.1.b, p. 20. Here the Downstream Transport

Performance Standard measures the effectiveness of the remedy in achieving this objective by measuring the levels of PCBs transported downstream. PCBs traveling downstream are an uncontrolled source. They are bioavailable to human and ecological receptors and could cause recontamination of the floodplains. As defined in the Final Permit Modification, a Performance Standard means cleanup standards, design standards and other measures and requirements necessary to protect human health and the environment. Permit, Definition 16. The Downstream Transport Performance Standard is related to risk reduction because it measures the effectiveness of the remedy in achieving source control objectives. Contrary to GE's argument, this Standard includes a clear human health or environmental risk-based justification.

Comment 663: GE asserts the following: The Downstream Transport Performance Standard is based on the assumption that the specified flux values can and will be achieved by the proposed remedy. That assumption, in turn, is based on the assumption that EPA's model accurately predicts future PCB fluxes. In fact, however, EPA's model was not designed and is not appropriately used for prediction of such absolute values, as recognized by EPA in its Model Calibration Responsiveness Summary. Although model results are useful for comparisons among remedial alternatives, they are not sufficiently accurate, and should not be used, to establish absolute numerical standards, as EPA has proposed for the Downstream Transport Performance Standard. EPA's use of the model results accounts for variability in flow in this application does not otherwise account for model uncertainty in any way, which further contributes to the arbitrariness of that proposed standard.

EPA Response 663: EPA disagrees. To the extent that EPA relies on the model results, EPA also accounts for model uncertainty in a number of ways. EPA recognizes that there is uncertainty in the model predictions due to a number of factors, including future boundary conditions, atmospheric inputs, the magnitude and spatial distribution of PCBs in unremediated areas, and the assumptions incorporated into the remediation scenarios of the model for elements such as releases of PCBs during dredging and the incorporation of dredging residuals into a cap. The approach followed to develop the Downstream Transport Performance Standard accordingly includes several mechanisms to provide a margin of safety against incorrectly identifying an exceedance of the standard. One is the use of a 95% prediction limit, which means that only 2.5% of the annual average PCB fluxes would be expected to exceed the 95% prediction curve around the regression of annual fluxes versus annual flows (2.5% above the upper prediction limit and 2.5% below the lower prediction limit). As GE states, this is to account for uncertainty based on annual variability in the PCB load due to the variability in flow. In addition, it accounts for the variability in annual PCB loads for years with the same annual average flow. Also, the standard for each flow-bin is set at the upper end of the flow range, so that the margin of safety for annual average flows less than the upper limit of the flow range is greater. For up to half of the flow range, the standard is equivalent to more than a 99% prediction limit, meaning that a single annual average flux would be expected to be above the standard once in more than 99 years.

An additional factor accounts for model uncertainty through the condition defined for the occurrence of the Performance Standard exceedance, which is annual average fluxes greater than the standard in 3 or more years in a 5-year period. Statistically, annual average fluxes would be expected to be above the upper prediction limit no more than once in 40 years (2.5% above the upper prediction limit), however values above the standard would not be classified as an

exceedance unless there were three in 5 years (60%). The combination of the specification of the standard for each flow bin at the upper end of the flow range and the criteria for assessing an occurrence of an exceedance provide account for uncertainty in the model predictions. Lastly, the standard flux only applies on days with daily average flow less than or equal to a 98% cutoff flow (excluding the highest 2% of daily flows), thereby eliminating the uncertainty with measuring and predicting PCB flux at these high flow events. Taken together, all of these elements of the Downstream Transport Performance Standard consider model uncertainty, including, but not limited to, annual variability in flow.

With respect to the model design, EPA recognizes that uncertainty in factors, including future boundary conditions (as stated in the Model Calibration Responsiveness Summary, EPA, January, 2006) result in uncertainty in the predictions of absolute concentrations. By considering these uncertainties in developing the flux standard, EPA is acknowledging and accounting for the uncertainty in predicted absolute values for flux values. Had EPA relied on the absolute value of the model prediction, the flux standard would be much more stringent.

Comment 664: GE asserts the following: There is no known precedent at any of the major contaminated sediment sites in the country for a performance standard such as the flux standard proposed by EPA, which establishes a numerical standard for future, post-remediation conditions – as opposed to a goal or remedial action objective (RAO) for such conditions – with specified consequences (other than continued monitoring) if that standard is not met. Indeed, the consequences specified by the Region for an exceedance of this standard are problematic.

EPA Response 664: While this type of standard may not be common, EPA regulations or policies do not prohibit having Performance Standards that are appropriate given the site-specific circumstances and the other components of the remedy. In this instance the combination of different remedy components including the Downstream Transport Performance Standard is best suited under the Permit criteria. The Permit criteria include the General Standard of Control of Sources of Releases, for which this Performance Standard is directly applicable. The remedy includes significant elements of containment and MNR, as well as avoidance of remediation for certain Core Areas, all in lieu of PCB removal. Given those elements, it is reasonable to have the remedy include another component that can ensure that the emphasis on containment, MNR and Core Areas (as opposed to a greater emphasis on PCB excavation) continues to yield an effective remedy that is protective and controls sources of releases.

Comment 665: GE asserts the following: The proposed requirement that, in the event of an exceedance of the Downstream Transport Performance Standard, GE must determine the cause is overbroad. Given the many factors that could potentially lead to an exceedance of the specified flux values at Woods Pond Dam and/or Rising Pond Dam, it may well not be possible to determine the cause. The most that could be done is to evaluate potential causes to determine whether a cause or causes can be identified.

EPA Response 665: GE expresses concern about being able to identify the cause of an exceedance, and states that the most that could be done is to evaluate potential causes to determine whether a cause or causes can be identified. The Final Permit Modification provision for the Downstream Transport Performance Standard addresses both those concerns. Specifically, EPA notes that the specific language of that Performance Standard (Section

II.B.1.a.(1)) was revised to allow GE to identify "potential" causes, and also allows for consideration that there is more than one cause. Providing GE, as Permittee, the opportunity to identify potential cause(s) is a reasonable approach to implementation. The specific language of Permit Section II.B.1.a.(1) is as follows:

> In the event that this Downstream Transport Performance Standard is exceeded, the Permittee shall evaluate and identify the potential cause(s) of the exceedance and propose, to EPA for review and approval, additional actions necessary to achieve and maintain the Performance Standard.

Moreover, if there were any disagreement between GE and EPA as to whether GE had satisfied that provision, the Decree contains a Dispute Resolution provision for disagreements on this and other deliverables related to the cleanup. Note that this provision is very similar to that for the Biota Performance Standard, so a very similar rationale applies. See EPA Response 674, 675.

Comment 666: GE asserts the following: The Downstream Transport Performance Standard would provide that, in the event of an exceedance, EPA "may consider modifications to the Rest of River remedy in accordance with its authority under the CD and CERCLA." EPA's authority under the CD to require GE to conduct additional response actions beyond the actions required by the initially selected remedy is limited to the situation in which the CD covenant reopeners are met – i.e., where EPA determines that the exceedance constitutes new information or conditions and that that new information or conditions, together with other relevant information, indicate that the selected remedy is no longer protective of human health or the environment.

EPA Response 666: EPA disagrees with GE's views on EPA's ability to require additional response actions under the Decree. EPA and GE agree that EPA's authorities include use of the Pre- and Post-Certification Reservations of Rights, or "reopeners", under Paragraphs 162-163 of the Decree. Additionally, though, EPA has the ability pursuant to its oversight authorities under the Decree to require actions in EPA's response to any GE submittal under the Decree. See Decree Section XV. Moreover, the Decree affords EPA the ability to require modifications of the Rest of River SOW if necessary to achieve and maintain Performance Standards or to carry out and maintain the effectiveness of a response action. See Decree Paragraph 39. Note also that the Final Permit Modification has modified the provision for EPA's determination on an exceedance. The Draft Permit Modification provided that EPA would determine any additional actions necessary to achieve and maintain the Performance Standards "in accordance with the CD and CERCLA," and the Final Permit Modification provides that EPA's determination would be "in accordance with the CD".

Comment 667: GE asserts the following: The proposed Downstream Transport Performance Standard conflicts with the CD and Permit requirements that the remedy decision must specify the particular remedial actions required, rather than giving the Region a blank check to determine such actions in the future. Paragraph 22.n of the CD provides that EPA's proposal must specify not only the Performance Standards but also the specific corrective measures that it determines are necessary to meet the Performance Standards, rather than giving the Region the discretion to develop and mandate additional corrective measures later, which would not have been evaluated under the Permit's remedy selection criteria. Additionally, CD Paragraph 22.p provides that the final permit modification will obligate GE "to perform the selected Rest of River Remedial

Action and O&M," thus indicating that that remedial action will be known and quantifiable at that time. Similarly, Special Condition II.J of the Permit states that the final permit modification "will set forth the selected Performance Standards and corrective measures for the Rest of River area" – again showing that the corrective measures are to be specified in that decision. These provisions demonstrate that, while the Rest of River Remedial Action was expected to include Performance Standards, the parties intended that those Performance Standards would be ones whose achievement would be ascertainable and attainable by doing certain specified work, rather than leaving the required work for a later EPA determination. This was intended to provide GE with certainty and finality at the time of the Rest of River remedy selection.

EPA Response 667: EPA disagrees with GE's assertions that additional response actions, when necessary, must all be defined in the Final Permit Modification. It is undisputed that EPA has authority to issue Performance Standards, as it is intended that the Final Permit Modification include Performance Standards. Decree ¶¶ 23, 24; Permit II.J. And it is undisputed that there are consequences under the Decree for failure to achieve and maintain Performance Standards. For example, in such cases, the Decree specifically provides for modification of the Rest of River SOW to include modified work to achieve and maintain Performance Standards, Decree ¶ 39.a, or to seek additional response action if certain covenant reservation, or "reopener" conditions are met. Decree ¶¶ 162, 163. Thus, even though the Permit calls for EPA to set forth "the <u>appropriate</u> corrective measures necessary to meet the Performance Standards," Permit II.J. (emphasis added), the controlling Decree recognizes that it will not always be possible or *appropriate* to identify all Corrective Measures necessary to meet and maintain the Performance Standards at the time of the Final Permit Modification. Decree ¶39.a. Indeed, the Decree specifically recognizes that there is no "warranty or representation of any kind" that compliance with the selected Corrective Measures will achieve Performance Standards. Decree ¶ 40.

GE argues that certain provisions of the Decree and Permit imply that together they were "intended to provide GE with certainty and finality at the time of the Rest of River remedy selection." In fact, no provision of the Decree or Permit explicitly or implicitly provides the certainty and finality now demanded by the GE. Indeed, the Decree directly contradicts such a strained interpretation by explicitly providing for additional response actions to achieve and maintain Performance Standards:

> if EPA determines that modification to the work specified in the … the Rest of the River SOW, … is necessary to achieve and maintain the Performance Standards or to carry out and maintain the effectiveness of a particular Removal or Remedial Action, <u>EPA may require that such modification [of the work] be incorporated in the … the Rest of the River SOW.</u>

Decree ¶39.a (emphasis added).

Comment 668: GE asserts the following: An open-ended Downstream Transport Performance Standard that allowed EPA to require GE to conduct additional, unspecified response actions if the standard was exceeded would prevent EPA itself, as well as GE, other stakeholders, and the public, from conducting a meaningful evaluation of the proposed remedy under the applicable Permit criteria. Unless one knows the full extent of remediation actions necessary to meet the Performance Standards, one cannot apply the Permit criteria. For example, a requirement for

significantly more removal to meet a Performance Standard could materially change the analysis of impacts (and thus overall protectiveness) and costs. Thus, such an approach is inconsistent with the Permit requirement to fully consider the above criteria in evaluating remedial alternatives and selecting a remedy.

EPA Response 668: EPA disagrees with the GE's views. EPA performed a very thorough, meaningful evaluation of the proposed remedy, and the alternatives, under the applicable Permit criteria. The scope of EPA's evaluation included potential cleanup approaches for sediments in Reach 5A, 5B, 5C, bank soils in Reach 5A and 5B, alternative approaches for Woods Pond, Reach 7, Rising Pond, Reaches 9-16, Floodplains and Vernal Pools. Overall, see the Comparative Analysis, Section 2, which demonstrates that EPA performed its thorough evaluation of the overall remedy, and nothing in the Decree or Permit requires EPA to perform that type evaluation on all potential, future activities that might be needed to achieve or maintain protection of human health and the environment, or an effective remedy. Moreover, if GE's claims that no additional new or modified work can be required for the Rest of River because any such work would not have been subject to the "nine criteria analysis required"[4] for other Corrective Measures at the time of the permit modification were correct, it would render superfluous individual Decree provisions, such as Decree Paragraph 39.a and the Decree's Operation and Maintenance (O&M) provisions (Decree, Paragraph 4 definition of O&M includes "all activities required to maintain the effectiveness of the Remedial Action for the Rest of the River as required under an Operation and Maintenance Plan developed for the Rest of the River Remedial Action)." Decree ¶ 4. In the Final Permit Modification, the O&M program requires "other response actions necessary to achieve and maintain compliance with Performance Standards." Final Permit Modification, II.C. Under GE's formulation, neither modified work pursuant to Paragraph 39.a nor O&M work could ever be required because such work can never be subject to the allegedly relevant analysis -- it is unknowable at the time of remedy selection what modified work or O&M will be necessary to achieve and maintain Performance Standards. (Additionally, as to the GE's concerns about the "nine criteria analysis" applying during Paragraph 39.a. modification of work, any disagreement need not be resolved today. This question should be resolved during dispute resolution under the Decree, if and when EPA ever determines that modification of the work is necessary under Decree Paragraph 39.a., and if and when GE disputes that determination. It is well settled that contractual terms should not be interpreted to render any provisions superfluous, and GE's argument is incorrect. In addition, not all components of the remedy require the level of analysis demanded by GE. In short, the Decree reinforces that future potential adjustments may be needed, and neither the Decree nor the Permit requires that all work required for the Rest of River Remedial Action be subject to a fixed analysis at the time the Final Permit Modification is issued.

Comment 669: GE asserts the following: The proposed Downstream Transport Performance Standard would constitute a "contingency remedy" under EPA guidance, because it would be contingent on a future event (i.e., an exceedance of the standard). EPA guidance requires that a

[4] Note that while the "nine criteria" are significant to remedy selection, the Decree and Permit provide that EPA may select the remedy based upon the CMS (which includes an evaluation of the alternatives under the nine criteria) and the information in the Administrative Record. Decree ¶ 22.p; Permit II. J.

contingency remedy (as well as the selected remedy) be evaluated fully against the remedy selection criteria, and indicates that if that is not done at the time of initial remedy selection, it will need to be done to invoke the contingency at a later point in time. For any additional response actions that might be required in response to an exceedance of the Downstream Transport Standard, EPA's proposal has not evaluated the Permit's remedy selection criteria, and it does not propose that that be done in the future. As such, it would conflict with EPA guidance as well as the Permit.

EPA Response 669: GE argues that any additional work required by an exceedance of a Performance Standard would constitute a "contingency remedy" that has not been fairly evaluated under the relevant criteria. EPA does not agree that this is a contingent remedy. While CERCLA guidance is relevant, it is not controlling. The process for selecting a remedy here is pursuant to the RCRA permitting process as set forth in the Decree. Moreover, the Decree itself contains several permissible conditional response action obligations. For example, the Decree authorizes Performance Standards for a Conditional Solution, including as may be identified for the Rest of River: for example, when a property owner declines a land use restriction offer from GE, then GE may need to undertake additional cleanup if the land use changes. Decree ¶ 34. Similarly, in certain circumstances when necessary to carry out the effectiveness of the response action or when the selected remedy fails to achieve and maintain Performance Standards, the Decree also obligates GE to undertake additional response actions to ensure the effectiveness of the remedy or to achieve and maintain those Performance Standards. Decree ¶39.a. Those additional response actions contribute to the effectiveness of the cleanup, but necessarily cannot be defined at the time of the remedy decision. Likewise, in certain emergency situations, GE must "take all appropriate action to prevent, abate, or minimize" the release or threat of release. Decree ¶91. Thus, the Decree contemplates that not all work, contingent or otherwise, required for the Rest of River, such as O&M, can or need be subject to a fixed analysis at the time of the Final Permit Modification. Thus, the requirement here to undertake additional work in response to failure to maintain and achieve Performance Standards is no different than failure to meet and achieve any other Performance Standard, and does not constitute an impermissible contingent remedy.

Additionally, a determination on whether an EPA-ordered additional response action is permissible is not currently ripe. Under the Permit, an exceedance cannot occur until three or more years after the completion of construction-related activities. (Final Permit Modification, II.B.1.a.(1)). Then if GE proposes to EPA additional actions necessary to achieve and maintain the Performance Standard, and EPA disapproves of GE's proposal, GE has its rights pursuant to the Decree's Dispute Resolution provisions to dispute EPA's determination. See Decree, Section XXIV.

Comment 670: GE asserts the following: The proposed approach to the Downstream Transport Performance Standard would also allow an impermissible end run around the covenants in the CD. Those covenants prohibit the United States from seeking to require GE to conduct additional response actions beyond those specified and required under the CD, unless the reopener conditions are met (i.e., that new information or conditions are discovered that indicate that the selected remedial action is not protective of human health or the environment) (CD ¶¶ 161, 162, 163). While the CD provides that EPA will conduct periodic reviews of the Rest of River remedial action and may select further response actions in the course of those reviews

(CD ¶¶ 43.c, 44), it also provides that GE is obligated to perform such actions ***only*** if the covenant reopener conditions are satisfied (CD ¶ 46). An approach that would allow EPA to require GE to conduct additional response actions (not specified in the remedy decision) in the future without satisfying the reopener conditions would violate the covenants.

EPA Response 670: In claiming that these Performance Standards violate the Decree's covenants, GE ignores the provisions of Paragraph 39.a, and the general obligation to achieve and maintain Performance Standards, including but not limited to through the inspection and Operation and Maintenance provisions. GE only points to the Decree's provisions regarding reopener conditions or five year review, Decree ¶¶ 43.c, 44, 46, 161-3, while ignoring the separate authority to require additional response actions to achieve and maintain Performance Standards set forth in Paragraph 39.a of the Decree, and in the Operation and Maintenance requirements of the Decree. Decree, Paragraph 4 definition; Paragraph 22. As a result, GE is wrong to claim that EPA's attempt to require GE to conduct additional response actions (not specified in the remedy decision) in the future without satisfying the reopener conditions would violate the Decree." That is exactly what Paragraph 39.a. and the separate inspection and Operation and Maintenance provisions allow. Paragraph 39 represents an obligation separate from the covenant reopeners in Paragraph 162-163, an obligation that recognizes that during the course of designing and implementing a particular response action, EPA may determine that a modification to the specified work may be needed to be undertaken to achieve and maintain the Performance Standards or to carry out and maintain the effectiveness of a remedy. Paragraph 39 reflects the recognition that modifications or adjustments to the remedy approach may be necessary during design/implementation, and that depending on the extensiveness of the modification, EPA may require GE to perform them through modification of the Rest of River SOW or Work Plans. In short, these Performance Standards, like any other Performance Standard, are not a violation of the Decree's covenants.

Comment 671: GE asserts the following: Paragraph 39.a of the CD is consistent with the conclusion expressed in Comment 670. That provision states that, if EPA determines that modification to the Rest of River work "is necessary to achieve and maintain the Performance Standards . . . , EPA may require that such modification be incorporated in [the relevant work plans]; provided, however, that a modification may only be required pursuant to this Paragraph to the extent that it is consistent with the scope of the response action for which the modification is required and does not modify the Performance Standards" (except with agreement of the parties and approval of the Court) (emphases added by GE). Given the requirement that the Rest of River remedy decision must specify not only the Performance Standards but the actions necessary to meet them, EPA's authority under Paragraph 39.a to require modifications of the Rest of River work does not extend to requiring additional remediation actions later to meet the Downstream Transport Performance Standard, because that would not be "consistent with the scope of the [Rest of River] response action." Rather, any such requirement would be barred by the U.S. covenants in Paragraph 161. In addition, to the extent that such additional remediation actions would modify any other Performance Standard for the Rest of River Remedial Action or the Performance Standards for any of the upstream Removal Actions under the CD, that would be precluded by the provision of Paragraph 39.a that modifications thereunder cannot modify the Performance Standards.

EPA Response 671: EPA disagrees with GE's conclusions on Paragraph 39. Achievement of the Downstream Transport Performance Standards is part of the response action; thus, additional actions to achieve and maintain those Performance Standards are consistent with the scope of the response action. There could be additional remediation actions that are consistent with the scope of the response action that do not modify Performance Standards. Precluding any additional response actions at this point would render Paragraph 39.a. meaningless. In addition, see Response 670 above.

Comment 672: GE asserts the following: An open-ended Downstream Transport Performance Standard that allowed EPA to require GE to conduct additional, unspecified response actions if the standard was exceeded could deprive GE of its ability to obtain a timely Certification of Completion of the Rest of River Remedial Action, with the certainty it provides. Under Paragraph 88 of the CD, once GE concludes that it has completed the Rest of River Remedial Action, it is to submit a written report requesting EPA to certify that the Remedial Action is complete. EPA must respond, either by agreeing (and issuing the Certification) or by telling GE the specific activities that GE must undertake to complete the work and achieve the Performance Standards. The CD draws a bright line between completion of the Remedial Action and operation and maintenance (O&M). The Certification of Completion for the Remedial Action issues when the Remedial Action is done, ***excluding*** O&M. However, if the Downstream Transport Standard were interpreted to allow EPA to require GE to conduct additional response actions to address an exceedance (without meeting the reopener conditions), EPA could, at the completion of the prescribed remediation activities, decline to issue a Certification of Completion on the ground that further remediation might be required in the event of a future exceedance of the standard. The result would be an infinite do-loop in which GE is deprived of the certainty that it has undertaken the tasks necessary to complete the Remedial Action. This is inconsistent with the intent of the parties in negotiating the CD.

EPA Response 672: GE claims that these Performance Standards conflict with the Certification of Completion provisions of the Decree. Decree ¶ 88. However, these Performance Standards function like any other Performance Standard. If at the time of completion of Remedial Action for the Rest of River, the Performance Standards have been attained and there is no violation of the Performance Standard, GE is entitled to a Certification of Completion. However, the Certification of Completion would not eliminate the ongoing applicability of the Performance Standard. The ongoing obligation of maintaining any Performance Standard continues through O&M following Certification of Completion.

Comment 741: GE asserts as follows: EPA has not conducted an evaluation of the proposed PCB Downstream Transport Performance Standard against potential alternative standards. Further, if that standard were interpreted to allow the Region to require additional response actions in the event of an exceedance (without going through the CD covenant reopeners), it cannot have evaluated (or allowed others to evaluate) those additional response actions (or alternatives to them) under the Permit criteria, since such actions are currently undefined; and it has not provided for such evaluation to be conducted in the future.

EPA Response 741: In response to EPA not conducting an evaluation against potential alternative standards, there is no requirement in the Permit or Decree to that requires all Performance Standards be evaluated against "other potential standards." Also, this downstream

transport, or flux, standard was developed with input that GE provided during the technical discussions held between GE, EPA and the States from August 2012 to December 2013 and revisions to the draft standard were made during those discussions. For example, see the April 25, 2014 Memorandum from Edward Garland, HDR, to Scott Campbell, Weston [both contractors to the EPA/Corps of Engineers]. Furthermore, see Responses 662 and 664 above.

With regard to requiring potential response actions in the event of an exceedance of the standard, see Reponses 668 and 669 above.

Comment 439, 456: CT DEEP recommended specific operational requirements and engineering controls to be included in the Permit. These include the following:

Emplacement of activated carbon is required in several sections of the permit. The addition of activated carbon must be managed in such a manner as to prevent downstream transport of the activated carbon under any flow conditions.

Anchored silt screens should be placed around the dredge during work and at the outlets of Woods Pond and Rising Pond to minimize transport of sediment downstream.

EPA Response 439, 456: The Decree and Final Permit Modification both provide that GE will propose Work Plans for the implementation of the response action. (Decree, Para. 22.x, y; Final Permit Modification, II.H). Operational details and engineering controls will be included in these Work Plans, which will be subject to EPA review and approval.

Comment 318: The technique for measurement of PCB flux at Woods Pond and Rising Pond dams should be described. How results are to be measured is an important consideration of a specification.

EPA Response 318: Based in part on this comment, the Final Permit Modification includes a description of how flux will be measured at Woods Pond and Rising Pond. Permit at II.B.1.a.(2).

Comment 448: A work plan should be required to establish the details associated with measuring and assessing compliance with the Downstream Transport Performance Standard. Development of this work plan should be added to Section II.B.11 of the permit, and require EPA and Connecticut review and approval.

EPA Response 448: Section II.B.11.e. of the Draft Permit Modification (Section II.H.5. of the Final Permit Modification) includes the requirement for the submittal of a Plan for Measuring Compliance with Performance Standards. This plan is the mechanism for a proposal for measuring and assessing compliance with the Downstream Transport Performance Standard. Connecticut's role in reviewing and commenting on submittals is discussed in Response to Comments Section VIII.B.

III.B.1.b Biota Performance Standards

Comments 228, 262, 407: One of the expected outcomes of the remediation, as discussed on p. 11 of the Statement of Basis, is a reduction in PCB concentrations in biota what will allow increased human consumption of fish and other biota taken from the river, within a short time

after remediation is completed. Why is this the goal? Even with capping, fish tissue will take a while to decrease, so why not specify a longer-term solution and a complete remediation? EPA selects the fish tissue concentration associated the average (CTE) non-cancer risk as the Performance Standard. Why is this used as the Performance Standard rather than the concentration associated with the MRE (sic)? With regard to fish consumption, it is not clear why Massachusetts residents are limited to 7 fish meals per year from the river while Connecticut residents are judged on 365 meals per year.

EPA Response 228, 262, 407: The Short-Term Biota Performance Standard sets an average PCB concentration of 1.5 mg/kg in fish fillets to be achieved within 15 years of completion of remedial activities in the applicable reach of the River. If the Short-Term Biota Performance Standard is exceeded in two consecutive monitoring periods after that 15-year period, GE must identify the potential cause(s) of the exceedance and propose additional actions necessary to achieve and maintain the relevant Standard, and EPA will determine any such additional actions in accordance with the Decree.

EPA took care in establishing the Short Term Biota Performance Standard (the "Short Term" standard) to be an achievable measure of the remedy's performance and progress. Consumption of PCB-contaminated fish is a major unacceptable risk to human health in the river; thus, it is important to use PCB concentrations in fish tissue as a basis for measuring risk reduction. Based on computer modeling, this Short-Term standard is expected to be readily achieved within the prescribed timeframes. It was selected based on the probabilistic risk assessment central tendency exposure (CTE) adult exposure Hazard Index (HI) of one. Conversely, the Long-Term Biota Monitoring Performance Standards were based upon more conservative exposure assumptions (or in this case, assumptions regarding the amount of fish or duck tissue consumed), using the probabilistic risk assessment Reasonable Maximum Exposure (RME) 1×10^{-5} cancer risk for fish in Massachusetts and duck breast in Massachusetts and Connecticut and, at the request of CT DEEP, a calculation assuming 365 fish meals per year and a 1×10^{-6} cancer risk for fish tissue in Connecticut. See Section II.B.1.b.(1)(b) footnote 3. Because it is anticipated that the Short-Term Biota Performance Standard will be achieved in the short-term, EPA established the complementary Long-Term Biota Monitoring Performance Standard to measure the remedy's long-term success at achieving additional risk reduction and measuring progress towards long-term risk reduction goals in Massachusetts and Connecticut.

The Short-Term standard should not be misconstrued as the ultimate goal for risk reduction from consumption of fish. The goal is to achieve a PCB concentration of 0.064 mg/kg in Massachusetts and 0.00018 mg/kg in Connecticut, or at a minimum, monitor progress towards those goals. The selected remedy is expected to achieve significantly more progress towards this goal beyond just achieving the Short-Term standard. Furthermore, the added reduction can be very significant for purposes of whether, and if so, at what level, a consumption advisory needs to be maintained by the Massachusetts Department of Public Health, which is currently set at 1 mg/kg, or their Connecticut counterparts, who may use the more stringent 0.00018 mg/kg standard in setting advisories.

For instance, for Woods Pond, the projected fish tissue concentration is approximately 1.0 mg/kg 15 years after remediation, approximately one-third lower that the Short-Term standard. Therefore, by applying the Biota Short Term Performance Standard in a given reach 15 years

after remediation is completed, EPA accounts for uncertainties in remedy performance, including those associated with model predictions of performance.

As the River, and biota that inhabit and feed from the River, begin to recover after implementation of the remedy, PCBs in fish tissue are expected to decrease, first, in compliance with the Short-Term standard, and then further over time. Fish tissue concentrations will be monitored over time and, depending on their concentrations, may allow for easing of biota consumption advisories and for increased human consumption. Thus, the CTE-based Short-Term standard, which assumes approximately seven fish meals per year from the river, is just one check of the remedy's expected performance and progress. Continued reductions in fish tissue concentrations will allow for consumption of many additional fish meals without unacceptable risk, but this performance may be achieved at different rates in different parts of the river and some reaches of the river may never be able to achieve "unlimited" fish consumption (or the RME-based standards), thus requiring continued advisories and institutional controls.

The Final Permit Modification was revised to clarify that the Connecticut-specific fish tissue concentration of 0.00018 mg/kg (and the accompanying duck breast and Massachusetts-based fish tissue standards) is included in the Long-Term Biota Monitoring Performance Standard and that GE is required to continue to monitor the progress towards achieving these fish tissue concentrations. Final Permit Modification, at II.B.1.b.(2). The Final Permit Modification also requires GE to cooperate with the states regarding all biota consumption advisories issued by the EPA, Massachusetts, and/or Connecticut until such time that the advisories are discontinued. Permit at II.B.6.a. However, EPA believes it is inappropriate to set achievement of 0.00018 mg/kg in fish tissue in Connecticut as a Performance Standard, in part, because none of the modelling for the remedial alternatives evaluated indicated that this was feasible.

Regarding the question as to why EPA has not selected a longer-term solution and "complete remediation," EPA considered a wide range of cleanup options, including those with larger volumes of contamination being removed from the river and less reliance on capping (e.g., Alternative SED8 in the Comparative Analysis). As discussed in response to other comments, EPA based its remedy selection on an evaluation of all the remedy selection criteria. Based on this analysis, EPA selected a balanced remedy that significantly reduces fish consumption risks. EPA's rationale for the extent of remediation in the Final Permit Modification is documented in its Statement of Basis and Comparative Analysis, as supplemented by this Response to Comments. EPA continues to believe that the remedy in the Final Permit Modification is appropriate and significantly reduces the risks associated with fish consumption. For a "complete remediation" option as described by commenter, the closest alternative evaluated was the SED 8 alternative. While the SED 8 alternative does remove more PCBs than other alternatives, and reduces the downstream transport of PCBs more fully than other alternatives, it also had higher costs, and higher short-term impacts than other alternatives. In light of EPA's evaluation of all nine criteria pursuant to the Permit, EPA determined that the selected remedy was the best suited remedy.

Comments 72, 193: The Plan sets a Performance Standard for PCBs in biota of 1.5 mg/kg (ppm) in fish tissues in 15 years and 0.064 mg/kg for the "long term" in MA. These values are too high and do not protect against cancer or non-cancer effects, according to EPA guidance. Fish tissue PCB levels of 0.012 mg/kg or less are necessary to reduce cancer risk to acceptable levels for one

fish meal a week. The Biota Performance Standard in the Permit is woefully inadequate. EPA guidance lists PCB levels in fish that are protective for cancer or non-cancer effects, associated with a range of fish consumption rates. The Permit indicates that a fish tissue PCB concentration of 1.5 mg/kg (ppm) shall be achieved within 15 years (Permit page 13, section 2 a), but EPA recommendations for PCB levels are orders of magnitude lower than 1.5 mg/kg for any level of fish consumption (see table below taken from EPA guidance: EPA-823-F-99-019 September 1999). PCB levels in fish need to be less than 0.006 mg/Kg in order to allow one meal a week without an increased cancer risk. The EPA plan will not support safe fish consumption for the anticipated future in MA or CT. The proposed fish tissue concentration performance standard of 1.5 mg/kg (to be achieved in 15 years following remediation) will not be protective of human health at anything above a minimal consumption rate, nor will it protect individuals with PCBs already in their body.

EPA Response 72, 193: As part of the Decree process, GE developed, and EPA approved numerous site-specific IMPGs for fish tissue concentrations, including the least stringent IMPG of 5.7 mg/kg (CTE, 10^{-4} excess cancer risk, probabilistic risk assessment) to 0.0019 mg/kg (RME, 10^{-6} excess cancer risk, deterministic risk assessment). The Permit does not require EPA to select the most stringent IMPG as a Performance Standard. As discussed in Response 228 *et al.*, the Short-Term standard should not be misconstrued as the ultimate goal for risk reduction from consumption of fish. The Short-term Biota Performance Standard, 1.5 mg/kg, based on the probabilistic risk assessment CTE adult exposure Hazard Index (HI) = 1, was set at the *minimum* acceptable outcome of the remediation, while the Final Permit Modification makes clear that the goal is Long-Term Biota Monitoring Standard of 0.064 mg/kg[5] in Massachusetts and 0.00018 mg/kg in CT.[6]

As described in the Statement of Basis, EPA expects the selected remedy to reduce PCB concentrations in biota, allowing increased human consumption of fish and other biota taken from the river within a short time after remediation is completed, and to greatly reduce the downstream transport of PCBs. This should result in further reductions in PCB levels in fish in both Massachusetts and Connecticut, which, over time, should allow the consumption of additional fish meals or increased consumption of other biota. EPA included the Short-Term Biota Performance Standard in the Final Permit Modification to provide a measure of this aspect of remedy performance. EPA modified the language from the Draft Permit Modification to better explain and differentiate between the Short-Term and Long-Term standards.

As shown in Attachment 10 to the Comparative Analysis, the remedy achieves the Short-Term Biota Standard in all Reaches (except 5B, where the modeling excludes the impact of a sediment amendment on fish tissue concentrations) and also achieves several other IMPGs, thus showing significant risk reduction. Furthermore, as also shown in Attachment 10, none of the remedies evaluated, including Combination Alternative 6 which requires the removal of all sediment with PCBs greater than 1 mg/kg (an estimated 2,252,000 cubic yards), comes anywhere near achieving fish tissue concentrations of 0.006 mg/kg in Massachusetts. In fact, the model predicts

[5] Based on the probabilistic RME and 1 x 10^{-5} cancer risk.

[6] Based on CT DEEP consumption calculation assuming 365 fish meals per year and a 1 x 10^{-6} cancer risk.

the most aggressive remedy, Combination 6, achieves fish tissue concentrations ranging from 0.10 and 0.35 mg/kg in Massachusetts; which are between one and two orders of magnitude higher than 0.006 mg/kg. Clearly, it is not practical to achieve this fish tissue concentration.

In reviewing the alternatives, based on the information above, the Administrative Record and Permit criteria, EPA selected a remedy that includes multiple Performance Standards related to reduce unacceptable risks from contaminated biota. Relevant remedy components include the many PCB removal and containment components of the remedy that will reduce bioavailability of PCBs, and the establishment of the Short-term Biota Performance Standards and Long-Term Biota Monitoring Performance Standards. EPA believes that that combination of actions, within the selected remedy, is best suited in light of the Permit criteria.

Comments 440, 449: Connecticut asserts as follows: The Connecticut-specific fish tissue values, currently identified as benchmarks by EPA, need to be continued as part of the proposed remedy and provided the full status as a Performance Measure so that attainment of fish tissue levels consistent with Connecticut's goal to eliminate the need to limit consumption based on PCB contamination can be realized and that the adaptive management components of the remedy be applied and enforced, as needed, to attain these goals. The draft RCRA Permit incorporates the Connecticut fish tissue value as a Long-Term Biota Benchmark. "Performance Standards" are defined for the Rest of the River as "the cleanup standards ....set forth in...the final modification of the Reissued RCRA Permit to select the Rest of the River Remedial Action, or the Rest of the River SOW." As such, the Performance Standards establish the enforceable conditions and compel additional actions if necessary to meet the Performance Standard. The Long-Term Biota Value for Connecticut should be identified as a Performance Standard.

EPA Response 440, 449: To address these concerns, in Section II.B.1.b of the Final Permit Modification, EPA further clarified the basis for, the relationship between, and the use of what are now termed the Short-Term Biota Performance Standard and the Long-Term Biota Monitoring Performance Standard. This change also addressed the concern that a "Benchmark" may not have the same meaning or effect of a "Performance Standard." See also Response 228 *et al*.

EPA generally agrees with Connecticut on applying and enforcing, if needed, adaptive management principles as the cleanup goes forward. However, with respect to doing so to attain fish tissue levels consistent with the Connecticut –specific fish tissue values, EPA has established those as Monitoring Performance Standards, not for active remediation, for the reasons cited in Response 228 *et al*. above in this Section. EPA will ensure the Monitoring Performance Standards are complied with, and will evaluate the monitoring information received in the context of the remedy going forward.

Comment 450: The permit triggers additional investigations and potential remedy modifications if the Biota Performance Standards are exceeded in two consecutive monitoring periods after the 15-year initial period. This provision should be modified to also require such additional investigations and potential modifications if the Biota Performance Standards are exceeded in any three years within a five year period.

EPA Response 450: EPA does not believe this revision is necessary and that the current Performance Standard is sufficient to protect against unacceptable risks to human health and the environment.

Comments 581, 582: GE asserts the following: EPA acknowledges that none of the remedial alternatives evaluated, including its proposed remedy, would achieve the fish consumption IMPGs based on EPA's Reasonable Maximum Exposure (RME) assumptions, which would allow unrestricted fish consumption in the Massachusetts portion of the River within the model projection period (over 50 years). As a result, under all alternatives, fish consumption advisories would need to remain in place indefinitely to protect human health from the asserted risks due to fish consumption. To support its proposed remedy, EPA relies on the predicted attainment of a fish consumption IMPG based on its Central Tendency Exposure (CTE) assumptions derived from a probabilistic risk analysis method set forth in the HHRA. EPA's model predictions indicate that its proposed remedy would achieve the probabilistic CTE IMPG based on a non-cancer hazard index (HI) of 1 for adults (1.5 mg/kg in fish fillets) in all Massachusetts reaches except one (Reach 5B) within the 52-year model projection period. However, attainment of that CTE IMPG would not avoid the need for continued fish consumption advisories.

EPA Response 581, 582: EPA has acknowledged that under all alternatives, Institutional Controls (including but not limited to fish consumption advisories) would likely be needed for a period of time following remediation as part of the actions to protect human health. However, the selection of the remedy is based on which alternative is best suited to meet the General Standards for Corrective Measures in consideration of the Selection Decision Factors, including a balancing of those factors against each other. EPA has concluded, as supported by the Administrative Record, including without limitation the Comparative Analysis, that the selected remedy best satisfies this analysis. Furthermore, although this risk level (CTE, HI =1) is included as a Performance Standard that must be met, the Final Permit Modification clearly states that the goal is to achieve an PCB concentration of 0.064 mg/kg in Massachusetts (the RME for a 1×10^{-5} cancer risk) and 0.00018 mg/kg in Connecticut. See also Response 228 *et al.* above.

Comment 583: GE asserts the following: A less extensive remedy would also achieve the same probabilistic CTE IMPG for fish consumption in Massachusetts. For example, Alternative SED 5 would achieve the HI = 1 CTE IMPG in all Massachusetts reaches except one within the model projection period – and in fact would achieve other CTE IMPGs (i.e., those based on a 10^{-5} cancer risk and a non-cancer hazard index of 1 for children) in more reaches than the proposed alternative. Alternatives involving less removal in Woods Pond, the Reach 7 impoundments, Rising Pond, and the backwaters would result in comparable reductions in fish tissue concentrations and comparable attainment of the probabilistic CTE IMPG as the proposed remedy.

EPA Response 583: As provided in the Administrative Record, including without limitation the Comparative Analysis, EPA believes that the selected remedy is best suited to meet the Permit General Standards in consideration of the Permit decision factors, including a balancing of those factors against each other.

In addition, the alternative cited by GE, SED 5, relies in part on thin-layer capping in Backwaters and Reach 8 and MNR in the Reach 7 Impoundments. The use of thin-layer capping provides a high level of uncertainty in performance and is not likely to perform as well as the model predicts. Response to Comments Section III.C.7 also discusses how GE's evaluation in its Revised CMS, including the evaluation of SED 5, overstates the long-term effectiveness of thin-layer capping. In addition, as discussed in the Comparative Analysis, remediation with excavation and Engineered Capping can be designed with no net loss of flood storage capacity (p. 5 and Attachment 14, p 10), whereas, thin-layer capping, which is placed on top of existing sediment, cannot be implemented without a loss of flood storage capacity. Response to Comments Section III.C.7 also discusses the effectiveness of MNR in the Reach 7 Impoundments.

Comment 673: GE asserts the following: The Biota Performance Standard consisting of an average PCB concentration of 1.5 mg/kg (wet weight) in fish fillets (skin off) in each reach of the river and the backwaters is based on the fish consumption IMPG that was developed using a probabilistic risk analysis, CTE exposure assumptions, and potential non-cancer impacts to adults. EPA assumes that the proposed remedy can achieve this standard based on model predictions. However, the EPA model was not designed to be used, and cannot be reliably used, for the prediction of such absolute numerical values.

EPA Response 673: EPA disagrees. The use of the Short-Term Biota Performance Standard ("Short-Term Biota Standard") is appropriate because its structure and numerical value reflect the uncertainties of modeling.

EPA did consider the uncertainty of the model in developing the Short-Term Biota Standard. The Final Permit Modification does not require that the Short-Term Biota Standard become effective until 15 years after the completion of remediation activities in a particular reach. If EPA were to consider the model to be predictive of absolute concentrations as GE claims, then EPA would have had the Short-Term Biota Standards become effective much sooner than the 15 year period. For example, in Reach 5A, the model predicts that the remedy would achieve the Short-Term Biota Standard approximately 8 years after the remediation in Reach 5A was complete. Yet the Short-Term Biota Standard takes effect 15 years after remediation, when the modelled concentration is approximately 0.6 mg/kg, 60 percent lower than the standard of 1.5 mg/kg. Similarly, for Woods Pond, the projected fish tissue concentration is approximately 1.0 mg/kg 15 years after remediation, approximately one-third lower that the Standard. Therefore, by setting the Short-Term Biota Standard 15 years after remediation is completed in a given reach, EPA is accounting for uncertainties in the remedy performance, including those associated with model predictions of performance.

Comments 674, 675: GE asserts the following: The establishment of a numerical Biota Performance Standard with consequences should the standard not be achieved raises similar issues to those discussed in Comments 662 – 672 with respect to the consequences of exceeding the Downstream Transport Performance Standard. The requirement that, in the event of an exceedance of the Biota Standard, GE must determine the cause is overbroad, because many factors can affect fish tissue concentrations and thus it may well not be possible to determine the cause of an exceedance. Further, as with the Downstream Transport Standard, in the event of an exceedance, EPA's authority under the CD to require GE to conduct additional response actions

beyond those prescribed by the selected remedy is limited to the situation in which EPA determines that the covenant reopener conditions are met. To the extent that the standard were interpreted to allow EPA to require GE to conduct such additional response actions without going through the covenant reopeners, it would be beyond EPA's authority for the same reasons discussed for the Downstream Transport Standard. (674) In addition to proposing the Biota Performance Standard, the Draft Permit includes Long-Term Biota Benchmarks, consisting of reach-wide average PCB concentrations for fish fillets in Massachusetts (0.064 mg/kg), fish fillets in Connecticut (0.00018 mg/kg), and duck breasts in all areas along the river (0.075 mg/kg). The Draft Permit states that GE "shall evaluate progress toward achieving these benchmarks" through a long-term monitoring program. There is no requirement – or provision that EPA may require – that GE implement any additional response actions (other than continued monitoring) based on these benchmarks or on a comparison of PCB concentrations in fish fillets or duck breasts to those benchmarks, including a determination that monitoring is not demonstrating continued progress toward achieving those benchmarks. To avoid any future question, EPA should clarify that no such additional response actions will be required on the basis of these long-term benchmarks. (675)

EPA Response 674, 675: With respect to GE's concern about being able to identify the cause of an exceedance of this Performance Standard, EPA disagrees with GE's assertion that the requirement is overbroad. EPA notes that the specific language of that Performance Standard (Section II.B.1.b.(1)(a)) was modified in the Final Permit Modification to require GE to identify "potential" causes, and also allows for consideration that there is more than one cause. Providing GE, as Permittee, the opportunity to identify potential cause(s) is a reasonable approach to implementation. The specific language is as follows:

> In the event that the Short-Term Biota Performance Standard is exceeded in any two consecutive monitoring periods after the 15 year period [from completion of construction]…, the Permittee shall evaluate and identify the potential cause(s) of the exceedance and propose, to EPA for review and approval, additional actions necessary to achieve and maintain the Performance Standard.

Moreover, if there were any disagreement between GE and EPA as to whether GE had satisfied that provision, the Decree contains a Dispute Resolution provision for disagreements on this and other deliverables related to the cleanup. Note that this provision, and the GE's concern, is similar to the Downstream Transport Performance Standard on this issue. See Response 665.

Second, as with the discussion on the Downstream Transport Performance Standard, EPA disagrees that EPA's authorities to respond to an exceedance are as limited as GE suggests. See Response 666 above for that discussion.

Third, GE asks for clarification that with respect to the Long-Term Biota Benchmarks of the Draft Permit Modification (which is now the "Long-Term Biota Monitoring Performance Standard" in the Final Permit Modification) that no additional response actions will be required on the basis of these long-term standards. EPA responds more specifically to that comment at Response 440, 449. As discussed in that Response, EPA further clarified the basis for the relationship between, and the use of what are now termed, the Short-Term Biota Performance Standard and the Long-Term Biota Monitoring Performance Standard.

Comment 676: GE asserts the following: There is no justification for EPA's establishment of the long-term benchmark of 0.00018 mg/kg for fish fillets in Connecticut. That benchmark is not and cannot be an ARAR, since it was not promulgated after notice-and-comment rulemaking. It is based on an assumed cancer risk of 1×10^{-6} for an adult and the assumption that an adult eats a meal of Housatonic River fish 7 days per week every day of the year for 64 years. This translates to a consumption rate of 227 grams of Housatonic fish per day. The assumption that people would eat a meal of Housatonic fish every day of their lives for 64 years is patently unreasonable. This is true even for subsistence anglers, although EPA found no evidence of such subsistence fishing populations in Connecticut. In fact, in prior comments on the HHRA, CT DEP (now CT DEEP) argued that, for subsistence anglers, based on a 1999 study, the HHRA should use consumption rates of 43.1 grams/day for lower income populations and 59.2 grams/day for Southeast Asian populations; and EPA, in its Responsiveness Summary to Public Comments on New Information for HHRA, found even those rates unsupported. Further, this benchmark is an order of magnitude more stringent than EPA's (and Connecticut's) water quality criterion of 0.000064 µg/L, which is based on human consumption of fish and would equate to a fish PCB concentration of approximately 0.002 mg/kg. The fact that CT DEEP has developed this benchmark and requested the EPA Region to include it in the Draft Permit is no justification for doing so in the absence of a determination by EPA that there is a health basis for this benchmark. EPA has not determined, and has no basis for determining, that a far stricter fish tissue benchmark is justified to protect health in Connecticut than in Massachusetts.

EPA Response 676: As to GE's concern about the Long-Term Biota Monitoring Performance Standard being an ARAR, EPA has not identified it as an ARAR. EPA has identified it as a Monitoring Performance Standard. As such it fits within the Final Permit Modification's definition of a Performance Standard, including cleanup standards, and other measures and requirements necessary to protect human health and the environment. Final Permit Modification, Definition 21. Here, EPA is measuring the effectiveness of the remedy in reducing the bioaccumulation of PCB levels, as part of the Permit's General Standards of overall protectiveness of human health and the environment, and controlling sources of releases. EPA Response 440, 449 provides, EPA will ensure that the monitoring required pursuant to the Long-Term Biota Monitoring Performance Standard is performed pursuant to the Final Permit Modification. As to GE's concern about the basis for the Connecticut Long-Term Biota Monitoring Performance Standard, it is, indeed, a risk-based value based on exposure assumptions provided by CT DEEP and incorporated into the Final Permit Modification. The rationale for this concentration was provided by CT DEEP. See Fish Consumption Advisories, Calculated Risk-Based Levels (Default Fish Ingestion Rates and Exposure Assumptions for Human Health Risk Assessments Attached, EPA, October 28, 2011).

While the Long-Term Biota Monitoring Performance Standard does not, in itself, require completion of further response actions beyond the monitoring delineated pursuant to the Final Permit Modification, it does allow EPA to better assess the effectiveness of the remedy. Finally, the Long-Term Biota Monitoring Performance Standard is one component of the chosen remedy that is best suited to meet the General Standards for Corrective Measures in consideration of the Selection Decision Factors, including a balancing of those factors against each other.

Comment 742: GE asserts that the deficiencies discussed in Comment 741 with regard to the Downstream Transport Performance Standard also apply to the proposed Biota Performance

Standards. [Comment 741 is: EPA has not conducted an evaluation of the proposed PCB Downstream Transport Performance Standard against potential alternative standards. Further, if that standard were interpreted to allow the Region to require additional response actions in the event of an exceedance (without going through the CD covenant reopeners), it cannot have evaluated (or allowed others to evaluate) those additional response actions (or alternatives to them) under the Permit criteria, since such actions are currently undefined; and it has not provided for such evaluation to be conducted in the future.]

EPA Response 742: With regard to the evaluation of the Standard, see Response 741. Note that this standard was also discussed with GE, EPA and the States during technical discussions that were held from August 2012 to December 2013.

With regard to requiring potential response actions in the event of an exceedance of the standard, see Reponses 668, 669, 674, 675 above.

III.B.2 Restoration Performance Standards

III.B.2.a Overall Impacts to the Ecosystem from Remediation Activities and Effectiveness of Ecological Restoration

Comment 21.a: I am speaking for the Massachusetts Fisheries and Wildlife Board. The Division of Fisheries and Wildlife, which is supervised by the Board, is the largest landowner in the affected area of the Housatonic.

Our Board recognizes that the PCB contamination poses a public health risk that must be addressed. We are also aware that no silver bullet that applies to every area contaminated with PCBs. Each area in the nation where PCB contamination exists has required development of a unique approach that cannot be simply copied for any other contaminated areas.

The plan presented by EPA has been crafted to responsibly address the public health risks while responsibly maintaining the natural and recreational values of this section of the Housatonic River. It has been a difficult balancing act, but it has our full support.

EPA Response 21.a: EPA acknowledges the support of the Massachusetts Fisheries and Wildlife Board. See also Response 21 in Section II.B of this Response to Comments.

Comment 455: Connecticut supports habitat restoration in areas which will be disturbed by remedial actions.

Comment 492: The Massachusetts Executive Office of Energy and Environmental Affairs commented as follows: The Proposed Cleanup Plan properly requires the development and implementation of a restoration program that results in the restoration of impacts caused by the corrective measures to the full range of wildlife species and habitats. The Commonwealth looks forward to working closely with both EPA and GE during the development and implementation of this critical component of the Proposed Cleanup Plan, with the objective of fully restoring the existing ecological resources of the PSA impacted by the corrective measures. In addition, the Commonwealth appreciates that EPA has made clear in the Proposed Cleanup Plan that nothing in the restoration provisions "shall be construed or deemed to satisfy the separate net benefit

mitigation in the Massachusetts Endangered Species Act (MESA),"and notes further that the Proposed Cleanup Plan also includes the separate and distinct requirement that GE mitigate the impacts of corrective measures on state-listed species and habitats in accordance with MESA.

EPA Response 455, 492: EPA acknowledges the States' support for the habitat restoration requirements and looks forward to working closely with these agencies in the implementation of habitat restoration efforts.

Comment 17: The remediation should clearly indicate what restoration will be performed, and restoration should include interaction with the community. Stream restoration is a fully developed field of practice and research. Current procedures and standards of practice offer sophisticated approaches to restoring waterways such as the Housatonic, points not acknowledged in the Plan. Another erroneous assumption inherent in the Plan is that once the contamination is removed, the system cannot be restored to conditions at least similar to conditions prior to the remediation. Stream restoration is conducted with great success around the nation and quite a bit in Massachusetts and throughout New England.

Comment 46: The remediation should take advantage of the recent advances in ecological restoration.

Comment 48: Plants should be extracted from areas to be remediated and cultured for use during the restoration phase of the project.

Comment 94: The restoration and recovery of the river following cleanup in the first two miles on the East Branch is not a good model for similar processes in Rest of River due to differences in geomorphology and extent of wetlands.

Comment 129: Where rare plants or animal populations could be extirpated by cleanup activities, GE should investigate methods to collect individual plants and animals from local populations of particularly vulnerable species, hold them during cleanup activities, and then re-establish them once restoration has been completed.

Comment 130: One hundred years ago, almost all of the river floodplain was in active agricultural use. The very significant ecologically rich areas which exist today were almost non-existent in that setting and thus have established themselves over the intervening decades. It is reasonable to expect that post-cleanup restoration efforts, such as bio-engineering bank and replanting floodplain vegetation, will reduce the re-establishment time to less than 60 years.

Comment 148: We urge EPA to require GE to consider measures to protect rare, endangered or threatened species, such as capturing individuals, holding them during cleanup activities, and then re-introducing them once habitat restoration has been completed.

Comment 206: Many of the state-listed species on which EPA bases the need for limited cleanup also exhibit remarkable responses to restoration. The National Remediation Review Board (NRRB) Site Information Packet evaluates each of the plausible effects of the cleanup plan on the habitats found within the Rest of the River. In discussing the effects of bank stabilization and other aspects of the current plan, the NRRB describes both the need for restoring plants and wildlife but also the natural tendency for habitats to recover. As the EPA region response to the

NRRB's report states, ten of the state-listed plant species are affiliated with habitats prone to natural and anthropogenic disturbance and are early succession species, and therefore quick to return given the right circumstances. The EPA's response also states that many of the listed wildlife have alternative habitats and could likely move and return after remediation. As both the Mass Audubon and the NRRB have suggested, the most vulnerable state-listed plants could be removed, cultivated and returned post-remediation. The removal and restoration of the submerged aquatic vegetation (SAV) and native plants on the Hudson during PCB remediation provides an example of the viability of such a process.

Comment 223: If it has been decided, as discussed on p. 10 of the Statement of Basis, that a restoration program will be required for the areas to be remediated, these efforts need to be extended to the areas determined to be too sensitive to remediate. Many of the same restoration methods will work in both areas and ultimately more PCBs will be removed to not further threaten sensitive species.

Comment 251: On p. 31 of the Statement of Basis, EPA notes that restoration will be effective in returning habitats to their pre-remediation state. If this is the case, why are alternatives that specify major sediment removal with subsequent restoration maligned for their impact on the environment?

Comment 273: EPA states on p. 40 of the Statement of Basis that the effects of remediation in the floodplain would not be permanent and would be mitigated following remediation. This needs to be kept in mind for all removal-driven options, i.e. the effects are not permanent because restoration will mitigate and begin the rebuilding of the ecosystem.

Comment 399: Ecological restoration methods including transplant or reseeding of rare species into disturbed areas should be considered along with the lessons learned from the pilot vernal pool restoration studies.

EPA Response 17, 46, 48, 94, 129, 130, 148, 206, 223, 251, 273, 399: EPA has reviewed and considered this information and these opinions in its analysis of the Permit criteria. Based on that analysis, EPA has made a determination regarding the appropriate balance of the criteria in the Final Permit Modification. EPA has determined that the remedy described in the Final Permit Modification provides the best balance in terms of reducing risk and minimizing long-term ecological impacts. As crafted, the remedy limits short-term impacts in key habitats and ensures that disturbed areas will be restored after remediation. Thus, EPA's remedy reasonably accepts some short-term impacts in favor of long-term protection of the environment.

Specifically, EPA, in consultation with the Commonwealth and the State of Connecticut, believes that the selected remedy best meets the permit criteria in part, because it:

- Provides the best balance between meeting the ecological cleanup goals while minimizing and mitigating the impact of the remedy on the river's ecosystem and its state-listed species and habitats;

- Is protective of human health in all areas, including state-designated Core Areas;

- Considers and reduces the impacts on floodplain habitat, especially in Core Areas; and,

- Includes Restoration of Areas Disturbed by Remediation Activities as a general Performance Standard (Section II.B.1.c of the Permit).

There are specific provisions in the Final Permit Modification to avoid impacts to key habitats designated as "Core Area 1" by the Massachusetts Division of Fish and Wildlife. Core Area 1 includes the "highest quality habitat for species that are most likely to be adversely impacted by PCB remediation activities." (Final Permit Modification, Attachment B.) GE must avoid excavation in Core Area 1 habitat except in limited areas where necessary to meet Secondary Floodplain Performance Standards. Additionally, no excavations shall occur in Vernal Pools except as necessary to meet Floodplain Performance Standards (unless application of an amendment such as activated carbon fails to meet the Vernal Pool Performance Standards, and even then, no excavation will occur in Core Area 1 Vernal Pools) or Backwaters (unless PCBs are greater than 50 mg/kg) in Core Area 1. Also, bank excavation is significantly limited in Reach 5B and limited in Reach 5A to a lesser extent. Furthermore, in Core Areas 2 and 3 impacts will be minimized and, on a case-by case basis, avoided. Phasing the work will also disperse the effects of the construction activities over time (the remedial action period is estimated to be 13 years) and space (a distance of over 30 miles). These and other restrictions will limit the short-term ecological impact of implementing the remedy.

The reduction in PCB exposures and the active restoration that will occur after implementing the remedy ensure that the long-term benefits of remediation outweigh the short-term harm. Performance Standards set forth in Section II.B.1.c.(1). of the Final Permit Modification require GE to:

(a) Implement a comprehensive program of restoration measures that addresses the impacts of the Corrective Measures on all affected ecological resources, species and habitats, including but not limited to, riverbanks, riverbed, floodplain, wetland habitat, and the occurrence of threatened, endangered or state listed species and their habitats, and,

(b) Return such areas to pre-remediation conditions (e.g., the functions, values, characteristics, vegetation, habitat, species use, and other attributes), to the extent feasible and consistent with the remediation requirements.

Section II.B.1.c.(2). requires GE to follow a four-step restoration process. GE must assess pre-remediation conditions; develop restoration objectives and criteria for Corrective Measures; develop a restoration coordination plan to be performed during the implementation of the Corrective Measures; and, finally, design and implement a Restoration Plan for all areas disturbed by the remediation activities. There will be opportunities for input from stakeholders during this process.

The Restoration Corrective Measures Coordination Plan (RCMCP) outlined in Section II.B.1.c.(2). includes the specification of protocols to be implemented prior to and during construction to minimize impacts to species including, for example, propagation and relocation of species. Section II.B.1.c.(2)(c)v provides for specification of protocols to be implemented prior to and during construction to minimize impacts to threatened, endangered or state-listed species and their habitats, including elements discussed above as well as other measures such as seed-banking, transplanting, wildlife exclusion barriers, and turtle tracking.

EPA has and will continue to stay abreast of the state of the science of ecosystem restoration as it applies to all aspects of the Rest of the River project to ensure that the project considers state of the science techniques and methods. Ecosystem restoration is an emerging science that has been practiced successfully at many large riverine sites. EPA has published specific guidance on aquatic restoration. In addition, several federal agencies, including the National Research Council, Natural Resources Conservation Service and the Fish and Wildlife Service have published guidelines for river restoration projects. Additional guidelines are available from non-profit organizations, such as the Society for Ecological Restoration—a non-profit organization comprised of individuals and organizations from around the world representing the public, private, and non-profit sectors. Scientific literature and the work of restoration practitioners provides additional information and specific technical guidance. In recent years, the number of river restorations has grown significantly, and restoration techniques are used to achieve a wide array of goals, such as removing contaminants, and providing fisheries and wildlife habitat.

EPA will continue to consider the successes and lessons learned at a full range of remediation and restoration projects. Examples of riverine restoration projects include a 35-acre contaminated wetland and stream remediation and restoration project at Loring Air Force Base in Maine. After only 6 years, large areas of remediation were virtually indistinguishable from the areas prior to disturbance. Another example is the remediation of the Clark Fork River in Montana, where hazardous mining waste contaminated 43 miles of river bed sediments and the floodplain. The state of Montana developed a restoration plan to restore river and floodplain habitats, maximize the long-term beneficial effects and cost-effectiveness of restoration activities, and improve natural aesthetics. Remediation and restoration activities have begun, with contaminated soil being removed and replaced with clean soil, and streambanks stabilized and replanted with native vegetation. In addition, immediately upstream on the East Branch of the Housatonic, restoration of the river was performed following remediation, and in the floodplain as well. While rivers are unique and restorations vary depending on the setting, these and other example projects show that restoration on the scale of the Rest of River ecosystem is feasible. However, given the variation among settings, EPA concurs that developments in the field of ecosystem restoration should be considered as a whole and no one project should serve as the sole model for the Rest of River project.

Over time, ecological restoration techniques have been refined to improve the likelihood of success. EPA concurs that the restoration should take advantage of future improvements as well. The Final Permit Modification incorporates this concept by requiring GE to implement an adaptive management approach in implementing the Remedial Action. As stated in Appendix G of the June 2011 NRRB Site Information Package, adaptive management of strategy implementation and monitoring is another important component of the restoration approach, which will be used to ensure that Performance Standards are met. Adaptive management will be used to test restoration techniques and approaches to determine which ones result in the desired restoration/recovery trajectory during the design of the phases of the project.

Comment 533: GE asserts the following: The proposed remedy would cause substantial, extensive, and irreversible harm to the Rest of River Ecosystem. While that ecosystem has thrived in presence of PCBs, it is nonetheless vulnerable in many respects, a unique place with unique and sensitive riparian habitats and substantial biodiversity. The Region's proposed remedy would inevitably cause more harm to these habitats and their biodiversity than it could

possibly relieve or prevent. Furthermore, EPA has no support for its claim that restoration is expected to be fully effective in returning the Rest of River habitats to their pre-remediation state following the proposed remediation, and therefore the likelihood of effective restoration is not equal under any of the alternatives.

Comment 738: GE asserts the following: Although EPA has listed the acreage (or miles) of each habitat type that would be impacted by the various remedial alternatives, it has failed to quantify the impacts of its proposed alternative on several types of floodplain habitats, including floodplain wetland forest, shrub and shallow emergent wetlands, deep marshes, and vernal pools. Instead, it has marked those impacts "TBD" on the asserted ground that such impacts "are to be determined based on habitats and occurrences of state-listed species as defined by the Core Areas." Similarly, it has not estimated the number of state-listed species that would be affected by its proposed alternative. In the absence of such quantification, EPA cannot have adequately considered the important Permit criteria of short-term and long-term adverse ecological impacts of its proposed alternative relative to other alternatives; and it has made it difficult for others to evaluate its proposal under those criteria.

Comment C17, C18: GE asserts the following: SED 9/FP 4 MOD would involve removal of close to one million cubic yards of sediment and soil, directly impacting approximately 370 acres of the PSA ecosystem. The impacts of disruption of this magnitude were specifically identified in the Revised Corrective Measures Study (CMS). The Revised CMS also evaluated the extent to which these negative impacts could be mitigated and the inevitable long-term impacts of work despite such mitigation. In the face of these detailed site-specific evaluations, EPA's Comparative Analysis for the Rest of River (May 2014) concludes that any negative impacts of SED 9/FP 4 MOD, or any remedial alternative evaluated in the Revised CMS, can be quickly and effectively reversed. That conclusion ignores the Revised CMS, additional site-specific evaluations done by the Commonwealth of Massachusetts, and the "significant body of knowledge with respect to ecosystem restoration" to which EPA refers and which we discuss in detail in "A Scientific Response to EPA's Conclusion that Restoration of the Housatonic Rest of River Will Be Fully Effective and Reliable." Any restoration attempted after a project of the nature and scope of SED 9/FP 4 MOD would not be fully effective or reliable in returning these habitats to their pre-remediation ecological condition. The best one could hope for is that these efforts would be partly effective at returning some types of habitats to a semblance of their pre-remediation state after an extended period. Larger combinations of sediment and soil removal like SED 9/FP 4 MOD would have a much greater negative impact on the PSA ecosystem than other combinations like SED 10/FP 9, the ecologically sensitive approach, or the alternative proposed by the Commonwealth of Massachusetts.

EPA Response 533, 738, C17, C18: Remediating and restoring the Rest of River is necessary to ensure the long-term health of the ecosystem. As discussed above, PCBs pose significant risks to aquatic life and wildlife in the Housatonic River, particularly in the PSA. While elements of the ecosystem that are unaffected by PCBs continue to function (e.g., the plant community), pollution from GE's Pittsfield facility has significantly degraded many aspects of the Housatonic River environment. Left alone, the ecosystem will not repair itself for several decades or even centuries. Remediation and restoration will support and accelerate the natural ecosystem recovery processes. While remediation of the river and floodplain at this scale cannot be accomplished to any meaningful level without impacts to the present state of the river and

floodplain, the restoration activities will mitigate impacts caused by the remediation. Over the long-term, restoration activities will return the processes sustaining diverse river and floodplain communities.

EPA has reviewed the state of the science of ecological restoration and provided examples focused on river restorations involving larger river channels and/or remediation in the Comparative Analysis (See Comparative Analysis Attachment 12). These examples show that, following restoration of impacted sites, it is possible to restore both the ecological function of areas and appearance after they are disrupted in projects on a large scale. The examples also serve to highlight the common practices that helped to establish the restoration success. Thus, EPA has concluded that implementing remediation and restoration as required in the Final Permit Modification will result in the return of the functions, values, characteristics, vegetation, habitat, species use, and other attributes, to the extent feasible and consistent with the remediation requirements. With respect to precise acreage impact estimates, as EPA explained in Table 6 of Comparative Analysis, EPA estimates the area of the floodplain to be affected to be 45 acres, and that specific locations and habitat types are to be determined based on habitat and occurrences of state-listed species as defined by the Core Areas.

EPA guidance and the Permit criteria require that the short and long-term effects of remediation (as well as other factors) must be evaluated comprehensively to identify the best suited alternative under the Permit criteria. In the case of the Housatonic River and its floodplain, EPA believes that the best suited alternative is the one presented in the Final Permit Modification. Also see Response 593 below regarding the Commonwealth's position.

Comment 593: GE asserts that, based on substantial evidence in the record, including evidence presented in the RCMS and in the comments submitted by the Commonwealth of Massachusetts, and with no serious effort by the Region to present any new contrary evidence, the proposed remedy would cause unavoidable, substantial, extensive, and irreparable harm to the Rest of River ecosystem, particularly in the PSA. As discussed in the RCMS and noted by the Commonwealth in its designation of the Upper Housatonic River as an ACEC and its comments on the RCMS, this ecosystem is biologically unique, with substantial biodiversity and wildlife habitat and an exceptional number of state-listed rare species. The proposed remedy would severely impact all of these aspects of this unique ecosystem.

EPA Response 593: As noted in EPA's Response 533, 738 and C17, C18, remediating and restoring the Rest of River is necessary to ensure the long-term health of the ecosystem due to the risks posed by PCBs. While remediation of the river and floodplain at this scale cannot be accomplished to any meaningful level without some impacts to the present state of the river and floodplain, the restoration activities will mitigate impacts caused by the remediation. EPA's Response 17 *et al.* above provides additional details on the state of restoration science and examples of remediation projects where restoration has been successful in restoring riverine and floodplain habitats. EPA's response also describe how adaptive management will be used to test restoration techniques and approaches to determine which ones result in the desired restoration/recovery trajectory during the design of each phase of the project.

It is important to note that the Commonwealth of Massachusetts supports the proposed remedy, despite the short-term impacts to the environment. Throughout its comments, GE misleadingly

suggests that the Commonwealth does not support EPA's proposed remedy. While in 2011, the Commonwealth did express concerns about potential impacts of the remediation on the ecosystem when commenting on GE's Revised CMS, EPA and Commonwealth subsequently addressed those concerns through a series of technical discussions culminating in the 2012 Status Report that outlined a conceptual framework for the remedy, which explicitly focuses on avoiding, minimizing and mitigating impacts to Core Areas. In its 2014 comments, the Commonwealth—specifically the Executive Office of Energy and Environmental Affairs and its Department of Environmental Protection (MassDEP) and Department of Fish and Game (MassDFG) —expressly stated its support for the proposed remedy, which is "protective of human health while employing a remediation framework developed in consultation with the Commonwealth and the State of Connecticut that is directed at preserving the dynamic character of the river ecosystem and avoiding, minimizing and mitigating remedy impacts to the affected wildlife and their habitats, with a particular focus on protecting state-listed species."

The Massachusetts Fisheries and Wildlife Board (MassFWB), which oversees the Division of Fisheries and Wildlife (the largest landowner in the Rest of River area), also supports the proposed remedy. The MassFWB recognizes that the PCB contamination at Rest of River "poses a public health risk that must be addressed." While noting that there is no "silver bullet solution" for sites contaminated with PCBs and that crafting the Rest of River remedy has been a "difficult balancing act," the MassFWB acknowledged that the proposed remedy "has been crafted to responsibly address the public health risks while responsibly maintaining the natural and recreational values of this section of the Housatonic."

Comment 594: GE asserts that, in its discussions of the ecological impacts of the proposed remedy, EPA acknowledges impacts on the various types of habitat, but asserts that all of those impacts would be short- term, because the affected habitats can be successfully restored so as to re-establish their pre- remediation condition and functions. EPA thus concludes that "restoration is expected to be fully effective and reliable in returning [the affected] habitats, including vernal pool habitat, to their pre-remediation state," and that, "[a]s a result, the likelihood of effective restoration is equal under any of the alternative." EPA's claims regarding the severity and duration of the habitat impacts and the effectiveness and reliability of restoration are unsupportable and unjustified.

Comment 594.a: GE asserts the following: While EPA has quantified the impacts of its proposed remedy on aquatic and riverbank habitats, it has not quantified the impacts of its proposed remedy on the specific floodplain habitats, claiming that such impacts "are to be determined based on habitats and occurrences of state-listed species as defined by the Core Areas" (Comp. Analysis, p. 29). GE has quantified the impacts of the proposed remedy on the various affected habitat types based on the Region's descriptions of that proposed remedy, existing data, and a reasonable identification of the locations of access roads and staging areas necessary to implement that remedy. Those impacts are listed, by habitat type, in Table 11 and depicted, for the PSA, on Figures 5a through 5f. The proposed remedy would impact over 400 acres of the Housatonic River ecosystem, including several types of sensitive habitats (e.g., riverbanks, floodplain wetland forests, and vernal pools).

EPA Response 594, 594.a: EPA's approach is justified and well supported. Remediation with subsequent restoration is necessary within the Rest of River due to PCB contamination that poses

unacceptable risks to human health and the environment, as demonstrated in EPA's HHRA and ERA. Addressing the contamination will result in some unavoidable temporary impacts, but will provide significant benefits for the river and its floodplain in the long term. Response 533, 738, C17, C18 and Response 17 *et al.* provide additional details on the state of restoration science and reference examples of successful restoration projects which support EPA's position that restoration will mitigate the ecosystem impacts of remediation.

Also, there are specific provisions in the Final Permit Modification to avoid impacts to key habitats designated as "Core Area 1" by the Massachusetts Division of Fish and Wildlife. Core Area 1 includes the "highest quality habitat for species that are most likely to be adversely impacted by PCB remediation activities." GE must avoid excavation in Core Area 1 habitat except in limited areas where necessary to meet Secondary Floodplain Performance Standards. Additionally, no excavations shall occur in Vernal Pools, except as necessary to meet Floodplain Performance Standards (unless application of an amendment such as activated carbon fails to meet the Vernal Pool Performance Standards, and even then, no excavation will occur in Core Area 1 Vernal Pools) or Backwaters (unless PCB concentrations are greater than 50 mg/kg) in Core Area 1. Also, bank excavation is significantly limited in Reach 5B and limited in Reach 5A to a lesser extent. Furthermore, in Core Areas 2 and 3 impacts will be minimized and, on a case-by case basis, avoided. Phasing the work will also disperse the effects of the construction activities over time (the remedial action period is estimated to be 13 years) and space (a distance of over 30 miles). These and other restrictions and required procedures will limit the short-term ecological impact of implementing the remedy.

Comment 595: GE asserts that the impacts of remediation activities on the affected habitat types and the constraints on restoration techniques that would prevent re-establishment of pre-remediation conditions and functions for several of those habitat types were discussed in detail in the RCMS (e.g., section 5.3). Further, the negative impacts of the proposed remedy on these habitats are discussed specifically in comments by Professors Robert Brooks, Aram Calhoun, and Malcolm Hunter, a copy of which is provided in [GE] Attachment C hereto. Those comments also demonstrate that those impacts cannot be avoided through timing of the remedial construction work and that, due to the limitations of restoration techniques, the adverse impacts on some of the habitats would be long-lasting. Even EPA's consultant recognizes that the unavoidable impacts of the proposed remedy and any attempt to rectify those impacts will result in a "novel ecosystem" different than the "probable trajectory" of the "original ecosystem" but for the disturbance of the remedy. EPA's Statement of Basis and Comparative Analysis of Alternatives ignore this critical conclusion of its own consultant.

EPA Response 595: The remediation and restoration would be unnecessary if PCBs from GE's Pittsfield facility were not currently contaminating many miles of the Housatonic River and many acres of the adjacent floodplain. Addressing the contamination in these areas will result in some unavoidable temporary impacts, but will provide significant benefits for the river and its floodplain in the long term. After remediation and restoration, it is understood that the Rest of River will not mirror what is observed today, an environment compromised in many ways by high concentrations of PCBs, nor what was there 100 years ago before PCBs were released into the river when the area had been largely cleared for agricultural use. To the extent that the remediation and restoration creates a "novel ecosystem," this is preferable to the currently contaminated ecosystem. Accordingly, the goal of the ecological restoration is to restore,

following remediation, the functions and ecosystem services that exist today but without the significant impairment from PCB contamination.

See Response 604, C19 for EPA's responses to concerns regarding long-lasting habitat impact. Also, EPA's responses to the individual points raised in comments by Professors Brooks, Calhoun, and Hunter from Attachment C of GE's comments can be found in Responses C1 through C29.

Comment 596: GE asserts that Professors Brooks, Calhoun, and Hunter have prepared a separate critique of EPA's claims that restoration would effectively and reliably re-establish the pre-remediation conditions and functions of the affected habitats, including the EPA consultant's report contained in Attachment 12 to the Comparative Analysis. That critique, which references 30 sources not considered by EPA, most of which have been peer reviewed, is provided in Attachment D to GE's comments. It includes a showing that none of the other sites referenced in that EPA consultant report as examples of "successful" restoration provides any precedent for restoration of an ecosystem remotely like that in the Rest of River. In fact, reviews of prior restoration efforts have shown low success rates in re-establishing ecological functions for rivers and vernal pools. As the Professors conclude: "If EPA's proposed remedy is implemented, the Rest of River will be severely impaired for many decades, perhaps centuries, and restoration efforts will constitute just a small Band-Aid on a gaping wound."

EPA Response 596: In the field of ecosystem restoration, as with nearly any scientific discipline, there is a large body of literature available and the authors of the literature often present diverging viewpoints. As GE notes in Attachment D to its comments on the Draft Permit Modification, its search of the literature generated 9,874 references on river, stream, or floodplain restoration as of July 17, 2014. GE's Attachment D provides a selected list of 30 technical papers from this body of work; the majority of which are relatively new.

EPA's review of the papers selected by GE leads to the determination that, in general, the conclusions in these papers do not suggest that the Restoration Performance Standards established in the Final Permit Modification will not be achievable. Nonetheless, EPA intends to consider the relevant information contained in these papers in reviewing GE's proposed Restoration Corrective Measures required by the Final Permit Modification.

The focus of several of the research papers cited by GE appears not to be on remediating and restoring rivers that have been contaminated and that present unacceptable risks to human health and the environment. Rather, the focus appears more to be on the evolving nature of the river restoration science and the debate on how best to restore ecosystems in general. For example, GE cites the following paper, which is described as "a case study that proposes a set of technical monitoring and assessment measures in an effort to assess success and discern failures in river restoration." (Buchanan, B.P., M.T. Walter, G.N. Nagle, and R.L. Schneider. 2012. *Monitoring and assessment of a river restoration project in central New York.* River Research Applications 28:216-33). According to the authors of this paper the main impetus for this project was to protect properties along a reach of the Six Mile Creek where bank erosion had become severe. In another example, GE cites the following paper which describes reasons for failure of one stream rehabilitation project. Smith, S.M., and K.L. Prestegaard. 2005. *Hydraulic performance of a morphology-based stream channel design*. Water Resources Research 41(1l):

W l 1413:1-17. This project was a stream rehabilitation project on a gravel bed tributary to the Patapsco River in Maryland. As the authors describe "The Deep Run reconfiguration was proposed to reduce sediment loading to a riparian wetland located immediately downstream of the project reach. The wetland project was created by gravel extraction in the Deep Run valley, which lowered the floodplain elevation." These papers highlighted issues with projects that had significantly different objectives than those of the Rest of River project: removing highly contaminated sediment and soil with subsequent restoration of the functions and values of the impacted systems.

EPA's Attachment 12 (River & Floodplain Restoration) to its Comparative Analysis provides some relevant examples of successful ecological restoration projects across various settings and scales. These example projects demonstrated successes following restoration of impacted sites, illustrating that it is possible to restore both the ecological function and appearance of areas after they are disrupted. These examples also highlight the common practices that helped to establish the restoration success. While no two sites are identical, examples of projects were selected where the project was of particular relevance to the Housatonic River in that they were large rivers and streams with a floodplain connection and/or with sediment/soil remediation (much of the current literature base includes much smaller river systems than the Housatonic and/or very different primary restoration goals, such as maintaining a specific stable channel form).

GE states in Attachment D to its comments on the Draft Permit Modification that "None of the case studies cited as examples of successful restoration is appropriate for comparing the potential outcomes of the proposed remediation and restoration efforts in the Rest of River…." However, GE bases that argument on the premise that the Rest of River area is "ecologically vibrant," and that the examples that EPA provides "were focused on rivers that were physically, chemically, and biologically degraded." As the Housatonic River and its floodplain are chemically and biologically degraded by the PCB contamination present, and the area has been physically degraded through historical alteration of the river channel and floodplain, EPA believes these examples serve as EPA intended.

Response 604 and C19 address GE's comment that "The Rest of River will be severely impaired for many decades, perhaps centuries…" Any individual points raised in Attachment D to GE's comments on the Draft Permit Modification not covered in other comments are addressed in Responses D1 through D4.

Comment 603: GE asserts that the impacts of the proposed remedy would extend beyond the footprints of the areas that are physically disturbed by remedial construction activities and for access roads and staging areas. There will be significant "edge effects" or "spillover effects" outside of those footprints due to potential increases in erosion and sedimentation (even with controls), the spread of invasive plant and animal species to such areas, changes in microclimate, and the effects of noise from construction and traffic on sensitive bird and mammal species during the breeding and rearing seasons.

Comment C20: "Edge effects" will cause significant negative impacts in areas extending beyond the footprint of the actual remediation work. These impacts will include potential increases in erosion and sedimentation, the spread of invasive exotic plant and animal species, changes in microclimate, and noise from construction and traffic that can disturb sensitive bird

and mammal species. Exactly how far those edge effects reach could vary considerably. Some effects such as microclimate changes are usually measured in tens of meters but movement of invasive plants and animals may reach hundreds of meters (Laurance et al. 2002). If we look at the full impact of SED 9/FP 4 MOD, using 100 meters as a reasonable estimate of the lateral extent of edge effects, it is apparent that almost the entire PSA is likely to be affected (Fig. 2 [in GE's comments, Attachment C]). These estimates likely understate the negative impacts of SED 9/FP 4 MOD because they do not include the substantial edge effects related to more than 3.5 miles of bank stabilization. Because banks are linear, they are particularly extensive sources of edge effects. Furthermore, despite EPA's stated goal of protecting what it has designated as Core Area 1 habitat (owing to its importance as habitat for immobile state-listed species), it is proposing the devegetation and excavation of areas within 100 meters around those areas. As depicted in Figure 3 [in GE's comments, Attachment C], the 100-meter wide area around Core Area 1 habitat should also be protected as a buffer because of the edge-effect phenomenon. Finally, it is noteworthy that all of these edge effects except for noise generated by remediation activities will persist long after the remediation work is complete, indefinitely in the case of invasive species that become established.

EPA Response 603, C20: EPA acknowledges and shares the concerns noted regarding potential spillover effects that might occur during the construction phases of the remediation and restoration. EPA's Final Permit Modification addresses these issues and provides the framework for minimizing and mitigating them. Each of the specific effects delineated in these comments is addressed briefly below. However, applicable to all of these issues is the fact that, as demonstrated by the body of data and other information developed at Rest of River over the last 15 years, wildlife is currently impacted by the existing PCB contamination and human health risks exist. As noted in the Comparative Analysis and Statement of Basis, EPA believes that the long-term environmental benefits of removing and/or isolating the PCB contamination in the River and surrounding areas will outweigh short-term effects and temporary loss of functions that will occur as a result of the remediation and subsequent restoration activities.

Erosion and Sedimentation – Erosion and sediment controls are a necessary component of any construction activity and are guided by Best Management Practices (BMPs). The Performance Standards and Corrective Measures outlined in EPA's Final Permit Modification require that GE develop Remedial Design/Remedial Action Work Plans. EPA anticipates that these plans will: 1) provide appropriate erosion/sediment control measures, 2) ensure that reconstruction of river banks will minimize erosion, considering the principles of natural channel design, in areas where PCB-contaminated sediments are removed, 3) maximize the use of bioengineering methods when reconstructing riverbanks, and 4) provide for the selection of appropriate cover/cap material for the Erosion Protection Layer of Engineered Caps.

To minimize the negative effects of construction on the community and adjacent habitats, BMPs such as phased construction, dust suppression techniques, perimeter air monitoring, and other engineering controls will be required during remedial construction. There are several techniques that can control erosion by working in conjunction with the geomorphic processes and conditions of the construction site, including minimizing the time between removal of the pre-construction cover and establishment of the post-construction cover.

Microclimate – Effects of remediation and restoration activities on the existing microclimate may include temporary loss of shading, increases in surface water and soil temperatures, increased wind velocities, and increased evapotranspiration, among others. As noted in the NRRB Site Information Package, remediation and restoration of the river and floodplain at this scale cannot be accomplished to any meaningful level without short-term impacts to the present state of the river and floodplain. However, EPA believes that phasing the project and performing construction in relatively small areas of the project at any given time will reduce the scale of these impacts. In addition, implementation of a comprehensive ecological restoration program will initiate an accelerated recovery of the ecosystem that will not only alleviate impacts caused by the remediation, but also, over the longer term, create processes that will sustain diverse river and floodplain communities.

Noise – EPA acknowledges the concern that construction-related noise during remediation activities may affect wildlife breeding and rearing of young in some species, but believes such effects will be localized and can be mitigated. Through consultation with the state and federal wildlife agencies, EPA will ensure that the remedial construction plans to be developed by GE, to the extent possible, avoid, minimize, and mitigate these effects. Time and scheduling constraints on construction activities will limit the amount of disturbance at any one time and restrict construction disturbance to seasonal schedules that allow use of the riparian corridor by native species. Furthermore, only a portion of the river system will be affected at one time, so the effects in any one area will be limited to a relatively short period of time, leaving other unaffected areas as refugia.

GE also asserts that a 100-meter buffer is necessary surrounding the Core 1 Areas to protect against the edge-effect phenomena, and implies that EPA already plans to devegetate and excavate areas within this buffer zone. Core Area habitats were established by the NHESP to "guide efforts to avoid, minimize and mitigate impacts to state-listed species." The NHESP did not require that further "buffer zones" surrounding the Core Area 1 habitats would be necessary to achieve this objective. In addition, the specific areas in the floodplain that will undergo remediation (including any in a so-called "buffer zone") have not yet been determined; when Remedial Design/Remedial Action (RD/RA) Work Plans are developed, EPA anticipates requiring that GE be cognizant of any areas in close proximity to the Core Area habitats.

Also see Response 147 *et al.* below.

Comment 604: GE asserts that, as a result of its direct and indirect impacts, the proposed remedy would cause fragmentation of and an overall loss of connectivity in the contiguous, largely undisturbed forested riparian corridor in the [Primary Study Area or PSA], which is important to the viability and sustainability of populations of native species that depend on that near-continuous corridor for daily use, dispersal, and migratory movements. Given the constraints and limitations on restoration methods, the PSA ecosystem would not recover entirely from that loss.

Comment C19: GE asserts the following: There will be extensive perforation of the vegetation in Reaches 5A and 5B (i.e., numerous patches cleared of what is currently unbroken vegetation), and in some places SED 9/FP 4 MOD will sever the linear forested riparian corridor of the PSA, such as in and near Exposure Areas (EAs) 2-6, 16-18, 20-24, and 32-34 (Fig. 1 [GE's

Comments], Attachment C). Indeed, in three of these places (all but EA 16-18), the proposed remediation reaches laterally across almost the whole PSA. The estimated total of 45 acres of floodplain that would be disrupted by SED 9/FP 4 MOD (see page 34 of the Comparative Analysis) may seem modest, but the locations of these areas are critically important given the narrowness of the riparian corridor in those areas. More importantly, EPA's estimates do not include the extensive area of access roads and staging areas, and related clearing that will be required in connection with the excavation of soil in these areas.

EPA Response 604, C19: EPA disagrees with GE's statement about recovery of the ecosystem.

To maintain, to the extent practicable, undisturbed forest corridors in the PSA and minimize adverse impacts to disturbance-sensitive species, EPA has included language in the Adaptive Management and Coordination of Corrective Measures portions of the Final Permit Modification requiring phasing and anticipates requiring GE to develop remediation plans that include a phased approach to construction and subsequent restoration. Phasing the work will disperse the effects of the construction activities over time (the remedial action period is estimated to be 13 years) and space (a distance of 30 miles), and provide optimal coordination of restoration with remedial activities, including support areas. This will limit ongoing disturbance to any one area and allow native species to continue using river corridor habitats in post-restoration areas and areas yet to be disturbed. The Final Permit Modification requires GE to address these concerns in the restoration plans, which will be reviewed and approved by EPA (after consultation with the States). In addition, GE will be required to submit plans proposing the location of infrastructure (e.g., roads and staging areas). EPA will review these plans carefully to ensure that habitat disturbance and fragmentation is kept to the minimum extent practicable. The Final Permit Modification also provides for the use of adaptive management to improve and adjust construction as well as restoration methods during later phases. Also see Response C5 *et al.* below.

In general, the complex ecosystems that currently exist within the project area are present despite anthropogenic activities that have been influencing land cover in the area since the 1700s. These historical activities significantly affected the ecological conditions and processes around the river, including vegetation types and succession, river meandering, downstream transport of sediment via accelerated bank erosion, and deposition in the floodplain. In addition to historical straightening and damming of the channel, the river and surrounding forests were impacted by the clearing of riparian areas for agriculture and development. Urban development and historical agricultural activities in the upper PSA resulted in loss of vegetation in the floodplain and riparian areas. Following these past disturbances, the ecosystem was left to adjust and recover naturally, which has resulted in the current conditions in the PSA. An active restoration program will speed up the natural process of ecosystem recovery following remediation. EPA's ecological restoration strategy is to mitigate the short-term impacts related to the remediation activities, not to restore the ecosystem back to some historic, unaltered, pristine state. After remediation and restoration, it is understood that Rest of River will neither mirror what is observed on-site today – an environment that has been compromised in many ways by high concentrations of PCBs – nor what was there 100 years ago before PCBs were released into the river. Instead, the goal of the ecological restoration is to restore the functions and ecosystem services that currently exist.

Comment 605: GE asserts that EPA's proposed remedy would have severe adverse impacts on state-listed species. Although EPA's proposal would limit remediation in Core Area 1, that would not avoid substantial impacts on state-listed species. Although EPA has not estimated the number of state-listed species that would be affected by its proposed remedy, GE has conducted such an assessment, building on the detailed assessment that was provided in Appendix L of the RCMS. This updated assessment for the proposed remedy is provided in [GE] Attachment E, which presents, for each potentially affected species, an evaluation of whether a "take" would occur, the estimated extent of the local population, and the estimated impact on a significant portion of the local population. This assessment shows that the proposed remedy would involve a "take" of 25 state-listed species and would adversely impact a significant portion of the local populations of at least 9 of those species.

Comment 606: GE asserts that, despite EPA's proposal of limited remediation in Core Area 1, impacts on state-listed species would occur in other areas. Given the nature of the work in the proposed remedy, at least three state-listed species (American bittern, wood turtle, and common moorhen) would be adversely affected to a substantial degree, experiencing an impact to a significant portion of their local populations. Further, despite NHESP's use of American bittern as an example of a species with lower conservation concern, Massachusetts Audubon's recent State of the Birds Report lists American bitterns as "locally and strongly declining; conservation action urgent." NHESP's additional claim that the habitats of the Core 2 species are "more easily restored" is belied by the evidence. Additionally, since Core Area 3 refers to areas with dense concentrations of state-listed species (i.e., overlapping habitat for eight or more such species), implementation of remediation activities in those areas would contribute to the overall impacts on those species. Indeed, given that definition, Core Area 3 would seem to be at least as deserving of special protection as Core Area 1.

EPA Response 605, 606: EPA does not agree with GE's view on the remedy impacts on state-listed species. On the contrary, the benefits of removing or significantly decreasing the exposure of such species, and others, to high levels of PCB contamination, outweigh the short-term impacts. EPA's opinion is shared by the Commonwealth of Massachusetts, whose responsibility it is to administer the MESA. As discussed in the Commonwealth's 2014 comments on EPA's Proposed Cleanup Plan for Rest of River, the Commonwealth has been providing comments to EPA on the remediation of the Rest of River since 2008 and has been involved in discussions with EPA and the State of Connecticut since 2011. As a result of this collaboration, and after a thorough review of the components of the remedy that potentially could result in a "take" of state-listed species, the Commonwealth expressed its support for EPA's proposed remedy, noting that the plan would be protective of human health and that the plan is "directed at preserving the dynamic character of the river ecosystem and avoiding, minimizing and mitigating remedy impacts to the affected wildlife and their habitats, with a particular focus on protecting state-listed species." Moreover, the Commonwealth specifically addressed the consistency of the proposed remedy with the MESA requirements and supports the proposed remedy. See also Attachment B to the Final Permit Modification, the July 31, 2012 letter from the Massachusetts Division of Fisheries and Wildlife.

In addition to the Commonwealth, the Massachusetts Audubon Society, one of the larger landowners along the Rest of River, also provided extensive comments on EPA's proposed remedy. Nowhere in its comments does Mass Audubon express concerns regarding the impact

of the proposed remedy on the American bittern, nor on state-listed species in general. The Audubon 2013 "State of the Birds" report cited in Comment 606 does include a species-specific review of the status of American bittern. However, one of the primary reasons listed in the Audubon report for the declining local populations of this species is habitat degradation, with "chemical contamination" cited as one of the major causes of habitat degradation. EPA agrees with this assessment. In fact, the American bittern was specifically evaluated in the ERA, and it was concluded that "American bitterns feeding and reproducing in the Housatonic River PSA are at a high risk of toxicity from exposure to PCBs in these reaches." Based on this information, EPA concludes that the long term benefits of remediating the contamination that poses a threat to American bitterns will outweigh any temporary disruption of remedy construction in their contaminated habitat.

See also Response 17 *et al.* above for information regarding the approach to Core Areas.

Comment C1: GE asserts that EPA suggests that an Adaptive Management framework will be employed in the implementation of SED 9/FP 4 MOD but overlooks the fact that such a framework would require much more time than EPA proposes, especially when dealing with slow ecological processes like the growth and succession of vegetation.

Also, in Attachment D to its comments, GE asserts as follows: All of the remediation in Reaches 5A, 5B, and 5C and their associated backwaters is scheduled to be completed in just 8 years. Adaptive management requires significant time, especially when dealing with slow ecological processes like the growth and succession of vegetation. The fundamental feature of adaptive management is learning from past experience, and that requires time to: monitor the results or outcomes of actions; assess if goals were met and unintended consequences incurred; and develop new approaches based on lessons learned. In the context of vegetation restoration, it is likely to take at least 5-10 years just to be able to judge if the restoration effort is on track to be successful (e.g., planted trees are surviving and the site is not overrun with exotic species.) Thus, even at sites where the goal is to restore fast-growing plants, like annuals, rather than trees or shrubs, it is not reasonable to suggest that in just 8 years one can make multiple trips around the cycle of adaptive management.

EPA Response C1: EPA disagrees that the proposed time frame for implementation of SED 9/FP 4 MOD precludes the use of an adaptive management approach as part of the remedy. Following an adaptive management approach, remedial construction plans will be developed with the view toward incorporating opportunities to learn from current and past project activities in order to improve future activities and the overall performance of remediation and restoration activities. Doing so will require that the time for monitoring and data evaluation be included in the project schedule in order to identify actions that can be taken to improve the overall project performance, in terms of satisfying project objectives. The time invested will produce dividends in the form of reduced uncertainty as the project proceeds, increased confidence in the success of project outcomes in terms of risk reduction and project objectives, and lower total project costs by reducing the time and expense associated with rework and other problems.

Over the course of the project, there will be numerous opportunities to make improvements in operational components of the project by selecting the appropriate metrics and using them in an adaptive management approach. In some cases, formal adaptive management can be employed

to optimize operational practices. For example, uncertainty regarding the relative performance of different dredge bucket sizes could be resolved by testing the performance of a 1- versus a 3-cubic yard bucket, using dredging production rate and mass of resuspended sediment as performance metrics. These types of metrics can be easily evaluated and used to make adaptive management decisions well within the time frame of the project. In other cases, these opportunities will emerge through "trial and error" (e.g., observations in the field indicate that dredging with a 1-minute cycle time releases more suspended sediment into the water column than dredging with a 2-minute cycle time). As an example that such an approach can be successful, an Adaptive Management Plan, focusing on metrics that could be evaluated within a suitable time frame, was developed by GE for Phase I of the Upper Hudson River remedial action (Quantitative Environmental Analysis, LLC. 2008. Phase I Adaptive Management Plan.), a project that was completed in a much shorter time than is proposed for the SED 9/FP4 MOD alternative.

GE implies that it will not be possible to evaluate the success of plantings of trees and shrubs, as well as the effectiveness of invasive species control during the project duration in Reach 5 and therefore an adaptive management approach involving such metrics is not possible. EPA notes, however, that just such evaluations were made shortly after completion of the ½-Mile and 1 ½-Mile remediation projects on the East Branch of the Housatonic River, and were reported by GE in its required annual monitoring reports (see, for example, the annual monitoring reports for ecological restoration activities in the Upper ½ Mile Reach and the 1 ½ Mile Reach, such as the Upper ½-Mile Reach 2005 Annual Monitoring Report, and subsequent Annual Monitoring Reports). In no case does GE suggest in these reports that evaluation of the success of vegetation plantings or invasive species control against the established performance metrics is unreliable, ineffective, or should not be used to inform potential corrective actions. This is exactly how such information would be used in the Rest of River as part of adaptive management which continues into post-remediation activities.

See also Section V of this Response to Comments for information regarding Adaptive Management.

Comment C22: GE asserts the following: As is discussed in Section 5.2.3 of the Revised CMS, given the numerous animal and plant species that would be affected by SED 9/FP 4 MOD, with their individual life cycles and growing seasons, there is no way that the remedial construction work could be timed to prevent direct adverse impacts to all species. For example, sediment removal and/or capping could be scheduled to avoid working in the river during the breeding or emergence season for one generation of animals, such as dragonflies, mayflies, and possibly spawning fish (typically late spring and summer), but this approach would not avoid all adverse effects because the impacts would last well beyond the immediate construction season, affecting breeding and emergence in subsequent seasons. Similarly, for animals with high site fidelity, such as the American bittern, even if remediation work occurred only during periods when they are not present, only direct mortality would be avoided. The habitats would be negatively impacted for multiple years. In most cases, loss of habitat equates to loss of populations, with subsequent negative impacts to food webs within the ecosystem. With specific reference to plant species, there is no time of year that would avoid adverse impacts, since even winter removal activities would affect either the plants themselves (at least their underground roots and rhizomes) or their seed banks or both. Similarly, winter

work would adversely affect the species that often spend the winter on the river bottom, such as the wood turtle or larvae of dragonflies. In short, there would be no time of the year in which remedial construction activities would not cause adverse impacts to many plant and animal species. Although a few temporal strategies could reduce the harm to some degree, the adverse impacts of SED 9/FP 4 MOD would still be significant.

EPA Response C22: EPA agrees that the timing of remedial construction alone is not a complete solution to avoid, minimize, or mitigate effects to all state-listed species. Section II.B.1.c. of the Final Permit Modification references additional measures to be considered such as, without limitation, propagation, relocation, seed-banking, transplanting, exclusion barriers, and turtle tracking. In addition, the work will be phased through time (13 years) and location (30 river miles) and much of the area will not be remediated, providing refugia as well as ongoing source areas for plant and animal species.

Comment D3: GE asserts the following with respect to "designation of a reference site" being identified in Appendix D of EPA's Comparative Analysis as one of the elements of a successful restoration plan: The uniqueness of the Housatonic River and floodplain make this [designation and description of the reference site] impossible. We note that EPA hasn't identified any system that is anything like a reasonable analog that might serve as a reference system.

EPA Response D3: EPA disagrees that there are not reasonable analogues to be used as reference areas. EPA recognized the unique nature of the Housatonic River and floodplain when selecting reference sites for use in the project. During the development of the ERA, EPA gave careful consideration to the potential confounding factors associated with the selection of reference areas. Reference areas were chosen based on similarity to the PSA in terms of natural communities, area, and land use. Necessary features of the reference areas included emergent, shrub, and forested wetland communities, considerable area occupied by or adjacent to forest land, and lack of extensive residential use. Reference areas could contain some housing and agricultural land, as these features were present in the PSA. Four separate reference areas located in the Housatonic Watershed were identified to compare to differing conditions in the PSA. ERA Appendix A.1 (Section II, pages 15-17) provides descriptions of these reference areas. In addition, locations with low or no PCB concentrations within the PSA in appropriate habitats were used as reference areas for specific studies. In the course of developing remediation and restoration design plans, GE could consider these reference areas selected for the ERA.

Comment D4: GE asserts the following: It will be critically important to tie post-project monitoring and assessment both to measures taken prior to remediation and to "as-built" conditions immediately following construction. Some improvements compared to "as-built" conditions are likely but the negative changes compared to the pre-project conditions are certain to be profound.

EPA Response D4: EPA agrees that it is critical to tie together pre-existing conditions with remedial measures and restoration activities as well as monitoring and maintenance activities. To this end, as specified in the Final Permit Modification Section II.B.1.c. GE is required to

- Perform a baseline assessment of pre-remediation conditions;

- Develop restoration performance objectives and evaluation criteria;
- Develop a restoration corrective measures coordination plan (tying remediation to restoration);
- Design a restoration plan to return all areas disturbed by the remediation activities to pre-remediation conditions; and
- Perform post restoration monitoring and maintenance activities.

EPA anticipates that GE will document "as-built" conditions and compare to pre-remediation conditions. However, EPA does not agree that, following implementation of this active and rigorous restoration program, negative changes will be as profound as speculated by GE. The requirements EPA has built into the Final Permit Modification are a reasonable method supported by science to minimize negative changes compared to pre-remediation conditions.

III.B.2.b Effects of Remediation/Restoration on Specific Habitats

Sediment Bed and Banks

Comment 90.a: The current cleanup plan relies on MNR in large areas of the river designated as core habitats to avoid disturbance of ecosystems that support several state-listed species. The consensus remains that this methodology is inadequate as the long-term consequences to these fragile ecosystems outweigh any short-term disruption caused by a more effective cleanup. The field of stream restoration provides a suite of effective tools to both mitigate habitat disruption as well as facilitate a return to equilibrium post remediation. However, the current plan fails to acknowledge the full extent of these tools and resorts to an insufficient cleanup. Finally, the entire Housatonic River will not require stream restoration. The plan should account for each reach on a case by case basis based on river morphometry and cleanup measures. Stretches of the Housatonic with lower flow rates and higher silt accumulations tend to accumulate more contaminants than high velocity areas of the river. Thus the lower velocity sections of the river, such as Reach 5B, tend to be contaminant hot spots. Such areas make good candidates for stream restoration, due to both the elevated contaminant levels and the ease of in-river construction in low flow areas. The Rest of River system will be more capable of returning to a natural state after comprehensive remediation followed by sound restoration.

EPA Response 90.a: As discussed in the Statement of Basis, the remedy is intended to "achieve Performance Standards while minimizing impacts on river dynamics and other ecological processes, and on the abundance of state-listed and other wildlife species." The use of MNR in selected reaches provides the "best balance between addressing human health risks and ecological risks and negative impacts of remedial work on the river's ecosystem."

EPA disagrees that Reach 5B is a "hot spot" for sediment compared to other reaches of the river. Average and median surficial PCB concentrations in sediment in Reach 5B are less than in surficial sediment in Reaches 5A, 5C, the Backwaters and Woods Pond (Figure 4-8 and Table 4-8, September 2003 GE RCRA Facility Investigation Report). PCB data collected from the Housatonic River confirm the considerable spatial variability in PCB concentrations in sediment, not only among river reaches but within each reach and subreach. The heterogeneity of PCB concentrations in sediment precludes the identification of sediment units with clearly defined

PCB concentration boundaries (i.e., hotspots). In part, due to these lower surficial PCB concentrations, the final remedy in Reach 5B requires removal of sediment with PCB concentrations greater than or equal to 50 mg/kg and the placement of an amendment such as activated carbon and/or other comparable amendments to reduce the bioavailability of the remaining PCBs in the sediment bed. In contrast, more extensive sediment removal and restoration is required in Reaches 5A, 5C, the Backwaters and Woods Pond.

EPA agrees that sound restoration approaches are necessary within the remediation reaches to achieve the long-term goals of the project. The use of stream restoration techniques (including consideration of Natural Channel Design (NCD) principles) is included in the Final Permit Modification. It specifies a hierarchy of bank stabilization methods to be used, where appropriate, to reduce bank erosion while maintaining the dynamic nature of the Housatonic River. EPA agrees that the final remediation plan will need to consider geomorphic processes in each reach and adjust the proposed restoration accordingly. EPA also agrees that stream restoration is not required throughout the entire Housatonic River corridor. In implementing the remedy, GE will be required to submit to EPA for review and approval a number of deliverables including conceptual and final remedial designs and restoration plans that will include the application of stream restoration techniques.

See also Responses 17 *et al.*, 455, 492, 533 *et al.*, 593, 594, 595, 596 above in this Section and Section III.C.6 of this Response to Comments regarding MNR.

Comment 597: GE asserts that the proposed remedy would impact the entire river channel in Reaches 5A and 5C and at least 3.5 miles of the riverbanks in Reach 5A. As the Commonwealth has noted, such work would "inevitably cause severe and long-lasting destruction of the Housatonic River ecosystem and state-listed rare species," and the Commonwealth therefore proposed no riverbed excavation (outside of Woods Pond) and no riverbank excavation or stabilization. Although the proposed remedy specifies that this work should be conducted "considering the principles of Natural Channel Design," that would not avoid the severe and long-lasting destruction noted by the Commonwealth. For example, regardless of the technique used, the sediment removal/capping would kill all existing benthic invertebrates in the area, damage existing fish populations, and alter the current substrate type. These effects would last until natural deposition from upstream changes the substrate back to a condition approximating its pre- remediation condition and benthic invertebrates and fish recolonize these reaches – which could take many years, during which invasive aquatic plant and animal species would have an advantage.

Comment C2: GE asserts that the sediment removal and/or capping would remove or bury the existing aquatic vegetation and benthic invertebrates, and displace the fish. The substrate will be dependent on deposition from upstream to begin its recovery, but the timeframe for that process is uncertain. While some recolonization would occur, primarily by drift from upstream reaches of the river, it would be slow, taking years to decades. Of concern is that much of the Housatonic River upstream of the PSA is quite urbanized, meaning less diverse source populations will be available for recolonization downstream. It is likely that common and invasive species would arrive first, particularly those tolerant of changes in substrate materials. Less tolerant sensitive and rare species may never recolonize reaches where removal of the original substrate or riverbanks is extensive over long sections. SED 9/FP 4 MOD would destroy

126 acres of aquatic riverine habitat. Thus, aquatic communities are unlikely to match the pre-remediation communities in terms of composition, species richness, and relative abundance of species.

Comment C3: GE asserts removal and replacement of substrate will adversely affect groundwater processes that are critical to both vertebrates and invertebrates. In particular, groundwater provides a base flow to a river during times of reduced surface flows. Groundwater flows also create a hyporheic zone in the riverbed where invertebrate and fish larvae can flourish. Disturbance of these discharge pathways by dredging, capping, and bank remediation will adversely affect groundwater-dependent habitats and flow patterns, and also destabilize the base of riverbanks, resulting in bank slumping and further erosion (e.g., Hester and Gooseff 2010). For small sections of riffles, there is evidence that if substrate is properly constructed, a functioning hyporheic zone can be restored (Kasahara and Hill 2006), but the restoration of this zone at a scale of miles of riverbed is highly uncertain. Under SEP 9/FP 4 MOD, much of Reach 5A will be directly destroyed by direct remediation of riverbed and riverbanks. Those reaches not remediated will be isolated from intact riverine habitats and/or become highly disturbed due to construction activities above and below their location. Where bank remediation is conducted in sections of Reach 5B, those sections will suffer similar fates. Figures 1 and 2 [of GE's comments, Attachment C] show the extensive fragmentation generated by the road and staging area system required to access the areas that would be remediated.

Comment C14, C15: GE asserts that removal of sediment in the impoundments would also remove any viable propagules (the organisms and their eggs, seeds, or regenerative tissue of any kind) in the sediment removed. Capping or backfilling would change the substrate from organic sediment over silt and fine sand to a substrate composed of the capping or backfill material. Over time, invertebrates and aquatic plants would recolonize the impoundments, although different species would be expected to dominate, at least initially, due to the changed substrates. For example, there is a high probability of invasion by non-native species - such as water chestnut (already prevalent in Woods Pond), as well as Eurasian water milfoil, curly-leaf pondweed, and potentially others not yet able to establish populations under current conditions - in areas within the photic zone. Such species are likely to immigrate and dominate, with few management strategies to avoid this occurrence.

Since impoundment remediation would kill most occupying organisms and displace the rest, at least temporarily, biological recovery would depend on colonization from outside the impoundments from upstream sources. Commonly occurring macroinvertebrates from upstream areas would be expected to recolonize the impoundments, as would aquatic plants, with such plants or their propagules arriving with flow into the impoundments. While fish would move back into the remediated impoundments readily, the composition and relative abundance of fish would vary, at least initially.

As sand and organic sediments are deposited from upstream, a biological community in the impoundments that is consistent with those conditions would be expected to develop. However, the length of time for such a community to develop, the number of organisms that may be present, and the presence of any specialized species are all uncertain. The restoration of impoundments is most likely to follow lake restoration technology, which is relatively mature. Although most lake restoration projects have been focused on vegetation and pollutant

management, there is a substantial body of knowledge concerning dredging of sediments to deepen water bodies and/or remove pollutants. Also, undesirable plant species can be more easily removed with aquatic harvesters compared to emergent, shrub, or forested sites (see National Research Council 1992 for a review of methods).

Comment C16: GE asserts that sediment removal and capping in the backwaters would cause changes in surface substrate type from silts or mucky organic material to sand, which would last until enough silt and organic material have been deposited through flood events to approximate current conditions - which could take a decade or longer. There would be changes in vegetative characteristics corresponding to the change in substrate type and elevation. With these changes in substrate and hydrology, there would be a proliferation of invasive exotic plant species.

There would be a change in the wildlife communities using the backwaters until such time as the substrate, hydrologic, and vegetative conditions of the backwaters return to conditions comparable to pre-remediation conditions - which is uncertain. There is high potential for the loss of certain sensitive (e.g., state-listed) species, such as the American bittern and common moorhen.

The potential for restoration of backwaters is better than for most other aquatic habitat types. Backwaters, having direct connections to the river, will readily receive propagules of plant species and mobile animals can move into these areas rapidly. The techniques for their restoration are most like those used for lakes and reservoirs, and thus there is abundant information available on how to proceed. Although comparable habitats can probably be constructed, there remains a major question about whether the desired plant and animal species can be attracted to and flourish within the restored backwaters. The specter of overwhelming colonization by invasive exotic plants remains present.

EPA Response 597, C2, C3, C14, C15, C16: EPA disagrees with the statement that "SED 9/FP 4 MOD would destroy 126 acres of aquatic riverine habitat." On the contrary, the remediation will restore approximately126 acres of currently contaminated aquatic riverine habitat. As discussed in the HHRA and ERA, benthic invertebrate populations in the Rest of River are demonstrably compromised by the high concentrations of PCBs in riverine sediments, particularly in depositional areas, and fish tissue is highly contaminated. Removal and capping of these contaminated sediments will allow benthic invertebrates to re-colonize the area and establish robust populations uncontaminated by PCBs, and will result in decreases in fish tissue concentrations, thus decreasing risks to human health and the environment.

The proposed remedy would remediate the entire river bed in Reaches 5A and 5C and would impact limited river banks in Reach 5A, or approximately 35% of the 10 linear miles of bank in that most upstream subreach, as well as selected areas of Reach 5B, the Backwaters and Impoundments. After sediment removal (sufficient to construct the appropriate Engineered Cap), the river bed will be returned to its former grade by placing the Engineered Cap to contain any residual PCB contamination. EPA recognizes that removal of the sediment in these reaches of the Housatonic River will create a short-term disruption to the ecosystem (e.g., to benthic invertebrates, fish populations, substrate composition, and colonization by invasive species), however, sediment removal and capping is necessary to mitigate the significant threat to human health and environment caused by GE's PCBs.

In recognition of these short-term impacts, EPA included measures in the proposed remedy to mitigate them to the extent possible. First, the remediation will be conducted using a phased approach, thus an entire reach will not be affected at any single time or place. Phasing the remediation (and restoration) will provide many species with areas not subject to remediation adjacent to the construction for refugia. The Restoration Performance Standards and Corrective Measures also include provisions for the management of impacts to state-listed species as necessary.

Second, the proposed remedy requires that the Engineered Cap include in its design a habitat layer approximating the natural sediment characteristics. Therefore, there should be minimal long-term effects on substrate composition. Furthermore, as shown following the remediation of the Upper 2-Mile Reaches, there will be significant redeposition of sediment from upstream sources and reworking of surficial sediment, which will further assist in returning the natural characteristic of the riverbed. Restoration techniques may include the planting of aquatic vegetation to accelerate the recovery process.

Third, the extent and timing of recovery of benthic invertebrates and fish populations in these reaches following remediation would be considerably more rapid than asserted by GE. There is an excellent example of the recovery that can be expected which was documented in the studies conducted upstream in the East Branch of the Housatonic River following the extensive remediation in the ½-Mile and 1 ½-Mile Removal Reaches (these actions included remediation of the river bed, all banks, and much of the floodplain immediately adjacent to the river). In 2007, approximately one year following completion of remediation of these two miles of river, EPA conducted a quantitative survey of benthic invertebrate populations and a semi-quantitative survey of fish populations at three transects in the 1 ½-Mile Removal Reach. The results of the investigation showed that benthic invertebrate populations had recolonized the sediment bed as measured by species richness, density, and diversity, and that the benthic community had higher diversity, increased abundance, and increased presence of pollution-intolerant taxa than before the remediation occurred. The fish species composition and numbers also were observed to meet expected conditions. In addition, tissue PCB concentrations in the invertebrates, which form the base of the aquatic food chain, were reduced by over 99% as compared with pre-remediation levels. Using similar field and laboratory methods, GE conducted surveys at the same three locations in 2012 and obtained substantially the same results, with even further reductions in tissue PCB concentrations observed (GE, 2012). There is no reason to believe that recovery in Reaches 5A and 5C, following sediment remediation, will be any less rapid or complete, particularly considering that recovery will be enhanced by placement of a habitat layer as part of the Engineered Cap.

Fourth, in these surveys, there was no indication of colonization by either invasive aquatic plant or animal species documented by EPA or GE. The development of an invasive species control plan is required by the Final Permit Modification, which EPA anticipates will include management strategies to control any invasive aquatic vegetation.

Similarly, there is no indication from these surveys that the removal of contaminated sediment and subsequent placement of an Engineered Cap have caused any meaningful change in groundwater flow and/or the presence of a hyporheic zone in the riverbed. GE cites a publication by Hester and Gooseff (2010) which is claimed to argue that "Disturbance of

[groundwater flows in the riverbed] by dredging, capping, and bank remediation will adversely affect groundwater-dependent habitats and flow patterns, and also destabilize the base of riverbanks, resulting in bank slumping and further erosion (e.g., Hester and Gooseff 2010)." EPA has reviewed the Hester and Gooseff paper and disagrees with GE's interpretation of the paper with regard to the adverse effects caused by dredging, capping, or bank remediation. On the contrary, the Hester and Gooseff publication is a discussion of the importance of consideration of the hyporheic zone as part of stream restoration projects, and provides an argument for the inclusion of restoration of the hyporheic zone as part of stream restoration, which the authors clearly accept as a legitimate and valuable method for improving the overall ecological quality of rivers and streams. EPA agrees with this recommendation. Using another citation (Kasahara and Hill, 2006), GE notes that restoration of the hyporheic zone is possible but not at the scale of riverbed remediation included as part of SED 9/FP 4 MOD. The Kasahara and Hill publication does in fact support the first part of this comment, but the latter part, i.e., that restoration of the hyporheic zone on a scale of miles is unlikely, is not supported by this citation.

Fifth, in the case of the banks in Reach 5A that will be remediated, extensive ecological restoration using the well-established principles of bioengineering and natural channel design are expected to lead to a recovery similar to that observed in the 1 ½-Mile Removal Reach.

With regard to the position of the Commonwealth quoted in the comment, EPA notes that these remarks were part of the Commonwealth's 2011 response to GE's Revised CMS, not to the 2014 proposed remedy or the 2015 Intended Final Decision. The current position of the Commonwealth is stated in its October 27, 2014 comment letter, as follows: "we support . . . the more specific approach to remediating the Reach 5 river banks set forth in the Proposed Cleanup Plan, which is . . . responsive to the Commonwealth's concern about ensuring that the fundamental, dynamic character of the river remains intact following the necessary remediation of eroding banks." With regard to the effect of remediation in the Backwaters on state-listed species, the Commonwealth of Massachusetts worked with EPA to develop the SED9/FP4 MOD preferred alternative and identified Core 1 areas that have high-quality habitat for state-listed species. The Backwaters in these Core 1 areas will not be subject to excavation unless PCB concentrations exceed 50 mg/kg, a significantly elevated concentration that results in substantial risk to the environment. The Commonwealth has responsibility for ensuring the long-term protection of state-listed species and is fully supportive of EPA's Final Permit Modification.

Also see Responses 147 *et al.*, and 604, C19 in this Section.

Comment 598: GE asserts that the proposed riverbank stabilization/excavation work, even if Natural Channel Design or "bioengineering" techniques are used, would cause an enduring negative change in the character of those banks, because it would: (a) prevent significant bank erosion and lateral channel movement, thus eliminating the vertical and/or undercut banks that provide critical habitat for certain birds and other animals, and reducing adjacent wetland habitats; (b) require the removal and permanent elimination of mature trees overhanging the River, thus changing the character of the banks from their current wooded condition to a more open condition; (c) produce a long-term reduction in slides and burrows of certain mammals and reduce access routes for reptiles, amphibians, and smaller mammals between the River and the floodplain; and (d) increase the potential for colonization by invasive exotic species.

EPA Response 598: The Final Permit Modification provides for removal of contaminated soil from eroding riverbanks in Reach 5A, and soil with PCB concentrations greater than 50 mg/kg from riverbanks in Reach 5B. EPA recognizes the value of undisturbed river banks and their role in providing habitat for some species of mammals, birds, and other taxonomic groups as well as in providing stability against erosional forces. However, EPA also recognizes, and has demonstrated via direct observations, data, and the Housatonic River Modeling Study, that many areas of river bank in Reach 5A are highly contaminated with PCBs originating from the GE facility in Pittsfield, MA and that eroding PCB-contaminated banks contribute significantly to PCB contamination that is transported downstream. Therefore, the proposed remedy requires contaminated, erodible banks in 5A and areas greater than 50 mg/kg in banks in 5B be excavated and restored. The four issues raised in this comment are: reduction of bank habitat and adjacent wetlands, removal/elimination of mature trees along the banks, reduction of burrows, slides and access routes for various animal species; and an increase in the potential for colonization by invasive exotic species. Each of these points is addressed below.

After remediation activities are completed, restoration practices will be implemented that address the impacts of the remediation on river banks and that restore, to the extent practicable, the functions, values, characteristics, species use, and other ecological attributes existing prior to remediation. The proposed remedy requires that GE employ a design approach for the restoration of river banks, using Natural Channel Design principles in Reach 5A, that will emphasize bioengineering methods. The bioengineering methods (e.g., woody debris toe protection) will provide a variety of habitats. Recognizing that the bank remediation/restoration will affect only a limited amount of the nearly 20 miles of river bank in Reach 5, EPA considers the short-term effects of bank remediation/restoration to be acceptable considering the long-term benefits of PCB removal and associated reduction in risk and downstream transport.

Similarly, EPA recognizes that some mature trees will need to be removed to remediate the banks. The Final Permit Modification stipulates ecological restoration activities that will promote and accelerate the regeneration of mature forest along the impacted banks, rather than result in a permanent change to a more open condition along the River. As noted above, the amount of bank disturbance is limited, thereby minimizing the removal of mature trees. As shown by GE's bank vegetation monitoring following remediation of the ½-Mile Removal Reach, the timely establishment of canopy trees on restored river banks can be accomplished; in 2008, which was the 7th year of monitoring, all planted areas had canopy tree numbers that exceeded the Target Performance Standard. Monitoring results in 2010 further confirmed success in establishing canopy trees as documented in the Annual Monitoring Report (2011). Based on the proven re-vegetation success that has occurred upstream, and at other large restoration projects, EPA expects similar success when requiring an active restoration program for the Rest of River, including the replanting of canopy trees.

Because the extent of bank remediation will be limited to only a portion of Reach 5A, the disruption of wildlife use, including slides and burrows of mammals and access routes for reptiles, amphibians, and smaller mammals between the River and the floodplain, will also be limited. In addition, local observations from the 1 ½-Mile Reach, which involved much more extensive bank stabilization than will be necessary in the Rest of the River, show the existence of a robust beaver population a few years following bank stabilization. The beaver population rebounded so successfully in this area that additional plantings, herbivore control measures, and

continued maintenance of protective tree cages were necessary to help ensure successful re-vegetation as documented in the Annual Monitoring Reports. Based on the large extent of undisturbed banks and the monitoring observations at the upstream remediation project, EPA expects any reduction in slides and burrows and access routes for reptiles, amphibians, and smaller mammals to be temporary.

With regard to the final point, EPA recognizes that colonization by invasive species during and following remediation and restoration, as with any project, is a serious concern, particularly in disturbed or newly planted areas, as well as downstream Impoundments and, to a lesser extent, in the Backwaters. As a result, and as specified in Section II.H.18.b. of the Final Permit Modification, an Invasive Species Control Plan is a required part of the Operation and Maintenance Plan, which will be part of the Rest of River Statement of Work and incorporated into an adaptive management approach.

Also see Responses 147 *et al.* below. For discussion on impacts to wetlands, see Response C11.

Comment C24: GE asserts the following: In areas in which bank stabilization will purportedly be avoided, riverbanks composed of silts and sands are likely to become unstable when the river channel is excavated and bank stabilizing vegetation is removed. This will have a long-term (many decades, possibly centuries) effect on large trees along the destabilized riverbanks that provide significant shade and woody debris to the aquatic ecosystem. To be more specific, woody debris provides cover and substrate that is important to many aquatic and semi-aquatic species, and shading limits water temperature increases. In the absence of this shade, aquatic plant growth and water temperature would likely increase and change the suitability of the habitat for temperature-sensitive species. This loss of cover would also result in a loss of wind protection, as well as decreased amounts of large woody debris and overall organic material. When riparian trees are removed from a previously closed-canopy stream, the underlying energy regime may change from allochthonous resources to an autocthonous one driven by primary production, and this may shift the stream further away from the desired ecological state, often toward algae-dominated streambeds (Sudduth et al. 2011). When combined with excess sediments (likely during bed and bank remediation), desirable periphyton (forming the base level of aquatic food webs) and benthic invertebrate communities can be severely depressed. Figure 1 [of GE's Comments, Attachment C] identifies examples of places where, under SED 9/FP 4 MOD, the riverine corridor will be fragmented by removal of native vegetation, especially mature trees in the floodplain and along riverbanks, which will have all of these adverse effects.

EPA Response C24: GE's assertion refers to remediation in Reach 5A. EPA recognized the importance of retaining bank vegetation where possible, and as such, the Corrective Measures in the Final Permit Modification require GE to perform remediation generally from within the river channel. Remediation from within the river will eliminate the requirement for removing all bank vegetation (including the large trees) as GE claims, and allows for the selective remediation of the contaminated eroding banks as required in the Final Permit Modification.

GE's speculation of the outcomes cited from Sudduth *et al.* 2011 has limited applicability to the remediation of Reach 5A. This reach is not a predominantly closed-canopy system in its present state. Ongoing pre-remediation river processes have regularly resulted in bank erosion and loss of mature riparian trees over past decades since revegetation following the historic clearing of

the adjacent floodplain. The Corrective Measures for Reach 5A specify that the remediation and subsequent restoration of the river bed and target banks will be implemented considering the concepts of Natural Channel Design and with engineering measures to control the release of suspended solids. Locations of bank remediation will be determined during remedial design, thus GE's Figure 1 is largely speculative. See also Response 600 *et al.*

Comment 599: GE asserts the following: A recent review by Palmer et al. (in press 2014) of ecological restoration projects in rivers and streams identifies the shortcomings with the Natural Channel Design approach – notably, its failure to address chemical and biological processes – and shows that river restoration is fraught with problems and has had disappointing outcomes to date. The authors concluded that "there remains a major emphasis on the use of dramatic structural interventions such as completely re-shaping a channel despite growing scientific evidence that such approaches do not enhance ecological recovery . . . ." This study of 644 river restoration projects found that only 16 percent showed any improvement in biodiversity and that was relative to the prior degraded state of the project sites, not a thriving ecosystem like that of the Upper Housatonic River system.

EPA Response 599: When taken in its entirety, the Palmer *et al.* paper does not lead to the conclusion that the proposed remediation and restoration of the Rest of River cannot be successful in implementing the principles of Natural Channel Design (NCD). Rather, there are numerous observations made by the authors that are germane to the remediation and restoration of the Rest of River and are fully supportive of the measures that EPA has specified in the Final Permit Modification.

First, Palmer *et al.* note, relative to ecological processes, that "an over-reliance on channel design may obfuscate efforts to identify the factor that most limits recovery of a stream; quite often this factor is water quality, and thus ecological recovery will not occur until the source of pollutants is removed." (emphasis added) Palmer *et al.* also note that "As with restoration of any ecosystem, the most successful and sustainable approaches should target the source of degradation and focus on the appropriate scale." (emphasis added) The authors also conclude that "efforts at watershed and riparian scales that target restoration of hydrological processes and prevention of pollutants from entering the stream appear to offer the most promise." The authors observe "In any case, once stressors, such as nonnatives, uncontrolled runoff, or pollutant inputs, are removed, restoration theory suggests that a stream should recover on its own (Falk *et al.* 2006). This form of restoration is the ultimate type of functional restoration because the stressors exert their impact by influencing the processes, both ecological and physical, that define healthy rivers (Gilvear *et al.* 2013)." These points show that the paper's conclusions support the focus in the Final Permit Modification on removal of PCB contamination from the river, banks, and floodplain followed by the active restoration of remediated banks and adjacent floodplain.

The conclusions that Palmer *et al.* make regarding complete channel reshaping are not applicable to the specific challenges for the Housatonic River and the Final Permit Modification. First, the channel restoration projects reviewed by Palmer *et al.* did not specifically include contamination removal as the primary objective. Second, Palmer *et al.*'s comments apply less to the channel work in the Final Permit Modification because, unlike many of the projects referenced in the paper, the post-remediation restoration goal is not to enhance biological diversity or improve

existing habitat, values and functions, but to replicate existing functions and values post-remediation. Therefore, the focus of the Proposed Remedial Action is fundamentally different from the goals set for the majority of stream restoration projects reviewed by Palmer *et al.*

Perhaps most important to reiterate in response to this comment, the Final Permit Modification is not an NCD project; instead, it is a contamination removal project. The cornerstone of the Final Permit Modification is to address contamination in river sediment and floodplain soil along the length of the degraded river corridor. The intent of the NCD and bank stabilization techniques proposed by EPA is to reduce the potential for erosion of contaminated banks and the subaqueous caps, thereby preventing additional pollutants from entering the stream system, where risks from exposure to PCBs are high. EPA fully understands that a critical aspect of the project involves applying NCD principles not in a vacuum, but as one tool to be used in concert with an active remediation and restoration program.

Comment 517: The cleanup on the East Branch has destroyed the habitat. It was once possible to see schools of legal-sized fish any time, but now only small fish are seen. Studies of lower organisms in this area are not relevant to the health of the river.

EPA Response 517: EPA disagrees with the assertion that the completed cleanup and restoration in the East Branch (½-Mile and 1 ½-Mile Reaches) has destroyed the habitat in this section of the Housatonic River. On the contrary, all data collected since completion of the remediation indicate greatly improved ecological conditions, with robust populations of resident species of invertebrates and fish.

With regard to schools of large fish being visible frequently in the East Branch, that type of observation is not consistent with the observations made before and during the remediation by EPA and its consultants. Regardless of whether or not it is contaminated with PCBs, this section of the river is simply not large or diverse enough to provide habitat for schools of large fish and lacks the refugia and other habitat features necessary to support large amounts of fish biomass. A semi-quantitative electrofishing survey conducted at three locations in the 1 ½-Mile Reach following the completion of remediation (WESTON 2007 Post-Remediation Aquatic Community Assessment -1 ½ Mile Removal Reach) demonstrated the presence of fish populations dominated by various smaller species. These populations are typical in both species composition and population density for the area. Although larger fish were occasionally encountered, large resident populations of such species have not been observed and are not anticipated in this habitat.

The use of benthic invertebrates as an indicator of the general ecological health of rivers and other aquatic habitats has a long history and is today not only relevant but is one of the most widely applied methods for assessing the condition of aquatic habitats. Indeed, benthic invertebrates comprise the basis for EPA's 1999 Rapid Bioassessment Protocols, a comprehensive and well-established methodology that is used nationally by both federal and state agencies, in addition to researchers, environmental consultants and other environmental professionals, as a means of evaluating the health of rivers and streams. Aspects of the bioassessment protocols were applied as part of the two post-remediation surveys of benthic invertebrate populations in the East Branch (WESTON, 2007; and General Electric Company October 24, 2012, Re: 1 ½ Mile Reach of Housatonic River 2012 Aquatic Macroinvertebrate Sampling Report, 2012). These studies indicate the presence of a robust community of benthic

insects and other invertebrates, with a relative abundance of pollution-intolerant insect taxa (EPT taxa) that was indicative of high-quality habitat. These observations were supported by an observed decrease of over 99% in PCB concentrations in sediment and biota tissue in the East Branch reaches.

Floodplain and Core Habitats

Comment C4: GE asserts the following: Excavating floodplain soils to a depth of one foot or three feet, as proposed by EPA, requires removal of all floodplain vegetation and at least one foot of soil. The upper layers of soil near the surface usually are those that have high organic matter, plant propagules, and soil biota. These soils also provide burrowing habitat for fossorial species of mammals, amphibians, reptiles, and invertebrates. Floodplain soils, particularly if saturated, serve as over-wintering habitat for those species of amphibian or reptiles that hibernate. The proposed remediation will kill individuals of animal and plant species during the excavation process as soils are removed and transported elsewhere, and eliminate their habitats for years to centuries.

Comment C8: GE asserts the following: The main direct negative impact to shrub and shallow emergent wetlands from floodplain soil remediation would be from vegetation and soil removal. Vegetation clearing would cause substantial direct effects, as these wetlands provide: (1) nesting, burrowing, and/or escape habitat and food for birds, amphibians, reptiles, mammals, and invertebrates, including important nesting habitat for migratory neo-tropical songbirds and, in the emergent areas, nesting habitat for two state-listed bird species (American bittern - Endangered, and common moorhen -Special Concern, as of 9-7-14); (2) a significant yearly infusion of biomass, consisting of fallen leaves, decaying herbaceous plants, and woody material, which make up a significant component of the underlying organic layer and are part of the foundation of the food web of these ecosystems; and (3) an effective system for cycling and transforming nutrients, evapotranspiring significant quantities of water, and helping to attenuate flood flows by increasing vegetation roughness.

EPA Response C4, C8: EPA agrees that removal of floodplain soil to a depth of 1 to 3 feet will also remove the vegetation growing there, and that the upper layers of soil in a floodplain typically have high organic matter and contain plant propagules and soil biota. Unfortunately, in the case of the Housatonic River floodplain, the upper layers of soil, as well as deeper layers in many locations, are also contaminated by PCBs released over a period of decades from GE's Pittsfield facility, and it is those upper layers of soil that ecological receptors and recreational and other users of the floodplain contact. As shown in the peer-reviewed Ecological and Human Health Risk Assessments, such direct-contact exposure results in unacceptable risks in some areas, and it is these areas that are targeted for remediation under the selected remedy.

It is unfortunate, but unavoidable, that individuals of some plant and animal species will be impacted in the limited areas targeted for remediation, but EPA believes that the alternative, leaving concentrations of PCBs that pose risk to human health and the environment, is worse. All areas slated for soil removal will be backfilled to original grade with soil of similar characteristics to that removed, and will also undergo active restoration. As demonstrated in the remediation of the floodplain in the Upper 2 Miles, with restoration, native biota will recolonize these areas relatively rapidly; there is no reason to believe that this process will require centuries. In fact, the current floodplain communities (referred to by GE as "mature") did not take centuries

to become established, as they were disturbed when much of the river was modified and realigned and the floodplain cleared as recently as several decades ago.

In all, an estimated 45 of the more than 1,000 acres of floodplain habitat are proposed for remediation sequentially over a period of years, with some additional areas that will be affected by temporary infrastructure. The remaining areas of the floodplain will provide a large amount of nesting and burrowing habitat for species temporarily displaced by the remediation, and natural recovery of the remediated habitats, accelerated by active restoration, will restore the important ecosystem structure and functions (e.g., food web and nutrient cycling).

With regard to state-listed bird species, and other state-listed species inhabiting the floodplain, EPA notes that the Commonwealth of Massachusetts, which has responsibility for ensuring the health and protection of these species, has reviewed the remediation plan and is fully supportive of EPA's decision. EPA worked closely with the Commonwealth in developing SED 9/FP 4 MOD to ensure that it would be consistent with the MESA, and the Commonwealth agrees that limited soil removal in the floodplain is unfortunately necessary for the long-term protection of human health and the environment.

Comment C5: GE asserts the following: There are multiple sources of water that feed these floodplain ecosystems (e.g., groundwater slope seepage, groundwater discharge from seasonally high water tables in the floodplain, and overbank flooding of the river). While efforts could be made to reconstruct the pre-existing swale systems to approximate current drainage patterns, the potential is high for larger overbank floods to cause erosion and destabilization in recently restored areas of the floodplain. The surface topography of the floodplain reflects the influence of floodwater dynamics. Thus, recently excavated soils will be highly exposed to erosion and transport by heavy precipitation and/or floodwaters because it is not possible to revegetate them quickly enough to risk exposure to a significant storm event. Exposing large areas of soil has the potential to subject other unaltered habitats in the floodplain and river to severely damaging sedimentation. Overbank flooding and subsequent floodplain deposition and erosion from surface flow patterns, along with remnant meander scars and levee formation, produce distinct surface topographic and soil variations that then affect biological conditions.

Comment C10: GE asserts the following: Due to the changes in hydrological conditions (as described above for the entire floodplain system), the vegetation currently present in the shrub and shallow emergent wetlands is likely to change. Species that can tolerate a broader range of conditions are likely to be more abundant than those species which require specific habitat conditions within shrub and shallow emergent wetlands. For example, the exotic species purple loosestrife might replace native buttonbush. These changes in vegetation would last until such time as soil and hydrological conditions comparable to pre-remediation conditions return to these wetlands so as to support a vegetative community similar to the pre-remediation community. Given the unpredictable and likely slow rate of organic soil accumulation, it could take a decade or more to reach conditions that would support shrub or emergent plant communities comparable to current communities. It is uncertain whether certain sensitive species, such as the state-listed species, would return.

Comment C12: GE asserts the following: The implementation of remediation activities will have a long-term impact on other floodplain functions as well. For example, the removal of

surface soils in the floodplain would alter soil moisture levels, soil infiltration rates, and groundwater flow. These changes, together with the removal of sediments in the river (which controls the rate and level of groundwater flow in the valley), would alter the groundwater recharge/discharge function of the affected floodplain areas. This function should return as flood deposition restores soil conditions and the disturbed areas become vegetated and root systems stabilize the floodplain soils, but such a return could take decades and would be dependent upon unpredictable flood dynamics, which themselves would be affected by alterations to the river channel and/or banks.

These changes to the PSA floodplain could result in either wetter conditions, such as from the loss of evapotranspiration due to tree removal or from soil compaction resulting in greater perching of surface waters, or drier conditions, such as from the use of sandier topsoils or from changes in overbank flooding and grading that result in decreased flood flows onto the floodplain. Without knowing the source of replacement soils or the dynamics of the reconfigured river channel, the potential hydrologic conditions of the remediated floodplain remain unknown, thereby reducing the chances of correcting problems through adaptive management.

EPA Response C5, C10, C12: No justification is provided for the assertion that widespread changes in hydrological conditions in the floodplain will occur as a result of the limited amount of remediation to be conducted, or for the assertion that changes in hydrological conditions would be sufficient to produce significant changes in the vegetation and species present in these areas. The floodplain remediation specified in the Final Permit Modification will affect only approximately 45 of the 1,000 acres of floodplain in Reaches 5 and 6. Construction will proceed in a phased approach from upstream to downstream and will require several years to complete. Accordingly, only a small portion of the floodplain will be exposed to potential erosion at any time, and appropriate controls will be required to reduce the possibility of erosion due to a significant storm event and/or overbank flooding. Restoration activities will require the detailed surveying of pre-remediation conditions (e.g., soil and vegetation characteristics and species use). Following the backfill with clean soil of similar characteristics, erosion will be further prevented by use of appropriate temporary cover and stabilizing materials until vegetation planted during ecological restoration has become established. Replication of pre-remediation conditions, including surface micro-topography, will also be required.

EPA recognizes that there are multiple sources of water to the Housatonic River floodplain, as listed in the comment. Indeed, it is one of these sources of water – overbank flooding – that has been primarily responsible for transporting PCB contamination released from GE's Pittsfield facility laterally out of the river channel and across the floodplain such that the 1 mg/kg PCB concentration isopleth approximates the 10-year floodplain boundary and defines the limit of the GE/Housatonic River site. However, EPA does not agree that implementation of the floodplain remediation specified in the Final Permit Modification will result in conditions that will either interfere with the drainage patterns and seasonal flooding or lead to significant erosion and destabilization of portions of the floodplain. GE's observations provide a listing of hypothetical adverse impacts that could result from any construction activity involving soil disturbance. There are numerous best management practices and methods that EPA expects will be implemented during construction to minimize the potential impacts enumerated in this comment. Further, EPA believes that the low potential that any of these impacts may actually affect a small

area of the floodplain is fully balanced by the reduction in the human health and ecological risks from the high concentrations of PCB contamination in the soil.

The comments also, as written, appear to presume the lack of active restoration and invasive species control programs. In the limited areas of floodplain to be remediated, pre-remediation conditions will be documented in detail. The active restoration and robust invasive species monitoring and maintenance programs outlined in the Final Permit Modification will require that careful attention be given to avoid the very scenarios of GE's speculation.

Also see Response 147 *et al.* below.

Comment C9: GE asserts the following: shrub and shallow emergent wetlands typically contain soils with high organic content (typically mucky silt or histosols [organic soils]) that have formed over many decades. It is unlikely that sufficient volumes of comparable organic soils could be found for use in any restoration effort, and attempts to manufacture such soils are not reliable, since the soil chemistry and seed bank of the on-site soils are specific to the existing Housatonic River floodplain system. The use of heavy machinery in these areas would likely cause soil compaction, which would affect the permeability of these soils, which influences plant colonization (e.g., slows the process of recolonization by native species and makes surface soils more susceptible to proliferation of invasive exotics), as well as adversely affecting the groundwater recharge/discharge and flood flow alteration functions of the floodplain. Replacement soils would be less conducive to the formation of the necessary subterranean burrows required by certain animals for overwintering, hinder the re-establishment of a native plant community, and facilitate proliferation of invasive plant species. Soil compaction is particularly problematic in shallow emergent marshes. These wetland types contain soft, organic soils that are extremely difficult to work in with heavy machinery when wet - which is most, if not all, of the time - and very difficult to keep dewatered during construction. The likely result would be creation of wetlands that are not the same as those of the current ecosystem. The plant communities would be different, and they would be conducive to colonization by invasive exotics. These new marshes would become less suitable for the current community of wetland-dependent wildlife.

EPA Response C9: Selecting backfill material (including manufactured soil, also referred to as engineered or amended soil) that best mimics the characteristics of the soil currently present is a restoration technique that will also serve to offset the soil disruption that is an unavoidable effect of the remediation. EPA recognizes that it will likely not be possible for backfill to duplicate exactly all of the physical, chemical, and biological qualities of existing floodplain soils. However, the use of soil that is reasonably similar to natural soils is implicit in the Restoration Performance Standard requiring excavated areas to be backfilled to original grade and pre-remediation conditions, and engineering specifications for backfill soil will be subject to EPA review and approval. Other engineering controls will also be necessary to prevent the compaction of backfill soil during and after placement. Ecological restoration in these areas will enhance the ability of backfilled areas to serve substantially the same functions as they did prior to remediation. Finally, EPA notes that less than 5% of the floodplain in the PSA is expected to be excavated; therefore, even if the backfilled soils ultimately present any of the problems cited in the comment despite EPA's oversight, such problems will be limited to a number of small, non-contiguous areas of floodplain and/or subject to additional actions by GE to alleviate the

concern(s). EPA believes that any short-term environmental effects are justified by the reduction of unacceptable human health and ecological risks by the excavation of contaminated floodplain soil.

In recent years, recognizing the limitations of conventional construction equipment in wetland environments, significant advances have been made in the production of suitable equipment, typically with low ground pressure. Examples are marsh buggies (also referred to as amphibious carriers), which exert 1.2 to 1.5 psi on the soil surface. Another example is the use of construction mats of various types suited to specific wetland conditions. These types of equipment not only allow for construction in wetland environments, but greatly reduce subsequent soil compaction.

EPA disagrees that it would be preferable to allow elevated concentrations of PCBs to remain in wetland soil for the extremely long time necessary for natural processes to reduce their concentrations below levels that pose a risks to human health and the environment. Short-term effects are an unfortunate, but unavoidable, result of any remediation. Taken to its conclusion, the logic presented in this comment could be used as an argument against any remediation of any contamination. Accordingly, the Permit criteria require that the short and long-term effects of remediation (as well as other factors) must be evaluated comprehensively to identify the best suited alternative under the Permit criteria. In the case of the Housatonic River and its floodplain, EPA believes that best suited alternative is the one presented in the Final Permit Modification.

Comment C11: GE asserts the following: The return of wildlife communities comparable to the pre-remediation communities in these shrub and emergent wetlands would depend on the return of soil, hydrological, and vegetative conditions. In the meantime, many common game and non-game avian species, as well as state-listed species (e.g., American bittern, common moorhen, wood turtle), would be lost from these wetlands, and the return of the state-listed species is doubtful. Where shrub and shallow emergent wetlands are disturbed by floodplain soil removal or ancillary facilities (access roads and staging areas), it is expected that restoration efforts would result in re-establishment of most pre-remediation functions of these wetlands over time. However, given the constraints described above, this recovery time is uncertain and would likely be measured in decades. In addition, there is a serious risk of additional invasive exotic species expansion into these areas. Moreover, depending on the extent of the disturbances and the length of time over which they last, some of the pre-remediation functions of these wetlands, such as providing habitat for state-listed species, may not return for a much longer period, if ever, in some of the affected wetland areas.

EPA Response C11: EPA recognizes that the necessary remediation of the limited areas of these PCB-contaminated habitats will unfortunately displace individuals of resident species and disrupt the communities for a short period of time. However, as the remediation will occur in limited areas (approximately 16 acres of scrub/shrub and emergent wetlands) of the floodplain (with some additional areas impacted by temporary infrastructure), significant areas of wetland habitat will remain undisturbed over the entire duration of the remediation which is spread over both location and time. These areas will provide refugia for the mobile species of concern. Specific restoration methods (e.g., propagation, relocation) will be required to accelerate the recovery of the habitats.

With regard to state-listed species, the Commonwealth of Massachusetts, which is responsible for the protection and management of these species, participated in the development of the plan for limited remediation of these habitats and is fully supportive of the Final Permit Modification. EPA will work closely with the MA Natural Heritage Program to implement strategies (e.g., limits to seasonal work, relocation, propagation, restoration of specific habitat features) to minimize impacts to these species during and following remediation.

In addition, development of an effective plan for management and control of invasive species (such as that implemented in the first two miles) is a requirement specified in the Final Permit Modification, and EPA will ensure that the invasive species control plan is properly structured and implemented.

Also see Response 147 *et al.* below.

Comment 90: The details on how the removal of contaminated material from the river and floodplain will be performed and how the excavated material and replacement clean material is processed and transported should influence the decision on the extent of the cleanup, as demonstrated by the decision to reduce the level of cleanup in Core Area 1, which is just about 100% wetlands and has the highest concentration of priority habitats in the whole River system. There is no way to conduct the cleanup required and process and transport the contaminated and clean material in that area without destroying Core Area 1. [The Rest of River area includes several Core Area 1 locations. The commenter did not specify which Core Area 1 location is being referred to in the comment. For purposes of including an example of a Core Area 1 location as part of EPA's response, EPA assumes the commenter is referring to the large tract of Core Area 1 in Reach 5A generally located between and to the north of Palomino Drive and Eric Drive in Pittsfield, Massachusetts.]

EPA Response 90: EPA believes that the cleanup required can be completed, including the processing and transporting of contaminated and clean material while still being protective of the Core Area 1 locations. To achieve a balance between reducing the risk of PCBs eroding from a bank into the river and reducing risk to human health to acceptable levels in the floodplain soils while still maintaining the habitat functions, values, and other attributes of the floodplain and the river, the Final Permit Modification includes Performance Standards and Corrective Measures that focus not only on reduction of the risks associated with the PCB contamination, but also on the minimization of remedial impacts and restoration of all ecological resources and habitats impacted by the Corrective Measures, to the extent feasible.

To reduce construction-related impacts to the floodplain and riverbanks, the removal and capping of Reach 5A (which includes portions of Core Area 1) will generally use engineering methods employed from within the river channel or other methods approved by EPA. For Reach 5A, riverbanks that are excavated will be reconstructed to minimize erosion considering the principles of Natural Channel Design. This will allow the maximum use of bioengineering methods in restoring riverbanks. See the Section III.C.1 of this Response to Comments for additional information. In addition, in the Final Permit Modification, the Performance Standards for floodplain remediation have been revised to explicitly include the following:

(d) Permittee shall avoid excavation in Core Area 1 habitat (other than Frequently Used Subareas) except in limited areas where necessary to meet Secondary Floodplain Performance Standards in Table 1.

(e) Permittee shall minimize the impacts from remediation on a case-by-case basis [permit language also includes a footnote with additional details here] for Core Areas 2 and 3 (as shown in Attachment B); however, at a minimum, Secondary Floodplain Performance Standards in Table 1 shall be attained.

Final Permit Modification at II.B.3.a.(1)(d) and (e).

These Performance Standards will reduce the impact on Core Area 1 by only requiring remediation as necessary to meet the least stringent, but still protective, standard for human health. Although not directly stated in the comment, the Performance Standards also require minimization of impacts in sensitive areas referred to as Core Areas 2 and 3.

Also, the Final Permit Modification includes a Performance Standard for the Restoration of Areas Disturbed by Remediation Activities, as discussed above.

Finally, GE is required to comply with Applicable or Relevant and Appropriate Requirements including, but not limited to, any activities to satisfy the separate net benefit mitigation standard in the Massachusetts Endangered Species Act (MESA).

Specific details of the construction plans (e.g., equipment, transport, staging areas) will be developed during the various Remedial Design documents, which allows for public input and the use of an adaptive management approach.

EPA believes that the Performance Standards, Corrective Measures, processes and procedures GE is required to adhere to in the Final Permit Modification will ensure that remediation is limited in sensitive Core Areas and that both floodplain and river habitat will be successfully restored, to the extent feasible, to pre-remediation conditions.

Comment 516: If the mature forest bordering many areas of the river is cut as part of the remediation, it will not be reestablished in our lifetime, and may never become reestablished. The assessment that this forest is only 60 years old is far off the mark in many areas.

EPA Response 516: Please see Response 600 *et al.* below.

Comment 600: GE asserts the following: The proposed remedy would impact 36 acres of floodplain wetland forested habitat. It would require the removal of all mature trees in those areas, resulting in a long-term loss of mature wetland forested habitat, which is vital to the health of the riverine/floodplain ecosystem of high importance to the Commonwealth. Assuming these trees are replanted, it would take at least 50 to 100 years for a replanted forested community to reach a mature condition comparable to current conditions – or potentially longer due to cumulative stresses from floods, changes in microclimate, changes in hydrology, and colonization by invasive species. During that period, there would be a loss of the coarse woody debris and leaf litter that provides habitat for numerous woodland species, a decrease in the floodplain's flow alteration function, changes in soil composition, a loss of the forest wildlife

species that utilize the mature forested habitats, and a fragmentation of the largely undisturbed forested riparian corridor in the PSA that is critical to the dispersal and migration of various wildlife species.

Comment C6: GE asserts that soil removal and the related removal of trees and coarse woody material would affect the distinct floodwater-influenced microtopography of the floodplain forest, reducing the floodplain roughness that produces flow resistance and thus contributes to the important flood flow alteration function of the floodplain. Reduction in roughness cannot be countered because the vegetative cover would become less dense due to floodplain clearing activities, and no amount of planting can counter the reduction in roughness. These conditions would result in faster flows during flood events, more erosion, and less infiltration. Reduced infiltration will likely reduce sustaining base flow to the river.

Comment C7: GE asserts that even with ecological restoration following remediation, replicating the structure and composition of the existing floodplain forest is unlikely. Although it is feasible to replace emergent and shrub species within a few years with direct planting, replacing forested habitat is much more complex, as the successional trajectory for a forest is much different than that for emergent, herbaceous, or shrub communities. Through competition, forests go through a reduction in numbers of stems from seedlings (up to 3 feet tall, 5,000-10,000+ stems/acre) to saplings (3-10 feet tall, < 5 inches in diameter, 1,000-3,000 stems/acre) to pole stage after about 20-30 years (5-11 inches in diameter, 500-1,000 stems/acre) to mature trees (> 11 inches in diameter, 100-200 stems/acre), usually occurring at more than 50 years after planting. Moreover, forests often have uneven size/age classes, as does the forested floodplain in the PSA. Planting replacement trees in a cleared area all at the same time could not reproduce these characteristics. Thus, even under optimum conditions (i.e., with invasive exotic species kept under control, which is highly unlikely over large areas), the developing forest would be an even-aged community for more than 25 years, with minimal structural profile diversity and associated significant reduction in overall wildlife diversity.

Comment C23: GE asserts the following: The remediation proposed in Reaches 5A, 5B, 5C, and their associated backwaters is scheduled to be completed in just 8 years (Fig. 4 [from GE's comments, Attachment C]). This means that extensive areas will be simultaneously denuded of their natural vegetation. This is of particular concern where the dominant vegetation is large silver maples. These trees are currently tall enough to support canopy-dwelling birds, have crowns wide enough to shade the river and backwaters, and have trunks old enough to provide dens for cavity-dwelling mammals and birds and to become large woody debris in the river. However, if SED 9/FP 4 MOD is implemented, these mature forests will, within just 8 years, be replaced with saplings that will take at least 50 years to reach tree height, and probably well over 100 years to develop full-size crowns and boles.

Comment C24: GE asserts the following: Many of the trees found within the floodplain in Reaches 5A and 5B are about 50 to 75 years in age, and the mature forests bordering Reach 5C and around Woods Pond are most likely 75 to 100 years old or older. In EA 2, for example, cottonwood and silver maple occur as multi-stemmed clumps (about 8 trees/acre), 12-36 inches in diameter at breast height (dbh), with complex root masses. A multi-aged forest produced over time will have a portion of large-diameter stems (> 15-inch dbh) suitable for producing cavities. Cavity-nesting birds (e.g., screech owls, wood ducks, and pileated woodpeckers) and mammals

(flying squirrels, bats) that use tree cavities and the bark of old trees return to these nesting, resting, and feeding sites over multiple years. Loss of the mature forest trees along the riparian corridor would remove these critical breeding habitats, and thus, many individuals of these species. In the best case, it will take 50 to 100 years for the mature forest to be reestablished. However, reestablishment could take even longer due to the cumulative stresses of floods, changes in microclimate, changes in hydrology and colonization by invasive species.

During the period of at least 50 to 100 years until the mature forest is re-established (if that occurs at all), the tree canopy would be more subject to sunlight and wind impacts and there would be a reduction in large woody material. The decrease in availability of mature trees and forested habitat would reduce the capacity of the floodplain forest to support species dependent on such habitat, such as pileated woodpeckers, thrushes, a variety of warblers and owls, and mammals such as the fisher and bobcat. As the replanted forest develops, it goes through stages of supporting different communities until such time as it reaches maturity. Younger, developing plant communities support a different wildlife community that is characteristic of early and mid-level successional habitats. Thus, EPA's conclusion regarding a "temporary loss" is inapplicable to these floodplain forests.

EPA Response 600, C6, C7, C23, C24: EPA acknowledges that the PCB remediation activities will directly affect aspects of forest ecology raised in the comments such as the production of coarse woody debris and leaf litter, flood flow alteration, and soil characteristics in the short-term and on a localized scale as was recognized in the Comparative Analysis. However, the remediation and its unavoidable short-term impacts will remove PCB contamination from the floodplain soil, and the restoration requirements specified in the Final Permit Modification will result in a mature forest becoming reestablished following restoration, benefiting the river and floodplain ecosystems. The impact to the forest and its ecosystem functions will be temporary, and the ecosystem, as it has in the past, will recover as succession transforms the young vegetation that initiates the restoration process into a mature restored forest.

Based on results of ecological characterization studies in the early 2000s, EPA estimated (via dating techniques) that the trees in the forest areas of the PSA to be remediated vary in age, with some as old as 100 or more years. Considered as a whole, however, the floodplain forests in the Rest of River area consist primarily of much younger trees. The Housatonic River and its floodplain have been heavily impacted by human activity over the past 300 years, including clearing and deforestation of nearly the entire watershed.

There are restoration techniques available to mitigate the specific types of effects noted in the comments. For example, during floodplain restoration, coarse woody debris can be introduced through the reuse of tree trunks that were removed during remediation, and similarly, woody materials can be introduced during bank restoration. Trees that will be planted within the remediated areas during restoration activities will begin to produce leaf litter in their first years, so the loss after clearing is a matter of degree and is temporary, as these planted trees grow and produce increasing amounts of leaf litter. While floodplain roughness in each of these limited areas may be reduced immediately following completion of contaminated soil removal and backfill with clean soil, effective roughness could be returned by appropriate restoration activities, including restoring microtopography, replacement of coarse woody material reserved during site clearing, as well as installation of various temporary ground cover and barriers to

flow. Construction methods can be employed that avoid excess soil compaction. EPA expects that GE will propose any or all of these methods, along with others, to control the potential for flood flow alteration and restoration of the microclimates present in the floodplain as well as other adverse effects following remediation and restoration. If there is an unexpected event or outcome such as flood impacts to newly established vegetation, the maintenance program required in the Final Permit Modification provides a mechanism to mitigate the effects.

It is true that in many situations, because of the time necessary for the growth of mature trees, large trees of varying size classes may be one of the last components to become established in a developing forest. However, EPA believes that GE overstates this concern with regard to the Housatonic River floodplain remediation activities. The forested floodplain remediation is planned for an estimated 36 of the 1000 acres of the total floodplain area, with some additional disturbance required for supporting infrastructure. The dominant tree species in the floodplain are relatively fast growing in comparison to the statistics provided by GE. The Housatonic River floodplain forests are dominated by silver and red maple and cottonwood, tree species that grow at a very rapid rate. The silver maple (*Acer saccharinum L.*) is one of the fastest growing deciduous trees of the eastern and mid-western forests. It can grow 3-7 feet per year achieving a mature height of 90 feet, and is a source of fast shade, large woody debris, and litter in streams. Silver maple shares many of its sites with red maple (*Acer rubrum L.*), a medium sized tree that grows 2-5 feet per year reaching a mature height of 68 feet. The cottonwood (*Populus deltoids*) is also fast-growing (up to 6 feet per year) and is also dominant in the forested floodplain of the Rest of River. Therefore, while it may be true as a generalization that restoration of some mature forest communities can be difficult and slow to achieve, the dominance of these species in the natural communities and conditions of Rest of River supports EPA's position that restoration of forested floodplain in these areas is feasible in a reasonable time frame following remediation.

It is also important to consider the history of the Housatonic River floodplain forest, which may appear to be a natural ecosystem that has evolved over millennia, but in fact has recovered in the relatively recent past from even more severe disturbances related to agricultural and other anthropogenic influences. This recovery process occurred naturally over the past 60-100 years, not aided by active restoration activities and without careful monitoring and adaptive management. With an active restoration program in place to promote and track the restoration response after remediation, the historical ecosystem response to human intervention supports EPA's position that substantial recovery will not require centuries following remediation, but rather a much shorter period of time. The restoration program will include active planting, transplanting, and seeding of native species occurring in the undisturbed floodplain and riparian forest. The survivorship, health, and growth of planted trees will be monitored post-construction, and vegetation management will be required to promote optimal growth rates of forest tree species. In this way, the planting efforts will generally be designed to restore former forested areas in as short a time frame as is feasible, relying on both planted and volunteer trees and shrubs.

Only a relatively small percentage of the floodplain will be disturbed during the estimated 8 years of work in Reaches 5A, 5B, and 5C. Even this work will be dispersed through time and location, which will allow the refugia of nearby mature forest habitat to remain and mobile species to move among mature forest patches during the remediation and restoration activities. As restored areas mature, migration and/or dispersal and re-introduction of mature forest species

can be expected. The riparian corridor will remain because work in such a limited area of the floodplain will only temporarily create small openings that will have minimal impact on corridor integrity and contiguity. In addition, phasing of the remediation and the careful location of infrastructure will prevent these impacts from occurring for the entire duration of the project, further reducing its impact.

Finally, EPA notes even if ultimately any of the problems that are described in the comments occur despite EPA's oversight, such problems will be limited to a number of small, non-contiguous areas of floodplain and/or subject to additional actions by GE to alleviate the concern(s). EPA believes that any short-term environmental effects are justified by the reduction of unacceptable human health and ecological risks by the excavation of contaminated floodplain soil.

EPA's belief in the success of this recovery is supported by the documented success of restoration activities at numerous sites, including in the 1 ½-Mile Phase 4 Floodplains properties, where GE planted over 650 trees and shrubs. With proper maintenance and replanting when necessary, GE achieved nearly a 100% survival rate. As an example, for the 79 cottonwoods planted in May 2010 in the 1 ½ Mile, 77 were healthy and the average height of the trees by the summer of 2012 (two years later) was at least 24.2 feet, with 58 of the trees having a recorded height of greater than 25 feet as documented by GE in 2012. Similarly, post-remediation monitoring of the adjacent riverbanks in both the ½-Mile Reach and 1 ½-Mile Reaches of the Housatonic River indicates that the trees and shrubs planted as part of the riverbank restoration efforts have been meeting or exceeding the Performance Standards for survivorship and areal cover. EPA expects that the future restoration of affected areas in the Rest of River will produce similar results.[7]

Also see EPA Response C5 *et al.*, 147 *et al.*, 603, C20, and C9 of this Section.

Comment 363.a: The mile and a half upstream that was cleaned is a dead zone. Before the cleanup there were large fish in the river, now there are none. The diverse forest canopy has been replaced by a monoculture of small trees and bushes.

EPA Response 363.a: The response to the portion of this comment regarding the absence of large fish in the 1 ½ -Mile Reach is provided in the EPA Response 517.

EPA disagrees with the characterization that vegetation on the riverbanks and floodplain in the 1 ½ -Mile Reach is a monoculture of small trees and bushes. EPA conducted extensive pre-remediation vegetation surveys along the riverbanks in order to develop post-remediation

[7] **References for Responses 600 *et al.*, and 363.a:**

Arcadis. 2009. *2008 Annual Monitoring Report, 1 ½-Mile Reach of the Housatonic River*. Revised May 2009.
Arcadis. 2015. *2014 Annual Monitoring Report, 1 ½-Mile Reach of the Housatonic River*. January 2015.
Weston Solutions, Inc. (Weston). 2007. *2006 Annual Restoration Monitoring Report, 1 ½ Mile Removal Reach, General Electric (GE)/Housatonic River Site*. February 2007.
Woodlot Alternatives, Inc. 2002. *Ecological Characterization of the Housatonic Rive*r. Report prepared for U.S. Environmental Protection Agency Region 1, Boston, Massachusetts. September 2002.
GE report submitted September 11, 2012. *Summary of August 2012 Inspection Activities for the Group 4C Floodplain Properties.*
Weston. 2011. *March 2011 1 ½-Mile Reach Completion Report*.
Arcadis. 2010. *Housatonic River Floodplain-Non-Residential Final Completion Report*.

planting plans that would lead to the establishment of vegetation similar in types and diversity to that in the area prior to the remediation. Based on the survey and a preference for native riparian species, over 6,000 native trees and shrub were planted consisting of a mix of black willow, box elder, silver maple, cottonwood, silky dogwood, northern arrowwood, winterberry holly, red-osier dogwood, and choke cherry. In the floodplain adjacent to the last stretch of the 1 ½-Mile Reach, an additional 1,300 trees and shrubs consisting of the species planted on the riverbanks plus red maple, sugar maple, river birch, paper birch, white birch, white pine, American cranberry, red oak, green ash, eastern hemlock, and serviceberry were planted. Clearly a wide variety of native riparian and floodplain plantings were installed to restore the banks and floodplain (Arcadis 2010, Weston 2011).[8]

As evidence of the effectiveness of active restoration, post-remediation monitoring in the 1½-Mile Reach of the Housatonic River indicates that the trees and shrubs planted as part of the riverbank restoration efforts have been meeting or exceeding the Performance Standards for survivorship and areal cover (Weston 2007, Arcadis 2009, 2015). Visual observations and quantitative assessments during monitoring performed between 2004 and 2014 show that woody vegetation survivorship (including volunteer plants) has generally been good, and growth was characterized as healthy and vigorous, with many of the trees with heights exceeding 25 ft. (Weston 2007). EPA expects that future restoration efforts in the Rest of River will experience similar results.

Comment 521: Cutting of mature trees as part of the remediation will adversely impact mating pairs of bald eagles that have been seen in the ROR area.

EPA Response 521: EPA recognizes the importance of protecting Threatened and Endangered species such as bald eagles, and is coordinating with the Commonwealth of Massachusetts and the State of Connecticut to identify high-quality habitats for state-listed species and to guide remediation efforts in avoiding and minimizing adverse impacts to the species. This response focuses on describing the bald eagle's general habitat requirements, the recorded occurrences for this species (including breeding pairs) in the proposed remediation areas, the overall habitat potential in the remediation area, and the steps that would be taken to protect the species from harm as a result of remediation activities.

Bald eagles are found in Massachusetts and Connecticut as year-round, wintering, or migrating inhabitants. Although the number of eagles has been increasing gradually in recent years in these two states, the species is currently listed as "Threatened" by both the Massachusetts NHESP under the MESA and by the Connecticut Department of Energy and Environment (CT DEEP) under the Connecticut Endangered Species Act. The bald eagle was removed from the federal list of endangered and threatened species in 2007, but is still federally protected by the Bald Eagle and Golden Eagle Protection Act of 1940 and the Migratory Bird Treaty Act of 1918.

In Massachusetts and Connecticut, bald eagles typically prefer areas of open water for feeding with nearby tall trees for roosting and nesting. Fish and waterfowl are the preferred foods. Eagles require large amounts of forested shoreline with trees for nesting and perching. Nests are

[8] *Id.*

located 30 to 120 feet from the ground in live trees that are relatively large and typically taller than surrounding trees. The nests usually lie below the tree crown to afford protection from the elements. Wintering eagles require suitable trees for night roosting that may be many miles from feeding areas but in locations protected from wind. In winter, bald eagles may congregate at areas with open water where fish and waterfowl are abundant. It is thought that the eagle population in Massachusetts is limited primarily by the number of large water bodies surrounded by mature forest. Bald eagles, particularly nesting pairs and winter-roosting birds, are easily disturbed by human activity; disturbance may cause nest abandonment. See CT DEEP 2010. *Bald Eagle Fact Sheet* and NHESP. 2016. *Bald Eagle Rare Species Fact Sheet*.

Although bald eagles were observed in the area of the Housatonic River during the ecological characterization studies, no nesting eagle pairs were observed in the Housatonic River PSA or in the Rest of River. Between 1998 and 2001, eagles were not observed breeding during raptor surveys within Reaches 5 and 6 or in any of the three nearby reference areas, though there were incidental bald eagle observations, including attempted nesting, in the vicinity of Woods Pond and at the Threemile Pond reference area. The NHESP (personal communication from L. Glorioso, NHESP, to Stantec Consulting Services Inc., April 29, 2015) reports that the only record of eagle nesting in the area was a 2005 observation of nest maintenance about 1 mile north of Woods Pond (the nest was abandoned unfinished). Publicly available information also indicates that in 2008 there were 72 wintering bald eagles counted in Massachusetts, and 26 pairs maintaining territories, including one pair on the Housatonic River. Similarly, the CT DEEP reports that in 2010, 18 pairs of eagles made nesting attempts in Connecticut, with nesting attempts and territorial behavior observed in 6 of the state's 8 counties.

The Housatonic River in the PSA and Rest of River areas contains open water feeding habitat for bald eagles. Existing riparian forests with tall, mature trees along the shorelines provide potential perching opportunities for feeding eagles. Some of these forests also contain trees potentially suitable for nesting, particularly superstory conifers in the undeveloped areas with low levels of human-caused disturbance. Based on eagle observations and known preferences, one of the most likely areas with nesting potential exists in the vicinity of Woods Pond on the eastern side of the river in the undeveloped October Mountain State Forest, which extends east to Washington Mountain Lake where eagles were observed feeding.

The Massachusetts Division of Fisheries & Wildlife has identified Priority Habitats for state-listed species in the PSA, and the NHESP has further identified "Core Habitat Areas" (based on field-documented occurrences) representing delineated habitats for listed species. As of 2012, these Core Areas did not include bald eagle as a species in the delineated habitats, suggesting that, even though bald eagle habitat exists in the Rest of River, it is not considered Priority Habitat. Nonetheless, EPA is committed to protecting the species.

EPA recognizes that the activities associated with PCB remediation will impact some of the mature trees located within the Rest of River that could be used by eagles for nesting and perching. However, the remediation will remove PCB contamination and reduce the concentrations of PCBs in fish, their preferred food. The remediation activities will only affect a small portion of the mature trees within the Rest of River. Project phasing will help to limit and spread out the effects to the riparian forest habitats and ecology, thereby maintaining stretches of the river for bald eagles to utilize during construction.

The Massachusetts NHESP and CT DEEP maintain and update data on listed species occurrences. The two states have been, and EPA anticipates will continue to, work cooperatively with EPA to assess the potential impacts to bald eagles and other listed species and their habitats as part of the proposed remedial activities in the Rest of River. This collaborative process will continue to help guide the cleanup efforts to avoid, minimize, and mitigate impacts to listed species and natural communities. As the planning and implementation of the remediation and restoration activities move forward, EPA will continue to work closely with these state agencies to identify listed species habitats and site-specific concerns (e.g., bald eagle nests) that may be affected by the cleanup activities.

Vernal Pools

Comment 601: GE asserts the following: The proposed remedy could impact up to 43 vernal pools (27 acres) in the PSA. Use of conventional remedial techniques in vernal pools would cause severe harm to those pools and loss of the sensitive amphibians that inhabit them due to changes in the hydrology, vegetative characteristics, and soil composition of the vernal pools. Moreover, those changes are likely to be irreversible since, contrary to EPA's assertion, there is no scientific support for the suggestion that vernal pool restoration will successfully return the affected pools to their pre-remediation condition. The evidence demonstrates that vernal pool creation or re-creation has a very low success rate and that, in most cases, vernal pool functions cannot be adequately replaced. The Commonwealth has likewise expressed its belief that "restoration of these vernal pools will not result in the actual replication of the vernal pools and associated amphibian communities that existed prior to removal of the pools."

Comment 602: GE asserts the following: In addition to the impacts on the vernal pools themselves, the proposed remedy would adversely affect varying portions of the critical 100-foot and 100- to 750-foot buffer zones around vernal pools in the PSA, which provide important non-breeding habitat functions (including cover, temperature and moisture regulation, foraging sites, and overwintering sites) for the vernal pool species. The proposed remedy would impact up to 52% of the 100-foot zone and up to 29% of the 100- to 750-foot zone for individual pools. In total, it would adversely affect approximately 10 acres within 100 feet and 60 acres within 100-750 feet of the vernal pools in the PSA. These impacts would disrupt those areas' important non-breeding functions for vernal pool amphibians, and thus further decrease the chances of successful restoration.

Comment C25: GE asserts the following: The most important and distinguishing feature of vernal pools is their hydroperiod, or the timing of flooding (when and how long before they dry down). The hydroperiod is what distinguishes these environments from permanent ponds and lakes by providing breeding habitat for obligate vernal pool species that excludes breeding populations of predatory organisms (e.g., bull frogs, green frogs, snapping turtles) (Calhoun and deMaynadier 2008). Hydroperiod is influenced by hydro geomorphic setting (HGM), defined by where a pool occurs in the landscape (e.g., groundwater or surfacewater depression, floodplain or perched setting) (Leibowitz and Brooks 2008) and in-pool characteristics (e.g., sediment types and stratigraphy, microtopography, foliage cover). It is very unlikely that soils that will be used to replace the soil excavated from the vernal pools and the adjacent areas will have the same permeability as the current soils in the vernal pools, particularly given the complex inter-bedding of silt and mucky soil layers in the existing soils. Replacement soils with a different permeability would not retain comparable amounts of surface waters and may not allow for comparable flow

of groundwater into or out of the pools. Pool replacement soils may subside, leading to longer hydroperiods.

Attempts to reestablish hydroperiod are unlikely to be successful (see Calhoun et al. 2014). Similarly, the reconstruction of the swales that convey water into and out of the vernal pools and re-establishment of riverbank conditions that would preserve the overbank flooding into the swales are unlikely to result in conditions that match current conditions. Minor changes in the surface elevations at control points where surface water is conveyed into and through the swales could significantly alter the quantity of flow to the vernal pools. In addition, loss of mature trees surrounding vernal pools would change rates of evapotranspiration, usually making the habitats wetter, and thus less suitable for obligate vernal pool species. When existing pools are disturbed, as will be the case for as many as 43 vernal pools in the PSA, efforts to reproduce the full complement of soil and hydrologic characteristics are unlikely to re-establish existing or comparable hydroperiods within the vernal pools.

Comment C26: GE asserts the following: Vernal pool remediation would involve the removal of the surficial soil, together with the vegetative cover, tree stumps, roots, and woody debris, in all or a portion of the vernal pools and the adjacent areas. These soil disturbances would have a significant direct effect on vernal pool wildlife. The soil compaction associated with the remediation, as previously discussed in connection with shrub/emergent wetlands, would similarly result in long-term changes in hydrologic patterns. The remediation would also remove physical components of the vernal pools that are critical to vernal pool ecology- e.g., the organically enriched soils, which provide a medium that supports the food chain (microbial nutrient transformers), affect permeability so as to keep the pools from drying out too soon, and facilitate groundwater flow in groundwater-influenced vernal pools (Leibowitz and Brooks 2008). Further, the remediation would affect the surrounding landscape characteristics that affect the timing and quantity of surface water and groundwater inputs into the pool and conveyance of water out of the pool (e.g., their juxtaposition with fluvial swales that flood waters into the pools). As a result, important elements of the vernal pool animals' life cycles, including breeding for obligate vernal pool species, would be disrupted. Tree clearing within and immediately adjacent to the vernal pools would also produce substantial direct adverse effects on the vernal pool ecosystem, as these mature trees provide shade that moderates surface water, soil, and air temperatures and evaporative losses, and additionally provide a significant yearly infusion of biomass (fallen leaves, twigs, and branches) that serves as the base of the detrital food web and as cover from predators (Baldwin et al. 2006b).

Comment C27: GE asserts the following: Vernal pools may function as discrete aquatic systems, but they often occur in clusters, allowing a metapopulation (a set of sub-populations) of amphibians to disperse among the pools (Gibbs and Read, 2008). It is the proximity of vernal pools with slightly differing, but generally suitable habitat characteristics, as currently present in the PSA, which provides the necessary network of breeding sites to keep the local population of a species intact. Vernal pool amphibians display a high degree of fidelity to breeding sites (Berven and Grudzien, 1990; Vasconcelos and Calhoun 2006), but opportunities for occasional exchange of genetic material among individuals by dispersing juveniles from different subpopulations are important to avoid reproductive isolation (Gibbs and Read, 2008). This exchange can occur when pools are present within an appropriate habitat matrix, such as the contiguous area of mature forest in the PSA. If the physical structures or hydrologic regimes of

the pools are altered, or the habitat matrix shifts to a non-forest habitat type, as would occur if SED 9/FP 4 MOD is implemented, then amphibian populations are at risk. Adult and emigrating juvenile amphibians have been shown to avoid clearcut areas adjacent to vernal pools (Patrick et al. 2006). Disruption of connectivity that is essential for dispersing animals, along with loss of the critical features of the forest floor that provide cover, temperature and moisture regulation, foraging sites, and overwintering sites to vernal pool species (see deMaynadier and Hunter 1998; Calhoun and deMaynadier 2004), as would occur under SED 9/FP 4 MOD, would constrain subsequent colonization and recolonization of the impacted vernal pools by obligate vernal pool species. Additionally, conversion to more open pools (e.g., less shade and forest cover) will likely promote use of those pools by habitat generalists such as green frogs or bullfrogs, both voracious predators of pool obligates (Vasconcelos and Calhoun 2006).

Comment C28: GE asserts that the impacts of SED 9/FP 4 MOD on vernal pools and associated habitat would be largely unavoidable as impacts would be significant regardless of the time of year of operations. Working in the pools when the amphibians have left the pools for the season would avoid one set of impacts (i.e., to the breeding and larval stages), but would simply displace impacts to the terrestrial life stage of the vernal pool amphibians, as vernal pool amphibians spend the majority of their annual life cycle in the surrounding forest. Even if the remediation work were to occur during the low-flow season and after the spring breeding and migration period, this would not avoid direct mortalities to vernal pool juveniles and adults living in the leaf litter or in shallow burrows. These are slow moving organisms that are especially vulnerable to ground disturbance or soil compaction. Further, the impacts of remediation in a given pool would last multiple years beyond the season in which that remediation takes place, thereby adversely affecting the breeding potential of the local population. Because vernal pool amphibians have strong site fidelities, they may unsuccessfully attempt to return to disturbed vernal pools, even if the pools are no longer suitable for breeding as we expect would be the case here.

Comment D1, D2: GE asserts the following: First, the evidence of breeding by any vernal pool amphibian sufficient for certification of a vernal pool under the Commonwealth's regulations is not appropriate to evaluate the potential population-wide effects on pool-breeding amphibians by destruction of both pool and terrestrial habitat at the scale proposed by EPA for the Rest of River. The MA NHESP's evidence-of-breeding criterion for certification is designed to protect vernal pools with this modest showing, not to maintain the population persistence of more diverse populations of pool-breeding amphibians or to maintain other vernal pool ecosystem services (e.g., resting and foraging sites for mammals, birds, and other herpetofauna (Mitchell et al. 2008)), biogeochemical services including nutrient cycling and transformations (Capps et al. in press), or hydrologic functions (Mushet et al. in revision). These guidelines were NOT intended or crafted for determining whether a remediated pool meets the goal of sustaining current population levels of pool breeding amphibians or other landscape-scale pool functions (see Lichko and Calhoun 2003, Calhoun et al. 2014). Second, EPA's experience with the remediated and "restored" vernal pool known as 8-VP-1 is no evidence that the over 40 vernal pools that could be affected by EPA's proposal (as an upperbound estimate) can be effectively restored. The single remediated vernal pool does now provide appropriate breeding habitat for wood frogs in some years (following a dry-down year) but also serves as a potential sink in years when hydrologic conditions allow green frogs to successfully breed there, which is devastating for sensitive vernal pool species. This mixed result tells us nothing about the effect of the

remediation proposed by EPA for the Rest of River. The relevant study would require baseline research on amphibian breeding populations of an analogous section of river with multiple pools and associated terrestrial habitat followed by a recovery study. Given that this is not possible, one needs to rely on broader scale studies that compare reference pools to mitigated pools with sample sizes large enough to be statistically significant (Calhoun et al. 2014). Findings from these studies are more relevant to guiding decision-making with respect to pool integrity in this system than are findings from a single, relatively undisturbed site where there is a strong local population of pool-breeders to recolonize a pool.

EPA Response 601, 602, C25, C26, C27, C28, D1, D2: Based in part on these GE comments, EPA has modified the Vernal Pool requirements to emphasize alternatives to excavation of Vernal Pools. EPA is aware of the challenges that may be posed in the remediation and restoration of excavated Vernal Pools, but disagrees with the comment that this will result in irreversible changes and have a very low chance of success. EPA believes that the long-term environmental benefits of stabilizing and/or addressing the risks posed by PCB contamination in the Vernal Pools will outweigh short-term changes and temporary loss of functions that may happen as a result of remediation activities.

EPA has reviewed the literature articles cited by GE in its comments and the state of the science related to the history and efficacy of Vernal Pool restoration and creation in the context of the Housatonic River cleanup. It is clear that Vernal Pool restoration in particular (as opposed to Vernal Pool creation) can be accomplished successfully with a careful approach and attention to detail. In the evaluation of 15 Vernal Pool creation projects in New England, Lichko and Calhoun (2003, Attachment D-15 to GE's comments) note that failures of pool creation projects to replace key Vernal Pool functions were due primarily to lack of clear goals, poor planning, poor execution, and lack of clear criteria for measuring success. Other studies are in accord with these conclusions, and indicate that an important factor in the success of Vernal Pool creation is evaluating and replicating physical and biological conditions of reference pools and/or those pools to be restored, particularly in regard to hydroperiod and pool morphology.

Based on comments received by GE, the Final Permit Modification includes modified Vernal Pool requirements to avoid excavation to the extent possible by specifying the use of an activated carbon (or similar) amendment of Vernal Pool soils. Activated carbon amendments reduce the bioavailability of organic contaminants by increasing the organic carbon content of the contaminated medium which binds the PCBs. Application of these amendments has shown promise in a number of scenarios as discussed in Attachment 3 to the Comparative Analysis. Activated carbon (AC) and similar amendments are increasingly being used successfully as a component of the remedy at contaminated sediment sites (Patmont C.R., U Ghosh, P LaRosa, C.A. Menzie, R.G. Luthy, M.S. Greenberg, G. Cornelissen, E Eek, J. Collins, J Hull, T Hjartland, E Glaza, J Bleiler, and J Quadrini. 2014. *In Situ Sediment Treatment Using Activated Carbon: A Demonstrated Sediment Cleanup Technology*. Published by the Society of Environmental Toxicology and Chemistry. October 2014 (Patmont *et al.*)). EPA believes there is a reasonable expectation that the application of AC will be successful, resulting in the avoidance of excavation in at least some of the contaminated Vernal Pools designated for remediation. To the extent that the area adjacent to the Vernal Pool is disturbed by the application of AC, GE will be required to restore the area to pre-remediation condition. Only if the application of the amendment is determined to be unsuccessful does the proposed remedy

require excavation and restoration of the Vernal Pools. Furthermore, should the AC approach not work, the Final Permit Modification specifies that no excavation is required in Core Area 1 and GE is required to minimize the impacts from excavation in Core Areas 2 and 3 on a case-by-case basis.

In the event that AC amendment is not successful in achieving the required reduction of bioavailability, and excavation and restoration of the Vernal Pools outside of Core Area 1 is required, EPA believes this can be successfully accomplished. EPA acknowledges that, if performed haphazardly, the cleanup and subsequent restoration efforts of Vernal Pools have the potential to cause changes in sediment types, soil structure and composition, degree of soil compaction and resulting permeability, pool size and depth and overall hydrologic regime, pool hydroperiod, microtopography, vegetation characteristics, shading and foliage cover, litter and coarse woody debris, characteristics of surrounding forested areas, habitat connectivity and other important parameters of these ephemeral pool features. However, these and other potential impacts can be eliminated or reduced by a well-designed remediation and restoration program such as the one outlined in EPA's Final Permit Modification. In such a program, the timing, duration, and phasing of remediation and restoration and other methods would be considered to minimize impact on local populations. See also Response 600 *et al.* for details with respect to concerns regarding the effects of tree clearing. Consideration will also be given to any remediation required in areas surrounding the pools to minimize adverse effects to the terrestrial life-stages of the amphibians to the extent possible.

In developing the Final Permit Modification, EPA coordinated with the Commonwealth of Massachusetts and the State of Connecticut regarding cleanup approaches, and evaluated remediation alternatives against the Permit's general standards and decision factors. The Final Permit Modification includes a requirement for avoidance and minimization of impacts to species and habitats regulated under the Massachusetts Endangered Species Act, and will employ an adaptive management approach as well as monitoring and maintenance. The phased approach to remediation construction over an estimated 13 years will also help to mitigate short term impacts on Vernal Pool habitats.

Despite GE's assertions to the contrary, the Vernal Pool remediation efforts by GE in the 1.5-Mile Reach in 2006 at Vernal Pool 8-VP-1 provide a good indication of the potential for successful Vernal Pool restoration following the removal of PCBs. After restoration, as documented by both GE and EPA in post-remediation inspection reports, in a short time Vernal Pool 8-VP-1 was providing breeding habitat for Vernal Pool amphibian species, providing ecological functions similar to the pre-remediation pool, and was shown to be meeting the Massachusetts criteria for a certified Vernal Pool. While the greatest wood frog egg mass count observed prior to remediation was 31 (in 2003), counts substantially increased following remediation to 75 in 2010, more than 100 in 2011, 60 in 2012, 170 in 2013, 59 in 2014, 96 in 2015, and more than 47 in 2016 (some had already hatched). In addition, hundreds of fairy shrimp were observed most years following remediation. In years where fairy shrimp were not observed, their absence was attributed to the hydrologic conditions in that or previous year(s). Prior to remediation, green frogs were observed in 34 of 45 Vernal Pools studied by EPA, including 8-VP-1. Therefore, GE's implication that that restoration of the Vernal Pool resulted in the presence of green frogs post-remediation is incorrect. The data demonstrate a clear improvement in the conditions in the Vernal Pool following remediation and restoration, not

simply a satisfactory "pass" of the NHESP breeding criteria and "mixed results" for the Vernal Pool as GE claims.

GE asserts that a "relevant study" is required prior to Vernal Pool remediation. During the Ecological Characterization, EPA compiled data on over 60 Vernal Pools over a period of three years, with detailed surveys conducted on 17 pools, and additional data in 8 pools. These data provide a baseline of pre-remediation conditions in the Vernal Pools in the PSA. In the Final Permit Modification, GE is required to perform additional sampling and gather data to update the baseline characterization of the Vernal Pools. GE is then required to implement the application of an amendment such as activated carbon (AC) in an initial set of 10 pools and monitor the effectiveness and any ecological impacts on the pools and restore any disturbed adjacent areas. GE will then submit a proposal for how to address the remaining Vernal Pools which is subject to review and approval by EPA in consultation with the states. Only then, as GE asserts after a "relevant study," will remediation be performed on the remaining Vernal Pools.

EPA acknowledges that the habitat surrounding a Vernal Pool is as important as the pool itself in supporting populations of Vernal Pool species and that, to varying degrees, remediation may have the potential to cause short-term changes in some floodplain characteristics in these buffer areas, which may include temporary disruption of connectivity among Vernal Pools. However, EPA believes that these short-term effects will be mitigated by an active restoration program and are off-set by the reduction in demonstrated risks to the amphibian populations. It is expected that disruption of the pools, the surrounding buffer zones, and pool connectivity will be minimal with the application of a relatively un-intrusive application of a sediment amendment such as AC. In the event that the remediation plans require disturbance of the buffer zones, the restoration program requires thorough documentation of pre-remediation conditions, including in these buffer zones, and active measures following remediation activities to return the area to the pre-existing conditions, to the extent feasible.

Comment C29: GE asserts the following: There is no published research on the effect of the use of activated carbon on vernal pool breeding invertebrates and amphibians. The case studies referenced by EPA have no relevance to vernal pools as EPA's own consultant, the Isosceles Group, recognized (see Attachment 3 to the Comparative Analysis). It would be reckless to research the potential impacts of this treatment technique in the sensitive ecology of the PSA. In any event, vernal pools in which activated carbon was used as an alternative to excavating the pools would still be adversely affected by the clearing and excavation of the 100-foot and the 100- to 750-foot zones around the pools.

EPA Response C29: The Final Permit Modification does not include requirements for the clearing and excavation of 100- to 750-foot zones surrounding the pools. The floodplain remediation plans have not yet been developed; they will be proposed in phases during project implementation, and EPA anticipates requiring GE to minimize the effects on the buffer zones surrounding the pools where feasible.

With regard to the effects of the application of AC in the Vernal Pools, Attachment 3 to the Comparative Analysis documents the effects to benthic invertebrates from the application of a sediment amendment found in the peer-reviewed literature. Contrary to GE's assertion, Attachment 3 has no statement about relevance, and in fact some of the case studies in

Attachment 3 are highly relevant to the use of AC in the remediation of Vernal Pools in the Floodplain. A more recent comprehensive review of the potential for adverse ecological effects from the application of AC is provided in Janssen E.M-L. and Beckingham, B.A., 2013 Biological Responses to Activated Carbon Amendments in Sediment Remediation. *Environ. Sci. Technol.*, 2013, *47* (14), pp 7595–7607. In this paper, the authors found adverse effects occurring in one-fifth of 82 tests, and that higher AC dose and smaller AC particle sizes, while further reducing bioaccumulation of hydrophobic organic contaminants, may induce stress in some organisms.

Further documentation is provided in Patmont *et al*. This paper reviews general approaches to the application of AC in the field at more than 25 sediment sites, and reviews the ecological effects associated with AC amendments. The authors identify particular conditions where adverse ecological effects may occur, however reaches the overall conclusion that remediation using AC is a proven, reliable technology that is appropriate for full-scale application at a variety of sediment sites.

Thus, there is a large body of work supporting the full scale field application of AC, with known cautions as to circumstances that result in adverse effects versus successful outcomes. EPA expects that this work will be used to guide the design of the remediation of the initial 10 Vernal Pools using AC or a similar sediment amendment.

Also see Responses 601 *et al.* and 660 in this Section.

III.B.2.c Invasive Species

Comment 147: Language should [be] inserted into Section II.B.3.c.(4) of the Permit (Preconstruction Preparation Requirements) requiring that effective measures be taken to avoid introducing invasive species. How will such species be controlled?

Comment 173: Successful invasive species control will require a long-term commitment, and therefore the Invasive Species Control Plan should establish standards for the long-term, post-construction control of invasive species, likely on the order of decades rather than years. This plan and all activities associated with it must also cover appropriate safeguards for all equipment and worker footwear, clothing, etc. as well as any activity in contact with the river or which will flush or put water back into the river.

Comment 185: A detailed invasive species study, control, monitoring and remediation plan, with specifics on eradication of any invasive species introduced into other reaches, must be developed and included in the Permit, augmenting the Permit's current requirement that GE must develop a control plan as part of its Statement of Work. Invasive species should include all plant and animals so classified, including consideration given to those so classified in other states which have not yet been introduced into the river. Such a robust plan will be required at least during the entire cleanup period and should require reactivation during any post-cleanup remediation.

Comment C13: GE asserts the following: The plant communities in primary successional systems, as would be formed by these extensive remediation activities, are generally dynamic, and it is under these conditions that aggressive and exotic species readily take hold. This is a very real risk to the overall success of restoration activities, as the plant community is one of the

foundations of the overall ecosystem. If non-native species out-compete native ones, the animals that depend on the native plants may be lost as well. Successful replacement of shrub and shallow emergent wetlands is more likely than for forested components of the floodplain - the latter being highly unlikely - but is still fraught with numerous issues related to how the overall configuration of river channel, bank structure, and floodplain topography are integrated to produce the essential hydrologic, soil, and vegetation elements required of these systems. Regarding the potential success for floodplain plant communities, the significant lag time for growth of mature trees will always be an issue. There are limitations to controlling the colonization and spread of invasive plants in aquatic and riparian ecosystems. As proposed, the remediation plans are not likely to replace the structure, function, or biodiversity of the floodplain components of the existing riverine ecosystem.

Comment C21: GE asserts the following: Invasive exotic plants are already present in the PSA, with 18 problematic species identified, and SED 9/FP 4 MOD will most likely increase the extent of their coverage. Invasive exotics will outcompete the native species currently present in the PSA because of the extensive areas of exposed soil (both backfill and new sediments), less competition from natives removed during remediation, and more sunlight following forest canopy removal (a factor relevant to both aquatic and terrestrial species). Furthermore, roads, staging areas, and the movement of vehicles and soil will all increase invasions of propagules of invasive exotics. EPA implies that controlling invasive exotics is straightforward, but this is not the case. One analysis (Kettenring and Adams 2011) examined 335 research papers covering control of 110 invasive exotic plant species and reported: *"Regardless of control method, our meta-analysis revealed that few studies produced gains in native plant cover, density or biomass."* They also warned about the negative ecosystem impacts of invasive control: *"Herbicide was the most commonly implemented and, according to our meta-analysis, the most effective control method for reducing invasives. However, native species response to herbicide was highly variable, probably because this broad-scale approach can hinder native species establishment through seed limitation."* In fact, there can be unintended consequences of using particular techniques to control invasive exotics (see Skurski et al. 2013).

EPA Response 147, 173, 185, C13, C21: EPA recognizes that colonization by invasive species during and following the Proposed Remedial Action, as with any project, is a serious concern, particularly in disturbed or newly planted areas, as well as downstream Impoundments and, to a lesser extent, in the Backwaters. EPA recognizes that control of invasive species can be difficult, particularly the control of invasive forms of submerged aquatic vegetation, but "difficult" should not be interpreted to mean that properly implemented control measures will not be successful. EPA recognizes there is a risk that some invasive species already in the Housatonic River system may increase, at least temporarily, as a result of the remediation.

EPA concurs that a well-designed and implemented long-term invasive species control plan is necessary to effectively manage invasive species both during and after implementing Corrective Measures. Requirements have been included in the Final Permit Modification in Section II.H.18.b for an Invasive Species Control Plan, specifying identification of invasive species prior to implementing remediation activities and monitoring and maintenance requirements during and after implementation of Corrective Measures. The specifics of these programs will be determined, with EPA review and approval, during the Rest of River Scope of Work process.

EPA anticipates the Invasive Species Control Plan will include, but not be limited to, components of the successful program for the 1 ½ Mile Reach Removal Action, as specified in the Final Post-Removal Site Control Plan (PRSC), which is Appendix A to the 1 ½ Mile Reach Final Completion Report. The PRSC describes the maintenance and monitoring requirements to be implemented by GE following completion of the 1 ½-Mile Reach remediation. Major components of the PRSC for the 1 ½-Mile Reach Removal Action are as follows:

- Establishing a maintenance standard of 5% invasive species in a given area;
- Monitoring to be performed by experienced personnel with at a minimum five years of experience and an undergraduate degree in a science pertinent to the proposed work;
- Qualitative and quantitative inspections will be performed and results documented on field form and summarized in summary tables;
- Areas identified during qualitative and quantitative inspection that do not meet the Maintenance Standard will be flagged and the necessary corrective actions implemented to meet the Maintenance Standard;
- Corrective actions to be implemented within 30 days of inspections;
- Personnel performing invasive species control shall be licensed in the State of Massachusetts.

The successful implementation of the 1 ½-Mile Reach Invasive Species Control Program (ISCP) in accordance with the PRSC is documented in annual Re-Vegetation Inspection Reports, subject to EPA review. In addition, GE implemented a similar program in accordance with EPA's 2008 Interim PRSC Plan. These inspection reports document that the Maintenance Standards for the quantitative component for invasive species have been achieved in every year that inspections have been conducted for the 1 ½ -Mile Reach. (Re-Vegetation Monitoring Inspection 1 ½ Mile Reach of Housatonic River General Electric (GE), 2008 – 2015.) Invasive species cover has not exceeded 5% in any of the established monitoring plots since inception of the program. EPA notes that invasive species detected during qualitative inspections are noted and corrective action is discussed between EPA and GE. Corrective action for the removal of invasive species may include physical removal and/or the application of herbicides or other appropriate methods following any and all requirements for use of these products in the vicinity of a waterbody. While the application of herbicide is known to be an effective control, it is possible however unlikely that there may be the unintended consequence of adverse effects to native/desirable vegetation. The Invasive Species Control Program will be designed to carefully assess the appropriate corrective action and response for various circumstances. The subject of herbicide application for invasive species control in the 1 ½ -Mile is further discussed in Response 363.b, 520.

Prior to implementing Corrective Measures for the Rest of River , Section II.B.1.c. in the Final Permit Modification requires a thorough baseline assessment of pre-remediation conditions to be conducted as part of the development of a restoration plan for areas impacted by the remedial action. This Baseline Restoration Assessment would include identification of state-listed and representative species, identification of invasive species, evaluation of Vernal Pool hydrology, and other characteristics of the habitats to be impacted by the remediation.

Section II.H. of the Final Permit Modification specifies that GE be required to submit, for EPA review and approval, an overall strategy for implementing the Correctives Measures. A component of this overall strategy will be an Inspection, Monitoring, and Maintenance Plan, which will include an Invasive Species Control Plan (see Section II.H.18.b.). The RD/RA workplans will also include appropriate safeguards to ensure that site activities do not introduce or spread invasive species in the river or floodplain.

Section II.C. of the Final Permit Modification specifies the requirement for an Operations and Maintenance (O&M) Plan, as a component of the Final Remedial Action Completion Report, implemented upon completion of the Remedial Action for the Rest of River. The O&M program will be implemented to maintain the effectiveness of the Corrective Measures, to evaluate MNR, and to conduct maintenance, repair, or other response actions necessary to achieve and maintain compliance with Performance Standards. A component of the O&M program is the requirement for inspections and maintenance of restoration activities, including invasive species control. The O&M Plan would be developed by GE and subject to review and approval by EPA.

The length of time for the implementation of post-construction monitoring and maintenance will be proposed by GE for review and approval by EPA. EPA anticipates the proposed length of time developed for implementation of the invasive species control plan may differ from the actual implementation period based on effectiveness of the program, site conditions, and other factors. For example, the results of summer vegetation monitoring surveys in restored areas of the 1 ½ Mile Reach reported that invasive species cover was below 5% in all monitoring plots and achieved the applicable Performance Standard, but also recommended continued treatment with herbicide and revised treatment strategies to optimize the growth of native plants (Stantec 2007). The requirement for GE to develop and implement a control plan and then monitor the success of that plan during the post-construction operation and maintenance phase, will ensure that invasive species will be kept under control during and after completion of the Remedial Action.

Also see Response 600 *et al*.

Comment 363.b: We have been told that Glyphosate (Roundup) is being sprayed on the riprap banks to control non-native invasives. This is more dangerous to the health of river than the PCBs.

Comment 520: Upstream in the "cleaned" areas there is now a plague of non-native invasive plants. Some of these plants are so noxious that there is no chance we will ever see the mix of plant and animal life that was there before the cleanup work. Currently, herbicides such as Roundup (Glyphosate**)** are being used in the floodplain to attempt to control this invasion. This chemical has been linked to a reduction in small creature populations, and several common commercial formulations have been shown to have major long-term effects. Plants exposed to the chemical have shown an increasing resistance to its use, requiring use of greater concentrations to be effective.

EPA Response 363.b, 520: There is no reason to believe, nor data to suggest, that the limited application of herbicides to control invasive species on revegetated banks remediated or disturbed as part of the East Branch remediation is causing any immediate or long-term harm to

the river or to adjacent habitats, including the desirable vegetation and animal populations on the banks themselves. The substantial ecological and human health effects of the PCBs present in the river and floodplain, on the other hand, have been thoroughly documented in the peer-reviewed Ecological and Human Health Risk Assessments. Rather than causing harm to the river, the use of herbicides to control invasive species is a necessary component of site maintenance activities and provides long-term benefits to the area.

The selective use of herbicides for invasive species control is specified in the Final Post-Removal Site Control Plan (PRSC) for the 1 ½-Mile Reach Removal Action. The PRSC describes maintenance and monitoring requirements to be implemented by GE following completion of the 1 ½-Mile remediation, including, among a variety of other requirements, the revegetation of riverbank areas. An important component of those maintenance activities is the control of invasive species, an issue of concern to both EPA and the public, as evidenced by comments regarding invasive species addressed above. The use of herbicides is necessary for control of invasive species and, by extension, necessary for the long-term successful re-establishment of desirable plant species on revegetated banks. The PRSC also specifies appropriate controls on the use of herbicides including, for example, the requirement that the application of herbicides is performed only by personnel licensed for such application in the State of Massachusetts, and that herbicide application not be conducted in windy conditions.

The herbicide selected for use in the 1 ½ Mile Reach invasive species control program is Rodeo®, a Glyphosphate-containing product specifically formulated to be safe for aquatic use. Roundup® is a different Glyphosphate product that is not used in the invasive species control program. Although both products contain Glyphosphate as their active ingredient, there are differences in the specific formulations, principally in the surfactant additives, that make Rodeo® a better choice for use in areas adjacent to the river. Both these products, along with other Glyphosphate formulations, are approved and legal for use in the United States and have widespread application in the agricultural industry. They have also shown to be relatively harmless to aquatic life, with the obvious exception of the plant growth they are intended to control. It is particularly important to note that the invasive species control program in the PRSC specifies the use of herbicide on a targeted and limited "as-needed" basis and in selected areas where invasive species have or might become a problem for the successful regrowth of native vegetation, and herbicides are not being broadly used on the rip-rapped banks.

EPA is aware that the International Agency for Research on Cancer (IARC) has recently reclassified Glyphosphate as a Group 2A probable carcinogen, however EPA's Integrated Risk Information System (IRIS) assessment of Glyphosphate remains unchanged, concluding that there is insufficient evidence that Glyphosphate causes cancer in animals. Glyphosphate-containing herbicides can be effective, particularly when such products are used as intended and in a limited, targeted manner, as is the case for control of invasive species in remediated areas of the Housatonic River site.

Also see Response 147 *et al.*

III.B.2.d Natural Resource Damage/Massachusetts Endangered Species Act

Comment 677: GE asserts the following: The proposed remedy contains habitat restoration requirements. These include requirements that GE must perform a baseline assessment of pre-

and floodplains to at least pre-remediation condition pursuant to the applicable Work Plans. (As discussed below, some of this restoration work was undertaken in compliance with ARARs). For example, pursuant to the Work Plan for Phase 4 Floodplain Properties, GE conducted inventories of pre-existing conditions, including trees, shrubs, and other features to ensure that restoration of conditions to pre-remediation conditions would be achieved. Accordingly, this work to restore the Brook, Silver Lake, and portions of the floodplain to pre-remediation condition is independent of GE's obligations to also create additional habitat improvements in other separate areas of the Brook and Lake to resolve its natural resource damages liability to the natural resource trustees.

Under CERCLA, cleanups must also comply with all ARARs (unless specifically waived). Here, Section 404 of the Clean Water Act and the Massachusetts Endangered Species Act constitute ARARs and, under certain circumstances, these ARARs require the restoration of areas disturbed by remediation. GE argues, however, that EPA does not have authority to require restoration of disturbed areas even as part of CERCLA's mandate to comply with ARARs, because ARARs may allegedly only apply to hazardous substances that remain "onsite." EPA is unaware of any court ever adopting GE's interpretation and it is refuted by the Decree. Appendix E, Attachment B, of the Decree incorporates ARARs that are not limited to hazardous substances remaining "onsite." Likewise, EPA's guidance makes clear that federal and state statutes and regulations that are directed at protecting locations (e.g., resource areas, including habitats) can also be ARARs. For example EPA's guidance - CERCLA Compliance with Other Laws Manual, Part II (1989) - on such location-specific ARARs states that substantive compliance with the federal Endangered Species Act (ESA) means:

> …that the lead agency must identify whether a threatened or endangered species, or its critical habitat, will be affected by a proposed response action. If so, the agency must avoid the action or take appropriate mitigation measures so that the action does not affect the species or its critical habitat.

Indeed, the ESA is an ARAR that GE does not dispute, including the obligation to "take mitigation measures so that action does not affect species/habitat."

Thus, contrary to GE's claims, it is well settled that the natural resources disturbed by remediation must be restored and mitigated as part of the remedial process in accordance with the substantive requirements of ARARs, such as the ESA, the Massachusetts Endangered Species Act, the Massachusetts Wetlands Protection Act, and the Clean Water Act. Indeed, in other areas of the Site outside the Rest of River, the Clean Water Act Section 404 and the Massachusetts Wetlands Protection Act constitute ARARs for the Removal Actions Outside the Rest of River and respectively require that river banks will be restored, habitat will be improved, and "disturbed vegetation will be restored" as specified in Appendix E, Attachment B, Table 3 of the Decree. Similarly, GE has not disputed that the National Historic Preservation Act and the Massachusetts Historical Commission Act serve as ARARs, including for the Rest of River, which are also included in Appendix E, Attachment B, Table 3 of the Decree.

In addition, GE claims that any restoration to return disturbed areas to pre-remediation condition or to comply with ARARs would conflict with the Decree's covenants regarding natural resource damages ("NRD"). As noted above, for response actions outside the Rest of River, GE has

already undertaken substantial restoration work to return areas disturbed by remediation to pre-remediation condition and/or to comply with ARARs. Likewise, GE evaluated the cost of undertaking restoration work for the Rest of River as part of its CMS related to the Rest of the River. See CMS, Appendix Q. In sum, the parties have assumed that GE would comply with ARARs in undertaking response actions pursuant to the Decree, including ARARs requiring restoration work. After all, such work constitutes a fundamental component of the response action.

Indeed, CERCLA prohibits the Natural Resource Trustees from providing a covenant for NRD until the responsible party "agrees to undertake appropriate actions necessary to protect and restore the natural resources damaged by" releases of hazardous substances. 42 U.S.C. § 9622(j)(2). Here the Decree requires that GE's implementation of response actions comply with ARARs, which include those requiring that natural resources disturbed by the remedy be restored or mitigated. Specifically, as required in the Decree, GE is required to comply with any ARAR set forth in the documents selecting the Rest of River Remedial Action and/or in the Rest of River SOW, unless waived by EPA pursuant to CERCLA and the NCP. Therefore, the NRD covenant for the Rest of River is contingent upon GE's compliance with the Decree and its obligations, including the obligation to implement the Rest of River response action, and ARARs.

GE uses language in the Decree Paragraph 114.b, a payment provision to the Natural Resources Trustees, to argue that it precludes EPA from requiring compliance with ARARs or restoration of areas disturbed by remediation activities. But this provision merely provides that GE pay the Trustees: "$600,000 as mitigation for wetlands impacts associated with PCB contamination and with response actions at the Site." A more relevant provision is ignored. Decree Paragraph 112 states that "[S]atisfaction of the Plaintiffs' claims for Natural Resource Damages shall consist of: Performance of the response actions required under the Decree…" (emphasis added), and other components, including the $600,000 payment. In short, until GE performs the Rest of River response actions in accordance with the requirements of the Decree, which include compliance with ARARs, GE has not satisfied the Governments' claims for natural resource damages. Accordingly, the payment provision in Paragraph 114.b is not a covenant not to sue from the United States. That covenant is set out in Paragraphs 112(a) and 161, and is contingent upon compliance with the response actions required under the Decree, including all of the Work required in the Rest of River SOW. The Trustees and EPA have overlapping interests and jurisdiction and worked together here to draft a settlement in the public interest. For all the foregoing reasons, the covenant not to sue for NRD does not apply until all the work is completed in the Rest of River, including restoration of resources disturbed by remediation and/or in compliance with ARARs.

GE also includes a few summary arguments regarding the level of detail and likelihood of success of restoration. To the extent that there is an objection that the specifics of restoration are not sufficiently developed, those details will be set forth in the Rest of River SOW or the Work Plans for the Rest of River SOW as is contemplated by the Decree. To the extent that GE further questions the likelihood of success of restoration efforts, information in the record does not support its position, and as noted in Responses 17 *et al.*, 455, 492, 533 *et al.*, 593, 594, 595, 596, and additional detail or certainty is not required at the remedy selection phase of remedy

implementation. Finally, the restoration requirements in the Final Permit Modification reflect the expertise and input of EPA and the States in this area.

Comment 683: GE asserts the following: EPA has recognized in the recent Focused Feasibility Study for the Lower Passaic River Site that, since the remedial action would itself repair, replace, and improve the existing habitat, it is considered rehabilitation, and that thus the proposed remediation would not require any additional compensatory mitigation.

EPA Response 683: Initially, EPA has not to date required compensatory mitigation as part of the Final Permit Modification, so there is no current dispute regarding a requirement to implement compensatory mitigation. However, as discussed in Response 677 *et al*., compensatory mitigation is consistent with ARARs and is not precluded.

GE does not accurately describe the situation at the Lower Passaic River, which was the subject of a 2014 Focused Feasibility Study (FFS) and the 2016 Record of Decision (ROD).

The character of the Lower Passaic River and adjacent wetlands differs significantly from the Rest of River. As described in the FFS, the Lower Passaic River flows through some of the most urbanized and industrialized areas of New Jersey, including the city of Newark. Approximately 2.8 million people reside in the New Jersey counties of Essex, Bergen, Hudson, and Passaic, which surround the Lower Passaic River (United States Census Bureau, 2010). Existing land use adjoining the FFS Study Area is primarily developed (i.e., 85 percent of the area is classified as urban), while forests, wetlands, and other land uses comprise the remaining 15 percent. Intensive commercial and industrial uses occur near the mouth of the Lower Passaic River and around portions of Newark Bay, in part to take advantage of the multi-modal transportation infrastructure that includes roadway, railway, air, and marine transportation services. Proceeding upstream from approximately River Mile 4, the Lower Passaic River continues to include commercial uses, but also starts to include more recreational and residential uses. The banks of the FFS Study Area between River Mile 1 and River Mile 7 consist of bulkheads and riprap (70 to 80 percent), bulkheads or bulkhead with overhanging vegetation (10 to 30 percent) and aquatic vegetation (5 percent). Mudflats within the FFS Study Area total approximately 100 acres. The lower reaches of river are designated as a federal navigational channel subject to maintenance.

Section 3.5.5 of the FFS - Compensatory Mitigation Requirements - clarifies the requirement for restoration versus the compensatory mitigation that GE references:

> The implementation of a remedial action in the FFS Study Area would result in short-term temporary impacts to existing aquatic and wildlife habitat in the FFS Study Area. However, should a selected remedial action be implemented the degraded FFS Study Area would be replaced with a healthier ecosystem of improved habitat. As part of the reconstruction of the remediated area, the existing open water, mudflat, riparian fringe and intertidal wetlands would be replaced with features of similar size and location but significantly improved substrate quality. In addition, biostabilization techniques, such as the use of biologs and coir fiber mats could be considered as an alternative erosion protection measure and have the added benefit of providing submerged aquatic or tidal emergent habitat. The removal or capping of contaminated sediments and the resulting

> improvements in water quality would improve the long-term health and diversity of aquatic communities of the FFS Study Area. Remediation may result in collateral benefits including removal of nuisance species, reintroduction of native species, aeration of compacted anaerobic soils and other enhancements of wetland and mudflat habitats…. Since the remedial action would improve and replace existing open water, mudflat and intertidal habitat, the FFS assumes that no additional compensatory mitigation measures for in-river operations would be necessary for this aspect of the remediation. This is consistent with other ongoing Superfund river dredging cleanup projects (e.g., Hudson River PCBs Superfund Site). See Appendix F for analysis.

Section 12.6 of the ROD further states:

> Habitat Restoration Measures to reconstruct habitat impacted by the dredging and capping will be implemented, including habitat assessment and surveys during remedy design. The design will address placement of habitat recovery material and aquatic vegetation and is discussed further in Section 9.2.3.

Thus, the characteristics of and situation at the Lower Passaic River are not directly comparable to the Rest of River, yet there is still a similar requirement for restoration of habitats disturbed by remediation following removal of contaminated sediment. Furthermore, simply because EPA determined within the context of the circumstances at the Passaic site that compensatory mitigation may not be necessary for certain sections of the Passaic response action, that does not mean that, if appropriate and to comply with ARARs, compensatory mitigation cannot be required as part of restoration elsewhere, including Rest of River. Similarly, the conclusion for the Passaic does not mean that compensatory mitigation as part of restoration in areas disturbed by remediation is barred due to NRD issues at Rest of River or elsewhere. Also, see Response 715 in Section IV [ARARs] of this Response to Comments regarding compensatory mitigation.

Comment 684: GE asserts the following: The draft Permit states that, where the remedy would impact a state-listed species, GE will be required to submit and implement a Conservation and Management Plan under MESA providing a long-term Net Benefit to the conservation of state-listed species that would be taken. Such a requirement is both overstated and unauthorized. Under MESA, the requirement to submit a Conservation and Management Plan providing for a Net Benefit to the species applies ***only*** when the take would impact an insignificant portion of the local population; if the take would impact a significant portion, it is prohibited altogether. EPA's ARARs table does not mention this. EPA's Comparative Analysis asserts that the impacts on state-listed species can be limited to an insignificant portion of the local populations, but it provides no support for that assertion. In fact, its conclusion is contrary to the evidence that, for at least nine state-listed species, the takes resulting from the proposed remedy would impact a significant portion of the local populations.

Comment 685: GE asserts the following: The requirement in the draft Permit that GE must take actions that provide a Net Benefit to the conservation of affected species is unauthorized at this Site and thus cannot constitute an ARAR for the proposed remedy. The MassDFW Director may or may not permit a take, thereby giving the Director complete discretion as to whether to do so. Thus, the regulation does not provide any "standard, requirement, criteria, or limitation" with

respect to whether the Director should allow a take – which would be required for a regulation to constitute an ARAR under the CERCLA definition (CERCLA § 121(d)(2)A)).

Comment 686: GE asserts the following: Application of the MESA Net Benefit requirement, requiring GE to conduct unspecified conservation and management measures in return for a take, would constitute an attempt to recover compensation for a take, which is a form of NRD. As noted in [Comments 677, 678, 680, 681, and 682], GE has already provided compensation for NRD at this Site, and has a covenant from the federal and state governments not to seek additional NRD (except in the case of dam failure, which is not relevant here). Thus, any attempt to require additional conservation and management measures would undermine those covenants and conflict with the Decree.

EPA Response 684, 685, 686: It is premature to determine if the specific actions that will occur during remediation will result in a "take" of any state-listed species. During the design of the remedy, if EPA determines that a "take" that would impact a significant portion of the local population of a species occurs, EPA will identify that to GE, and GE would have the right, as with any design/implementation dispute, to pursue Dispute Resolution under the Decree, including review by U.S. District Court.

With respect to the Net Benefit provision, EPA's Final Permit Modification's Summary of ARARs table has the following Synopsis for this provision of the MESA:

> A proposed activity in mapped Priority Habitat for a state-listed rare, threatened, endangered species or species of special concern, or other area where such a species has occurred may not result in a "take" of such species, unless it has been authorized for conservation and management purposes that provide a long-term net benefit to the conservation of the affected state-listed species. A conservation and management permit may be issued provided an adequate assessment of alternatives to both temporary and permanent impacts to state-listed species has taken place, an insignificant portion of the local population would be impacted by the project or activity, and an approved conservation and management plan is carried out that provides a long-term Net Benefit to the conservation of the state-listed species. Projects that will alter a designated Significant Habitat must be reviewed to ensure that they will not reduce the viability of the habitat to sustain an endangered or threatened species.

Similarly, based in part on GE's comments, the Summary of ARARs table now includes the following as part of the Actions to be Taken to Achieve this requirement*:*

> To the extent that unavoidable impacts result in a take of state-listed species, EPA would follow the regulatory requirements with respect to implementing a conservation and management plan providing for a long-term net benefit to the affected state-listed species.

GE argues that if there is a "take" of a species which results in a "significant" portion of the local population being impacted by the project or activity, the requirement to submit a Conservation and Management Plan providing for a Net Benefit to the species would not apply, because the "take" is prohibited outright.

Massachusetts Division of Fisheries and Wildlife (MassDFW) has affirmed for EPA that under the MESA regulations, if a determination of a take is made, the project or activity must either be modified to eliminate the take or the proponent must obtain a conservation and management permit ("CMP") pursuant to 321 CMR 10.23. More specifically, in addition to showing that the impacts from the remedial action have been avoided, minimized and mitigated, the MESA regulations at 321 CMR 10.23(2)(a)-(c) set forth three separate, distinct and substantive Performance Standards that must be met in order to obtain a CMP authorizing a take under MESA:

a) there has been an adequate assessment of alternatives to both temporary and permanent impacts;

b) only an insignificant portion of the local population of the affected state-listed species will be impacted, and

c) an approved conservation and management plan provides for the long-term Net Benefit for the conservation of the state-listed species. The term "Net Benefit" is defined in the MESA regulations at 321 CMR 10.01 to mean (1) an action(s) that contribute significantly to the long-term conservation of a state-listed species, and (2) that conservation contribution exceeds the harm caused by the proposed project or activity.

As noted above, MassDFW has affirmed for EPA that the insignificant impact on local population and the Net Benefit Performance Standards in 321 CMR 10.23(2)(b) and (c) are separate and distinct substantive requirements applicable to the permitting of a take. More specifically, in order to authorize a take, 321 CMR 10.23(2)(b) requires that there be an "insignificant impact" to the *local* population of the affected state-listed species. In comparison, 321 CMR 10.23(2)(c) requires that a Net Benefit be provided to the affected state-listed species *as a whole* (i.e., beyond the geographic location of the local population of that species).

If a take will have a significant impact on the local population of the affected species, in order to move forward, such an activity would need to be redesigned or coupled with a form of mitigation that would result in an insignificant impact on the local population. In that regard, there are certain forms of mitigation designed to enhance the local population, thereby lessening the overall impact of a project. For this reason, MassDFW typically requires an applicant to evaluate whether a Net Benefit can be provided, even in cases where there is a preliminary assessment that the activity will impact a significant portion of the local population. This approach is appropriate because after-the-fact habitat management and habitat restoration could off-set remediation impacts in certain cases, which should be considered in evaluating the level of impact on the local population resulting from a particular remedial alternative in site-specific locations.

During design and implementation of the proposed remedy, if, despite that evaluation and potential mitigation, a significant impact on the local population remains, EPA, in consultation with MassDFW, will evaluate whether it is appropriate to waive the requirement of an insignificant impact on local population pursuant to CERCLA Section 121(d)(4), such as if it is technically impracticable to comply with that requirement. GE remains obligated under the MESA regulations to comply with the separate, distinct and substantive Net Benefit Performance

Standard in 321 CMR 10.23(2)(b) to compensate for the resulting take through the implementation of a conservation and management plan.

EPA disagrees with GE's position that MESA provides too much discretion to the decision maker on determining whether to permit a "take," and that amount of discretion does not satisfy CERCLA 121(d)'s requirement that an ARAR be "standard, requirement, criteria or limitation." The MassDFW Director's authority to permit a take of a State-listed species is subject to and limited by several specific standards established in the MESA regulations. First, as outlined above, the DFW's Director's authority to authorize a take is subject to the Performance Standards at 321 CMR 10.23(2), which place limits on such authority. Furthermore, the MESA regulations at 321 CMR 10.23(7) ("General Mitigation Standards Applicable to Individual and General Conservation and Management Permits Issued by the Director") specifically address the general mitigation standards to be applied by the DFW Director in issuing CMPs. This regulation directs the Director to apply the areal habitat mitigation ratios specified therein that correspond to the affected category of state-listed species: 3:1 for endangered species; 2:1 for threatened species; and 1.5:1 for species of special concern.

While the MESA regulations reserve the right to deviate from the applicable mitigation ratio or allow an alternative mitigation approach, discretion to do so is subject to the process and criteria specified therein. Specifically, the decision-maker is required to determine in writing that the alternative mitigation ratio or mitigation approach is either sufficient or required to meet the Net Benefit standard. In making such determination, the decision-maker must also consider, at a minimum, the five factors identified in the regulation, which involve specific conservation management considerations such as the threats to and population density of the affected state-listed species, the size and configuration of both the habitat impact and quality of the habitat proposed to be protected.

With respect to GE's argument on the MESA-required activities being precluded by the Natural Resource Damage covenants in the Decree, EPA disagrees with this characterization. See above Response 677 *et al.*

III.C River Sediment and Banks

III.C.1 Reaches 5A, 5B, and 5C

Comments 55, 57, 79, 95, 116, 140, 207, 209, 212, 227, 320, 325, 358, 421, 422, 513: EPA should clarify and provide a rationale for the sediment cleanup criteria in Reaches 5A, 5B and 5C and for why there is no numeric target for cleanup of sediment in Reaches 5A and 5C. In addition, some commenters believed that the cleanup level of 50 mg/kg in Reach 5B was not stringent enough to protect wildlife and human health and limit downstream transport of PCBs. Another commenter believed that the cleanup level of 50 mg/kg should be applied in Reach 5A, thus minimizing impacts to the neighborhoods in this area. One commenter suggested there should be uniform target cleanup concentrations throughout the areas to be remediated and that there are no differences between the various reaches that would justify such large differences in cleanup targets.

Some commenters believed there was a 5 mg/kg cleanup level in the sediment in reaches 5A and 5C.

EPA Response 55, 57, 79, 95, 116, 140, 207, 227, 212, 209, 320, 325, 358, 421, 422, 513: EPA believes the selected remedy is appropriate. The selected remedy does not use numeric target cleanup levels for the sediment in Reaches 5A and 5C because of the type of remedy selected for the sediments in 5A and 5C. The Performance Standards for Reaches 5A and 5C are to remove sediment throughout the reach, regardless of the concentration of PCBs, to allow for the placement of an Engineered Cap over the entire riverbed. That is, excavation and capping of sediment bank to bank, from the upstream boundary to the downstream boundary of each Reach. For Reach 5B, there is a numeric Performance Standard of 50 mg/kg in the top foot of the sediment. Areas of sediment with a PCB concentration greater than or equal to 50 mg/kg in the top foot will be removed and backfilled. In response to these comments and to Comment 125.a (see below), the Final Permit Modification was revised for Reaches 5A and 5C to clarify the lateral extent of sediment remediation required in these reaches. The 5 mg/kg cleanup level is only relevant to riverbank soil in Reach 5A, not sediment.

As discussed in Section II.B of this Response to Comments, the Performance Standards for sediment in Reaches 5A through 5C were based on an evaluation of all of the remedy selection criteria. The selected remedy is the remedy best suited to meet the Permit's general standards in consideration of the Permit's decision factors, including a balancing of those factors against one another. Among the Permit general standards to be met are the Control of Sources of Releases and Overall Protection of Human Health and the Environment, and one of the Permit decision factors is Short-term Effectiveness of the remedy. Compared with other alternatives evaluated by EPA, the selected remedy includes significant risk reduction and reduction of downstream transport of PCBs while also reducing the area of excavation footprint within Reach 5B. Because Reach 5B sediment has significantly lower surficial sediment concentrations than in Reaches 5A, 5C, the Backwaters and Woods Pond[9], the selected remedy specifies only the removal of sediment with PCB concentrations greater than or equal to 50 mg/kg and, subsequent to excavation and backfill of those sediments, placement of an amendment such as activated carbon and/or other comparable amendment to reduce the bioavailability of the remaining PCBs in the sediment bed. To evaluate remedy performance, modeling was conducted on the various remediation alternatives, and this modeling showed that although other alternatives, such as Combination 6, achieved greater fish tissue reductions, the selected remedy (SED 9 MOD in the Comparative Analysis;) achieves several fish tissue IMPGs, including the HI of 1 for the CTE individual using the probabilistic risk model. Comparative Analysis at page 13, and Attachment 10. The selected remedy also significantly reduces the downstream transport of PCBs (89% compared to initial conditions), although several other alternatives achieve slightly greater reduction in downstream transport of PCBs. (Statement of Basis, page 29 and Table 3). Combined with limited bank excavation in Reach 5B (see below), the selected remedy resulted

[9] Median PCB Sediment Concentrations for the 0-6 inch depth interval are as follows: Reach 5A: 11 mg/kg; Reach 5B: 3.3 mg/kg; Reach 5C: 6.1 mg/kg; Backwaters: 8.4 mg/kg; and Woods Pond 17 mg/kg. From Table 4-8, of GE's 2003 RFI Report.

in a significant area of the river and riverbanks that would not be disturbed. As a result, partly due to limited sediment removal in Reach 5B, EPA concluded in its Statement of Basis:

> Combination 9 [SED 9/FP4 MOD], which includes more excavation than most alternatives, but also provides the most measures and procedures to preserve and protect the river's sensitive ecosystem, including its array of state-listed species, provides the best balance in terms of reducing residual risk and minimizing long-term ecological impacts.

Statement of Basis, page 31.

Also see Response 55, 140, 141, 423 in Section III.C.2 of this Response to Comments.

Comments 79, 95, 117, 140, 207, 209, 212, 320, 325, 358, 418, 421, 422, 513: There were several comments on the cleanup criteria for riverbanks in Reaches 5A, 5B and 5C. Some commenters suggested the 5 mg/kg criterion in 5A be used in Reach 5B, while others believed the 50 mg/kg criterion should be used in 5A, because this is where people live, as opposed to Reaches 5B and 5C, where there are fewer abutters. Other commenters stated that the criteria should be lower than 5 mg/kg. One commenter also suggested that the 5 mg/kg standard also be applied to the banks in Reach 5C. Commenters also requested that EPA provide the rationale for the different criteria.

EPA Response 79, 95, 117, 140, 207, 209, 212, 320, 325, 358, 418, 421, 422, 513: The primary rationale for remediation of riverbanks is to prevent PCB-contaminated bank material from eroding into the river. Preventing this erosion will reduce fish tissue PCB concentrations, and will reduce ecological risk from, and downstream transport of, PCBs. Comparative Analysis at page 2. As articulated in the Statement of Basis, the 5 mg/kg erodible bank standard was used for Reach 5A because it best balances the objective of minimizing erosion of PCB-contaminated banks and subsequent redistribution of the PCBs with the desire to maintain the dynamic nature of the River. A similar standard is not appropriate for Reach 5B, given the importance of minimizing the disturbance to the habitat in that Reach and the lower concentrations present. Based on a rationale similar to that discussed above for river sediment, less bank removal in Reach 5B was incorporated into remedy as part of EPA's evaluation of the Permit criteria, including balancing the remediation of unacceptable risks posed by PCBs with minimizing the amount of bank excavation to preserve the dynamic character and related biodiversity and habitats of the river. Statement of Basis, page 24. Due to the limited amount of riverbank soil in Reach 5C (banks generally less than one foot in height), EPA determined that applying a bank standard in Reach 5C was unnecessary. As discussed for the Reach 5 sediment, modeling was conducted on the various remediation alternatives, and this modeling showed that although other alternatives, such as Combination 6, achieved greater fish tissue reductions, the selected remedy (SED 9/FP 4 MOD in the Comparative Analysis, referred to as Combination Alternative 9 in the Statement of Basis) achieves several fish tissue IMPGs, including the HI of 1 for the CTE individual using the probabilistic risk model. Comparative Analysis, page 13, Attachment 10. As discussed above, the selected remedy also significantly reduces the downstream transport of PCBs (89% compared to initial conditions), although several other alternatives achieve slightly greater reduction in downstream transport of PCBs. (Statement of Basis, page 29 and Table 3).

The alternatives that would also have been protective but that were not selected would have had greater negative short term impacts.

Comment 125.a: Page 4 of the Statement of Basis reads: "the Proposed Cleanup Plan requires the removal of river bed sediment throughout Reach 5A and soil in eroding river banks contaminated with more than 5 mg/kg PCBs". This could be read to mean that both river sediment and bank be cleaned up to a 5 mg/kg level. Yet Table 1 of the Statement states simply that "2.5 ft removal and capping" will occur in Reach 5A, and that "Removal/stabilization of erodible river banks in Reach 5A and banks in reach 5B w/ PCBs >50 mg/kg". Page 14 of the Permit that deals with Reach 5A does not indicate any mg/kg threshold for river sediment and indicates that only soil from "eroding" riverbanks with contamination of >5 mg/kg will be removed. These thresholds should be clarified so that the Statement and the Permit clearly are in agreement.

EPA Response 125.a: As discussed above in Response 55 *et al.*, there is no numerical target PCB concentration for remediation of sediment in Reach 5A. To eliminate any confusion on the extent of remediation for the sediment in Reach 5A, the Performance Standard in the Final Permit Modification was revised to read as follows:

> Throughout Reach 5A, river bed sediment shall be removed and an Engineered Cap . . . shall be placed over the entire river bed. (Emphasis added).

Final Permit Modification, at II.B.2.a.

The depth of the excavation will be determined during design in accordance with the Engineered Cap Performance Standards specified in the Permit. The depths provided in the Statement of Basis were an estimate.

The Final Permit Modification is also clear on the concentration-based Performance Standards for riverbanks in Reaches 5A and 5B. See Final Permit Modification Section II.B.2.a. and b. To the extent there is any conflict between the Statement of Basis and the Final Permit Modification, the Final Permit Modification shall govern.

Comment 125.b: Reach 5B: Page 5 of the Statement of Basis specifies "excavation and restoration of river bed and banks that exceed the reach-specific Performance Standard of 50 mg/kg," yet the map [from EPA's June 18, 2014 presentation] does not show any areas of Contaminated Erodible Bank for this reach, nor does it indicate that any river sediment is to be removed.

EPA Response 125.b: There are no locations shown on the map for sediment and bank removal because the locations will be determined by future sampling conducted pursuant to the Final Permit Modification. In addition, there is no "erodible bank" component to the performance Standard for Reach 5B. Removal of bank soil is determined solely by PCB concentrations that are equal to or exceed 50 mg/kg.

Comment 125c: There are no numeric thresholds or other performance standards listed in the text of the Statement or the Permit for sediment or banks for this reach [Reach 5C]. However, the

Map [from EPA's June 18, 2014 presentation] and Table 1 of the Statement indicate that two feet of river bed will be removed in this section.

EPA Response 125.c: There is no bank removal required in Reach 5C. See Response 79 *et al*. above. The rationale for no numeric thresholds for sediment is described in Response 55 *et al.* above. The two feet of riverbed is an estimate off the depth of sediment that needs to be removed. The actual depth of the excavation will be determined during design in accordance with the Engineered Cap Performance Standards specified in the Permit.

Comment 229: The statement on p. 13 of the Statement of Basis that "eroding contaminated riverbanks are a significant source of PCBs in Reach 5, currently contributing an estimated 45% of the PCB load to the river…" is inconsistent with the decision to leave a large part of Reach 5B undisturbed, as noted above? Rather than being a reason for leaving an area undisturbed, this process is a reason for cleaning it up.

EPA Response 229: See Response 79 *et al*. above.

Comment 417: In Reach 5A, the Permit stipulates no depth of sediment excavation, but the comparison matrix of alternatives in the Statement of Basis indicates a removal depth of 2.5 ft. We continue to support a removal depth of 2 ft with full engineered capping, with removal to 3 ft, followed by backfill and capping in areas with elevated PCB concentrations at depth and/or areas of high scouring.

EPA Response 417: The Engineered Cap Performance Standards and Corrective Measures require an evaluation of shear stresses and scour (as well as other factors) when determining the thickness of the Engineered Cap. The depth of the excavation will be determined during design in accordance with the Engineered Cap Performance Standards specified in the Permit. The depths provided in the Statement of Basis were an estimate. Also see Section III.C.7 of this Response to Comments regarding cap design and thickness.

Comments 45, 419, 519. The proposed remediation will result in a large extent of hardscape that is fixed channel river. A fixed channel is not practical considering the known increase in severe weather that is going to occur in this system as well as others. The river will meander even more in the coming years, and any hard fix, any hard remediation, such as bunkering and riprap, will be impermanent.

In Reach 5A, remediation of some bank areas via removal will potentially shift erosion potential in areas not remediated, resulting in the release of contaminated media to the river. Additional modeling should be conducted to predict where and how this effect will occur to allow for contingency planning.

Armoring the riverbanks with loose rocks is simply not a suitable substitute for tree roots as a bank stabilizing structure. Armoring with riprap also devastates habitat for wildlife bank dwellers and limits many other creatures from being able to effectively migrate across the river.

EPA Response 45, 419, 519: There is a significant quantity of PCBs in riverbanks and floodplain soils that are subject to erosion and are a potential source of contamination to the Housatonic River. EPA's May 2012 Status Report and Statement of Basis highlighted the

objectives of 1) addressing the unacceptable risk posed by PCBs and 2) minimizing the amount of bank excavation to preserve the dynamic character and related biodiversity and habitats of the river[10]. As summarized in the Statement of Basis, EPA believes that although the selected Remedial Action requires less riverbank and floodplain soil excavation than several other combinations of active alternatives, the Selected Remedy "provides the most measures and procedures to preserve and protect the river's sensitive ecosystem, including its array of state-listed species habitats, [and] provides the best balance in terms of reducing residual risk and minimizing long-term ecological impacts." (Statement of Basis, pgs. 30-31.)

EPA agrees that the natural tendency is for the river in this section to continue to meander and for banks to erode. As documented in Attachment 11 to the Comparative Analysis (pg. 9), "The Housatonic River has been highly impacted over the past two centuries and currently exhibits accelerated bank erosion and other signs of instability, including a profile that is out of phase with the channel planform." Artificial straightening predominantly associated with railroad construction and agricultural practices likely occurred between the 1850s and 1886, resulting in "large-scale manipulation of the river channel…that would have shifted the channel away from the quasi-equilibrium condition existing at the time of the straightening" (Comparative Analysis, Attachment 2, pg. 9). In response to these major historic disturbances, the Housatonic River has been undergoing a period of channel adjustment that has resulted in the current planform and formation of the existing meanders along much of its length. Eventually, absent other factors, the river would attempt to return to quasi-equilibrium, or a stable state, through these natural changes, however, if no remediation/restoration is implemented "such change will necessarily include accelerated erosion of the floodplain and stream banks, which are contaminated with PCBs" (Comparative Analysis, Attachment 11, pg. 3).

In addition to the impacts of channel relocation described above, many factors determine the erosion potential of natural river banks in non-remediated areas. River systems are complex and stream banks are just one component. The banks form the critical boundary between channel and floodplain, and the height and slope of the banks determine the ability of the stream to interact with the floodplain. Existing bank height, slope, and coverage of native riparian vegetation are important indicators of channel stability. Near-channel vegetation increases bank protection and prevents erosion of the bank soil (Comparative Analysis, Attachment 11). Stream banks are dynamic and can both build through deposition and retreat or deform through erosional processes. Bank erosion occurs when the shear stress of the stream flow is greater than the ability of the bank to resist failure. The minimum force needed to initiate erosion, or critical shear stress, is influenced by the characteristics of the channel, such as vegetation density and rooting depth, substrate composition, soil cohesion, channel armoring, hydraulic radius of the channel (typically equal to mean depth), and the water surface slope (Comparative Analysis, Attachment 11, pg. 1). Bank erosion is a natural process of river dynamics, but accelerated bank erosion often occurs in unstable rivers, causing issues such as decreased water quality, over-widening, and loss of near-channel vegetation.

[10] In addition, in describing the required remediation for Reach 5A, the Statement of Basis states, "a focus of the river bank work will be to reduce the mobilization of PCBs into the river from the erosion of contaminated banks while maintaining the dynamic nature of the River" (Statement of Basis, pg. 4).

Based on bank erosion data collected in 2009, the river banks in Reaches 5A and 5B are eroding at a rate of 0.3 to 0.5 ft./yr., which is significantly higher than rates for stable reference streams, and is contributing a significant portion of the PCB load to the river (Comparative Analysis, Attachment 11, pg. 9). Once remediated and restored, if properly designed, the amount of channel migration and bank erosion can be significantly reduced compared to current conditions and the amount of PCBs entering the river can be greatly reduced.

Potential bank restoration techniques have been discussed in Attachment 11 to the Comparative Analysis, and may be "achieved through the use of natural materials such as woody debris, soil bioengineering, and log and rock structures, as well as by adjusting the slope of stream banks and revegetating the riparian zone" (Comparative Analysis, Attachment 11, pg. 5). Bank stabilization techniques can be roughly categorized into traditional methods, such as hard armoring, and bioengineering, or biotechnical engineering techniques. There are many examples of sites where such bank stabilization techniques have been implemented successfully, and several specific instances are cited in Attachment 11 to the Comparative Analysis. In addition, where hard armoring is used to cap soils contaminated with PCBs, soil bioengineering approaches can be used over the cap, thus providing a deformable bank that will help to accommodate slight channel adjustments.

Various bank stabilization techniques have advantages and disadvantages that must be considered on a case-by-case basis. To implement a long-term effective bank stabilization solution, reduce the risk of failure, and minimize future bank erosion, it is important to consider the engineering, geomorphic, and biological aspects of the project (Comparative Analysis, Attachment 11). According to Attachment 11 to the Comparative Analysis, "engineering considerations include the ability of the stream banks to resist erosion, hydraulic conveyance of the channel, scour, and deflection of erosive forces to other locations along the reach. Geomorphic considerations include location of the proposed structures, channel-floodplain interaction, sediment competence and capacity, bankfull cross-sectional shape, width-to-depth ratio, sediment supply, location of depositional areas, bar formations, and locations of scour. Biological considerations include selection and survivability of planted riparian species, growing seasons, and fish and macro-invertebrate habitat" (Comparative Analysis, Attachment 11, pg. 5). An integrated approach considering all these factors is part of the "Natural Channel Design" or "NCD" process and will enhance overall stability of the river and reduce the risk of shifting erosion potential to areas where bank remediation is not conducted. Further explanation of restoration objectives addressed by stream restoration techniques is provided in the U.S. Department of Agriculture National Engineering Handbook, 2007, Part 654.1102.

To achieve the balance of reducing the risk of PCBs eroding from bank and floodplain soils while still maintaining the meandering and dynamic nature of the river, the Final Permit Modification includes Performance Standards and Corrective Measures that include the following:

For Reach 5A:

> Excavated riverbanks shall be reconstructed to minimize erosion considering the principles of Natural Channel Design and result in a channel that is in dynamic equilibrium, balances flow and sediment loads, and reduces erosive forces. This will allow the maximum use of bioengineering methods in restoring riverbanks. Riverbank reconstruction shall follow a hierarchy of approaches as follows, with the first bullet being the most preferred.
>
> - Reconstruct disturbed banks solely with bioengineering restoration techniques;
> - Reconstruct disturbed banks with an Engineered Cap extending into the riverbank placed under a bioengineering layer; or
> - Place rip-rap cap or hard armoring on residual surface of banks (e.g., where needed for protection of adjacent infrastructure).

For Reach 5B, the Final Permit Modification requires removing riverbank soil with PCB concentrations of 50 mg/kg or greater and restoring disturbed banks using bioengineering methods.

In Reaches 5C and 5D there are no significant lengths of riverbanks that require remediation.

These Performance Standards provide that the placement of riprap/rocks on the surface of the banks is the least-preferred option for bank restoration and will be limited to areas where placement of riprap/rocks is necessary for protection of infrastructure such as bridges, culverts, private property, etc. In addition, the incorporation of the principles of NCD will reduce the risk of PCBs eroding into the river from unremediated bank and floodplain soils while still maintaining the meandering and dynamic nature of the river.

For additional comments on the effectiveness of restoration, see Section III.B.2 of the Response to Comments.

Comment 420: We are in agreement with the preferential use of bioengineering techniques for reconstruction of river banks disturbed by remediation.

EPA Response 420: EPA acknowledges support for this preference.

Comment 78: The first section of the river to be remediated [i.e., ½-Mile and 1½-Mile] is now no longer useable for recreation due to the rock which covers the banks.

EPA Response 78: The options available for bank restoration and armoring in the Rest of River are considerably more diverse than those previously used in the 1 ½-Mile and ½-Mile Reaches. Within those reaches, hard armoring was selected to stabilize the residual PCB-contaminated riverbank and floodplain soils that remained in place. Dense urban and residential development immediately adjacent to the river in the upstream reaches precluded significant reshaping of the banks or implementing the principles of NCD, which may have allowed less armor, or use of bioengineering, or just revegetation to stabilize the slopes. For example, a large stretch of the

1 ½-Mile reach consisted of residential properties with relatively small floodplains. Reshaping the river form would have resulting in the taking of some of this private property and soft bioengineering techniques may have increased the risk of erosion of residential back yards.

Even with the hard armoring that was necessary, the upstream 1 ½-Mile and ½-Mile Reaches are providing significant habitat uses. The riprap (armor) within these reaches is silting in and vegetation has become established both within and above the riprap, and the banks are on a trajectory to approach pre-remediation conditions. According to the 2014 Monitoring Report for the 1 ½-Mile Reach (General Electric, 2015), planted specimens were "healthy and surviving" and meeting the 80% survival performance standard. Additionally, the Invasive Species Control Program was functioning as intended, and all areas showed invasive species presence less than 5% of the areal coverage.

With the riverbanks silting in and becoming revegetated, the recreational uses, which are limited due to the urban nature of this stretch of the river, are returning. The most significant pre-remediation recreational feature of this stretch of the river, a canoe launch at Fred Garner Park, was re-created as part of restoration activities.

As discussed above in this section, the Performance Standards in the Final Permit Modification will ensure that the placement of riprap/rocks on the surface of the banks is the least-preferred option for bank restoration and is limited to areas such as those needed for protection of infrastructure such as bridges, culverts, etc.

Comment 153: The Permit should require GE to sample bank and floodplain areas where lateral movement of the river channel is most likely to occur and create action plans to monitor, mitigate and quickly capture PCBs that are exposed during high flow events. The areas where the river is most likely to leave its meandering path and cut a new channel should be the focus of such planning efforts.

Comment 293: We appreciate and agree with the strategy that the agencies are calling for "soft" armoring along sections of the river where remediation will occur or erosion is expected. It is inevitable that the river will continue to move laterally and will cut new channels, and in doing so will expose new soils, much of which is contaminated on some level. Because of these known dynamics, we request that the Permit proactively requires GE to sample bank and floodplain areas where lateral movement of the river channel is most likely to occur and create action plans to monitor, mitigate and quickly capture PCBs that are exposed during high flow events. The areas where the river is most likely to leave its meandering path and cut a new channel should be the focus of such planning efforts. Town officials should be involved in working with EPA to identify other areas which may require similar attention. Given the changing patterns of the river channel and banks over time, the permit should require a comprehensive review of the areas which may be at risk on a relatively frequent basis, such as every 3 years, with requirements to address newly identified at-risk areas on a timely basis.

EPA Response 153, 293: As specified in the Final Permit Modification, Section II.B.2., riverbank sampling is required every 25 feet along the river channel in both Reaches 5A and 5B. EPA believes that amount of sampling will provide adequate coverage in these areas. In addition, as required by Section II.B.4. and II.C. of the Final Permit Modification, GE shall be

required to propose and implement an inspection, monitoring and maintenance plan(s) and an operation and maintenance plan, both of which provide for conducting actions necessary to achieve and maintain compliance with Performance Standards. The plan(s), which will be submitted to EPA for review and approval, will include details such as sampling frequency, locations, etc. and other inspection, monitoring and maintenance requirements. Regarding coordination with towns, see Section VIII of this Response to Comments.

Comment 208: On p. 5 of the Statement of Basis, in the discussion on Natural Channel Design and Bioengineering, it is claimed that "The Housatonic River is currently recovering from these past disturbances, and over time, the river will approach sustainable dynamic equilibrium." What evidence supports this conclusion? Even a reference would be a help. In truth, the data do not support this conclusion, but a different one since PCB levels are no longer declining.

EPA Response 208: The statement on p. 5 of the Statement of Basis is referring to the geomorphology of the River, not to PCB concentrations in riverine sediment and floodplain soil. As discussed in Response 45 *et al.* above, over the past few hundred years, the Housatonic River ecosystem has undergone a long history of channel disturbances and channel relocations, and in some cases has adapted to these channel and watershed disturbances through changes to plan form and dimension. In Reach 5, channel straightening and other channel manipulations have dramatically altered the channel and accelerated meander development and chute/cutoff formation during this time, as the river has attempted to re-equilibrate to these disturbances. Rather than resulting in permanent change, the recreation of well-developed meanders in less than a century along much of the straightened river channel indicates the capacity of the river to approach sustainable dynamic equilibrium and recover from large-scale perturbations in a relatively short time frame. Additional information on channel realignment and channel dynamics is presented in Attachments 1 and 2 to EPA's Comparative Analysis.

Comment 395: We agree that historic land uses and channel disturbances destabilized the river decades ago. However, we fundamentally disagree with EPA's statement that as the river recovers from historic disturbances, it will approach sustainable dynamic equilibrium. This may be somewhat true if the surrounding landscape remains largely forested, but that is not assured.

EPA Response 395: EPA agrees that if the surrounding watershed is significantly altered (e.g., deforestation occurs) that affects stormwater runoff, the river will in effect be responding to continually changing conditions and will not be able to reach a sustainable dynamic equilibrium. However, given reasonable assumptions based on existing regulations combined current land ownership and with trends in land use, such ongoing changes are not anticipated, and the recovery of the river after the remediation and restoration activities are undertaken will trend toward dynamic equilibrium.

As discussed above, the Final Permit Modification requires that the riverbanks be constructed to minimize erosion, considering the principles of NCD. Implementing these principles will reduce the instability of the river channel and banks during remediation and restoration activities and will assist in moving the river and its ecosystem towards a sustainable dynamic equilibrium.

Comment 454: Connecticut supports the use of Natural Channel Design principals to guide the implementation of the remedy. EPA should provide further specific guidance on natural channel

design to identify design goals and objectives for GE as they propose the implementation of the required remedy.

EPA Response 454: EPA acknowledges Connecticut's support of the use of NCD principles to restore the Housatonic River in conjunction with remediation activities. A key objective of NCD is to achieve long-term stability through establishment of a self-sustaining system that maintains natural river dynamics and functions. As stated in the National Engineering Handbook (NEH), Part 654 (USDA NRCS 2007, pg. 11-1), "restoring rivers involves securing their physical stability and biological function," which is commonly accomplished by emulating the natural, stable state of the river. This objective supports the use of NCD principles in the implementation of the Proposed Remedial Action in connection with minimizing the erosion of PCB-contaminated riverbanks.

EPA believes it has provided appropriate detail in the Final Permit Modification regarding the use of NCD during the implementation of the remedy. The Statement of Basis discusses the use of a combination of cleanup approaches that will work in conjunction with NCD and indicates that NCD principles will be used to support the project goals, including "focusing on the use of bioengineering techniques in restoring any disturbed banks", as opposed to the use of hard armoring or traditional engineering techniques. The Statement of Basis also states that "a focus of the river bank work will be to reduce the mobilization of PCBs into the river from the erosion of contaminated banks while maintaining the dynamic nature of the River." EPA's Comparative Analysis also reiterates this objective, stating, "an important focus of the riverbank work will be to reduce bank erosion…while maintaining the dynamic nature of the Housatonic River using the principles of natural channel design" (pg. 2). Further explanation on implementing NCD is provided in NEH, Part 654.1102 (USDA NRCS 2007).

III.C.2 Backwaters Adjacent to Reaches 5, 6, and 7

Comment 646: GE asserts that EPA's proposed remedy for the backwaters in Reaches 5 and 6 is unjustified because it would not have significant risk-based benefits compared to a less extensive removal/capping remedy in the backwaters.

Comment 647: GE asserts that with respect to reductions in fish PCB concentrations that might be achieved through remediation of the backwaters, it should be recognized that the backwaters do not generally provide good habitat for fish due, for example, to high temperatures and low dissolved oxygen in the summer. Fish are more likely associated with the main stem of the River, and thus would be adequately addressed by remediation of the main stem. In addition, as demonstrated by a comparison of model projections of fish fillet PCB concentrations in the main stem of the River with and without backwater remediation, PCB concentrations in the backwater sediments do not contribute appreciably to PCB concentrations in the River or its fish.

Comment 648: For the fish in the backwaters themselves, GE has compared the backwater fish fillet PCB concentrations estimated to result from the proposed remedy at the end of the model period with the model-predicted concentrations for a backwater alternative involving removal/capping of surface sediments to achieve a SWAC of 3.3 mg/kg (the EPA-approved IMPG for protection of amphibians) outside Core Area 1 and removal/capping of all discrete surface sediment locations with PCB concentrations > 50 mg/kg in Core Area 1.49 The latter alternative is estimated to require removal of 40,000 cubic yards, less than half of EPA's

EPA Response 321: The Backwaters are primarily net depositional areas (Figure 3.5-35 Final Model Documentation Report: Modeling Study of PCB Contamination in the Housatonic River, Weston, November 2006), therefore transport of any residual PCB contaminated sediment to the floodplain from the Backwaters is expected to be minimal. In addition, in areas outside of Core Area 1 the sediment above 1 mg/kg will be removed and replaced with an Engineered Cap. Similarly, for Core Area 1, sediment above 50 mg/kg will be removed and replaced with an Engineered Cap. Thus, the Backwaters that remain with concentrations greater than 1 mg/kg will be significantly reduced by the remediation, and will be limited in area. With respect to potential additional response actions, please see Response 669 in Section III.B.1 of this Response to Comments, and note also that pursuant to Section X of the Decree, EPA will conduct periodic reviews of the remedial action after completion.

Comment 380: How did EPA arrive at a cleanup target of 3.3 ppm for vernal pools and backwaters in some Alternatives but 5.6 ppm in others? The cleanup target should be to 1 ppm for these habitats for all of the alternatives.

EPA Response 380: The Performance Standard for removal and capping of sediment for Backwaters is 1 mg/kg outside of Core Area 1 and 50 mg/kg for Core Area 1. See Section III.D.2 for the rationale for the Performance Standards for Vernal Pools.

III.C.3 Woods Pond

Comment 616: GE estimates that EPA's proposed remedy for Woods Pond would require deep dredging and placement of an engineered cap throughout the Pond so as to achieve a minimum post-capping water depth of 6 feet (except in near-shore areas, where the slope from the shore to the 6-foot water depth must be as steep as possible).

Comment 617: GE asserts the following: EPA estimates that the deepening of Woods Pond would require removal of 285,000 cubic yards of sediment from Woods Pond. However, that estimated removal is based on achieving an *average* post-capping water depth of 6 feet; achieving a *minimum* post-capping water depth of 6 feet, as proposed, would require removal of approximately 340,000 cubic yards of sediment.

Comment 618: GE asserts the following: EPA claims that its proposed deep-dredging remedy for Woods Pond would reduce human health risks from fish consumption. However, projections using EPA's model show no discernible difference between the proposed remedy and an alternative involving shallow dredging and full capping in reducing fish PCB concentrations or attaining fish consumption IMPGs in Woods Pond itself or in the downstream impoundments. A comparison of model results for EPA's proposed Woods Pond remedy with an alternative remedy that would involve sediment removal to a depth of 9 inches in the shallower portions of the Pond (estimated at 44,400 cubic yards) and placement of a cap over the entire Pond, holding all other aspects of these alternatives constant, indicates no difference between these alternatives in fish fillet concentrations in Woods Pond or any of the downstream impoundments, because cap placement over the entire Pond would achieve the same reduction in fish PCB concentrations as deep removal over the entire Pond followed by capping [GE Attachment F, Figure F1 series and GE Attachment G]. This demonstrates that the substantial additional sediment removal under EPA's proposed remedy (nearly 300,000 cubic yards) would have no benefit in terms of reducing fish PCB concentrations.

Comment 619: GE asserts the following: EPA also asserts that its proposed remedy for Woods Pond would reduce direct contact risks and ecological risks. However, the less intrusive remedy, by installing a cap over the entire Pond, would result in a comparable reduction in any direct contact or ecological risks. For example, both of these alternatives are predicted to achieve a surface sediment PCB concentration of 0.4 mg/kg in Woods Pond, which is far below any threshold for direct contact or ecological risks.

Comments 534, 535, 536, 620: GE asserts the following: EPA claims that its proposed deep dredging remedy would increase the solids and PCB trapping efficiency of Woods Pond and thereby reduce downstream transport of PCBs. Solids trapping efficiency does not equate to PCB trapping efficiency, since some portion of the PCBs are present and pass the dam in dissolved form. Although EPA's proposed remedy would appear to result in some increase in solids trapping efficiency compared to smaller alternatives (estimated by EPA to increase from about 15% to 30%), the model results indicate the projected average annual PCB loads passing Woods Pond and Rising Pond Dams are 2.5 kg/year and 2.7 kg/year, respectively, under the proposed alternative and 2.6 kg/year and 2.9 kg/year under the smaller alternative. This modest increase in solids trapping efficiency resulting from the proposed remedy would not translate to any reduction in risk due to fish consumption or any other source compared to the smaller alternative. Thus, the difference in trapping efficiency would not result in an increase in the protectiveness of the remedy.

EPA also states that its proposed deep dredging remedy would reduce the potential for a release of PCBs from Woods Pond in the event of dam failure. However, dam failure is not a realistic risk, since GE owns Woods Pond Dam and conducts the necessary monitoring, maintenance, and repair of the dam to prevent dam failure, particularly in light of the fact that the Decree's covenants from the federal and state governments for natural resource damage do not apply in the case of a failure of Woods Pond Dam. Hence, that potential does not provide a justifiable basis for the proposed deep dredging.

In fact, it appears that the Region's actual purpose in proposing this Pond-deepening remedy is to improve Woods Pond as a recreational fishery, as desired by the State, not to reduce risks. Indeed, the Commonwealth proposed a deep dredging remedy for Woods Pond, citing the enhancement of recreational opportunities as one of the benefits ([GE] Attachment B). The improvement of recreation, of course, is not within EPA's authority under either CERCLA or RCRA, which is limited to prescribing such actions as are necessary to protect human health and the environment from identified risks due to releases. As shown above, any risks can be reduced to a comparable extent with a remedy that involves much less removal.

Comment 621: GE asserts the following: EPA's proposed remedy for Woods Pond would involve greater adverse impacts due to the extra contaminated sediment removal and much higher costs than the comparably protective smaller remedies. For example, due to the greater removal volume, the proposed remedy would require more truck trips (with their attendant community impacts) and produce greater GHG emissions than the smaller remedy. GE has estimated that the proposed Woods Pond remedy would require a total of approximately 39,000-46,000 truck trips to import the necessary remediation material (i.e., capping and staging/access material) and transport the dredged sediments from the Pond (with the range dependent on the size of trucks used to transport dredged sediments), while the alternative described above

involving shallow dredging (44,400 CY) and capping of the entire Pond would require a total of only approximately 10,000-11,000 such truck trips – approximately 30,000 fewer truck trips. Further, GE has estimated that the proposed remedy for Woods Pond would produce 51,000 tonnes of GHG emissions, compared to 7,800 tonnes for the smaller alternative (see Table 14) – a more than six-fold difference.

Comment 622: GE asserts the following: The proposed remedy for Woods Pond would be much more costly than the smaller alternative. GE has estimated that, assuming off-site disposal, the proposed deep dredging remedy would cost $164-188 million (depending on whether rail or truck transport is used), whereas the shallow dredging/full capping alternative would cost $34-39 million. As discussed above, the latter alternative would be equally protective of human health and the environment and would effectively reduce residual risks to a similar extent as the proposed remedy. Further, the smaller alternative would meet ARARs to the same extent as the proposed remedy. In these circumstances, the incremental costs of the proposed remedy, which would be at least $130 million, are not proportional to its incremental benefits (if any), and hence the proposed remedy would clearly not be cost-effective.

Comment 623: GE asserts the following: For the reasons above, adoption of EPA's proposed deep dredging remedy for Woods Pond would be arbitrary, capricious, and otherwise unlawful because it would require extensive unnecessary removal and would not have the risk-based benefits claimed by EPA, compared to a smaller remedy such as shallower sediment removal in shallower portions of the Pond and placement of a cap over the entire Pond surface.

EPA Response 534, 535, 536, 616, 617, 618, 619, 620, 621, 622, 623: GE provided a number of assertions, and its conclusion, about the appropriate remediation for Woods Pond. EPA disagrees as follows.

GE and EPA differ on the estimates of the volume of material required to be excavated from Woods Pond. EPA based its calculations of 285,000 CY on a minimum water depth of six feet (except along the shoreline), not an average depth of six feet as GE mistakenly claims. Comparative Analysis, Attachment 6. GE provided no support for its 340,000 CY figure so EPA is unable to comment upon its accuracy. Further, GE's "preferred remedy" as briefly described in these comments would likely involve the removal of approximately 100,000 CY or more. The 100,000 CY estimate is based on a 1.0 to 1.5 foot excavation (as opposed to 9 inches, which is a new GE assumption regarding cap thickness, which was not contemplated in GE's Revised CMS (see Table 6-1)) in both the shallow and deep portions of Woods Pond. Excavation in the deep part of Woods Pond may be necessary to avoid the loss of flood storage capacity in the Woods Pond area. With the additional volume of excavation needed to avoid the loss of flood storage capacity, then, the volume difference between EPA's remedy and GE's inferred remedy could be as small as 185,000 CY, a significantly smaller difference than portrayed by GE. But even if GE's figures were correct, EPA's analysis would not change for all the reasons set forth herein. GE's position in these comments was not included in the series of remedial options evaluated by GE in its Revised CMS, so GE's position has not been fully evaluated by EPA against the remedy selection criteria. Significantly, GE, in its Revised CMS, opined that the alternative known as SED 10 best met the permit criteria. For Woods Pond, SED 10 required the removal of 169,000 CY in the top 2.5 feet of sediment without the placement of an Engineered Cap.

In addition, EPA does not disagree with GE's assertion that sediment removal sufficient to place a properly designed, constructed, operated and maintained Engineered Cap in perpetuity might achieve the same reductions as the selected Woods Pond remedy for certain risks. However, this conclusion assumes that such a cap will be properly maintained and operated in perpetuity to resist floods and ice-scour and that there is no breach or failure of Woods Pond Dam. In making these arguments, GE discounts the benefits of more effective source control through the permanent reduction in the bioavailability of PCBs to human and ecological receptors through removal. Here the more extensive source control – removal – leads to the twin benefits of risk reduction, including reduction of the risk of downstream transport, and increased long-term effectiveness. In Woods Pond, there is a significant benefit to removal of the large amount of PCBs in the event of breach or failure of Woods Pond Dam. After all, even with the best intentions and significant resources, it is impossible to guarantee that there will never be a dam breach or failure in perpetuity, even if GE remains the dam owner in perpetuity, including unknowns or uncertainties associated with potential climate change. One relevant example is the release of PCBs caused by the 1992 partial breach of the Rising Pond Dam, described further in Section III.C.5 of this Response to Comments, which occurred even after GE worked in cooperation with Rising Paper Company to develop sufficient data on sediment quality to evaluate management options for the dam. In contrast, removing sediment from behind the dam and disposing of it in a secure landfill guarantees that such sediment cannot be reintroduced into the Housatonic environment and transported downstream in the event of cap or dam breach or failure. GE simply fails to account for the benefits provided by the finality in risk reductions and source control related to actually removing 285,000-340,000 CY of PCB-contaminated material from the River.

At issue here is the opportunity to permanently remove the risks posed by approximately 285,000-340,000 cubic yards (depending upon EPA's or GE's respective calculations as described above in this response) of PCB-contaminated sediment. Woods Pond sediment contains approximately 25% of the mass of PCBs present in the Housatonic River (GE's RCRA Facility Investigation Report for the Rest of River, 2003, Table 4-11), and does not provide priority habitat for state-listed species. (Commonwealth of Massachusetts' 2014 Comments on the Draft Permit Modification). Accordingly, EPA's remedy for Woods Pond represents the opportunity to remove a significant mass of PCBs from the river system, thereby reducing the potential for downstream transport of PCBs, and significantly reducing the bioavailability and exposure of PCBs to human and ecological receptors (including but not limited to the consumption of contaminated fish) with minimal short- or long-term impacts to the environment from the remediation itself. EPA's remedy selection for Woods Pond is supported by the Administrative Record, and falls within EPA's expertise in evaluating all the relevant factors in selecting a remedy for the Rest of River.

Additionally, EPA disagrees with GE's discounting of the benefits provided by a deeply dredged Woods Pond in its capacity to serve as a PCB trapping mechanism to prevent PCB transport downstream. GE acknowledges that the proposed deepening increases the PCB trapping efficiency compared to remedies that do not deepen the Pond. Accordingly, at issue is the significance of the increased trapping. GE's own modeling shows that as a result of the increase in trapping efficiency, the incremental reduction in downstream transport, or flux, over Woods Pond is 0.1 kg/year and over Rising Pond is 0.2 kg/yr. These are far more than "modest" benefits; these reductions in flux are significant relative to the Downstream Transport

Performance Standards. If these trapping-related reductions were not achieved it would decrease the likelihood of GE achieving the Downstream Transport Performance Standard. Furthermore, Woods Pond has historically been an effective trap as demonstrated by the significant amount of PCB mass that has been retained in the pond. Increased trapping combined with future periodic removal of PCB-contaminated sediment from the pond, as required by the Final Permit Modification, will logically reduce downstream flux of PCBs in two ways. Removing future sediment accumulation will eliminate the opportunity for those PCBs to dissolve off the solids and into the water column, and will prevent the PCBs attached to the solids from migrating downstream due to erosional forces and/or dam breaches or failure. Accordingly, the benefits of additional trapping efficiencies favor the selected remedy.

EPA disagrees with GE's unsupported contention that the actual purpose of the remedy for Woods Pond is to improve Woods Pond as a recreational fishery. Pursuant to the process set forth in the Decree, EPA considered all public comment on the proposal, including those from GE, Massachusetts, and Connecticut. As stated in its October 27, 2014 letter expressing support for the Proposed Cleanup Plan, the Commonwealth strongly favors the proposed remediation approach to Woods Pond for the reasons identified by EPA. Following that, while the Commonwealth noted, after summarizing the remediation objectives and benefits of the proposal, that it will also have the *secondary* benefit of enhancing the public's safe, recreational use of the Pond, the latter was not the basis for the Commonwealth's support or a factor in EPA's decision. As discussed in the comments above and in EPA's Comparative Analysis, not only will the selected remedy significantly reduce human health risks from fish (and other biota), but also it will remove a significant mass of PCBs, reducing the potential for release in the case of dam breach or dam failure, and increase the PCB trapping efficiency of Woods Pond, thus assisting in reducing downstream transport of PCBs. (See Comparative Analysis at pages 3 and 4.)

In addition, GE exaggerates the downsides of the EPA proposal for Woods Pond, by arguing that other remedies would be almost as good and cost far less. EPA believes that GE's cost discrepancies are inflated. While GE infers a cost difference of approximately $130 million, EPA believes a more accurate cost difference is likely to be approximately $80 million. Regardless of the exact figures, EPA considered the magnitude of any additional cost when evaluating all the relevant factors for remedy selection.[12] Similarly, GE cites additional truck traffic and greater greenhouse gas (GHG) emissions for deeper removal of PCB contamination from Woods Pond as a negative issue due, in part, to its impact on the community. In determining the best suited remedy for Rest of River, EPA evaluated nine Permit criteria; cost and short-term impacts were among, but were not the only criteria considered. EPA also evaluated the differences in criteria such as the general standard of Control of Sources of Releases, and the decision factor of long-term effectiveness, both of which favored a remedy with significant increase in trapping efficiency and source removal.

[12] Even if GE's cost figures and assumptions are accurate, EPA's proposal for Woods Pond would remain the preferred alternative based upon a full evaluation of all the relevant factors, including the objective of eliminating risks related to source control and downstream transport.

Finally, the remedy for Woods Pond cannot be considered in isolation from the other components of the Rest of River remedy selection. In evaluating all the relevant factors for all the relevant components of the Rest of River, including Floodplains, Vernal Pools, sediment and bank remediation for individual reaches, EPA considered the totality of the proposal from a holistic perspective. For example, EPA's initial proposal before the National Remedy Review Board (NRRB) included considerably more removal of contaminated PCBs from other portions of the River and floodplains, resulting in the total removal of approximately 1,080,000 cubic yards of contaminated sediment or soil with the approximate cost of $677 million. (EPA Region 1 June 2011 submittal to the NRRB). In contrast, the final remedy is somewhat less costly overall, and while it includes far less removal from other portions of the River and floodplains, especially Reach 5B, where the reduction is 88,000 CY, it does require the removal of additional PCB contaminated sediment from Woods Pond. The net change represented by the Final Permit Modification involves removal of approximately 90,000 CY less material than originally recommended to the NRRB and an estimated savings of over $50 million.

Overall, as the Comparative Analysis demonstrates, EPA considered all the relevant factors, and for Woods Pond, selected an alternative best suited to addressing these criteria based on all the information in the Administrative Record. EPA's decision to remove a significant portion of PCB contaminated sediment from Woods Pond and control the sources of PCB releases is a sound decision.

Comment 27: *National Remedy Review Board Recommendations* of October '11 (NRRB), for the CMS noted that model predictions for trapping efficiency may not have been consistent with historical data for the site and suggested that it be considered. As a result, a *US Army Corps of Engineers (USACE) Analysis* reported in Jan '12 of potential trapping efficiencies of up to 60% for PCB contaminated sediment if various alternatives were considered. The alternatives were omitted in the Regional Response to NRRB Recommendations of Aug '12. In addition to raising the trapping efficiency of the pond, the USACE analysis recommended work in Reach 5 be delayed until work on the trapping efficiency of Woods Pond was completed to minimize transport of PCBs downstream during corrective work. This recommendation was also omitted from the Regional Response of Aug '12.

EPA Response 27: EPA Region I considered all of the comments submitted by the NRRB in making its proposal and selecting the final remedy. In fact, part of the rationale for the selected remedy is the increased trapping efficiency resulting from the deepening of Woods Pond. However, to achieve even greater trapping efficiencies, the Corps of Engineers estimated that it would require installation of weirs, levees, and other alterations to the structure of Woods Pond. Such structures would have changed the natural course of the River flow into the Pond. Instead, EPA elected to pursue other options included in the Corps' January 2012 analysis in crafting the remedy, including the deeper excavation to enhance trapping. In addition, the Final Permit Modification allows for the remediation of Woods Pond to begin concurrent with the remediation of upstream reaches (e.g., Reach 5 and Backwaters). This will allow for the increased trapping efficiency generated by the deepening of Woods Pond to mitigate any releases resulting from the upstream remediation.

Comment 28: I had fundamental differences with the Charrette Presentation made at the Mini Workshop Two, in Lenox on April 6, 2011 and noted this in an email of April 28, 2011 to Jim

only require negotiation with the project proponent, it is still unauthorized, since EPA does not have the authority to attempt to govern GE's discussions with third parties on claims for payment.

EPA Response 624: Based in part on this comment, EPA revised the Reach 7 Performance Standards in the Final Permit Modification to clarify GE's obligations. First, Section II.B.2.f.(1)(a) through (d) of the Final Permit Modification specifies the initial remediation requirements for the Reach 7 Impoundments assuming the dams remain in place. Section II.B.2.f.(1)(e) of the Final Permit Modification allows that GE, in lieu of implementing the remedy required by Section II.B.2.f.(1)(a) through (d), *may* propose to EPA for review and approval that GE coordinate with any entity the response actions necessary to address the PCB contamination behind the Impoundments. Therefore, there is no absolute requirement for GE to conduct negotiations with third parties. In addition, there is no absolute requirement that GE perform inspection, monitoring and maintenance requirements on dams they do not own. GE can elect, as part of the Performance Standards for the Reach 7 Impoundments, to remove the PCB-contaminated sediments in the Impoundments, thus eliminating the inspection, monitoring and maintenance requirements.

However, depending on the approach that GE implements, if risks remain, then the inspection, monitoring and maintenance requirements are required to ensure protectiveness. Similarly, in response to GE's concern that the Draft Permit Modification required GE to make direct payments to third parties, the Final Permit Modification was changed to require GE to implement response actions related to inspecting, monitoring and maintaining the Reach 7 dams that remain in place, as opposed to mandating cash payments. These requirements are in Section II.B.2.j. of the Final Permit Modification. They address risks posed by PCB contamination and represent a rational approach to ensuring protectiveness. Also see Section III.G of this Response to Comments for Legally Permissible Work or Projects.

Comment 636: GE asserts the following: With regard to the potential for failure or removal of the Reach 7 dams, it is important to recognize that these dams are subject to detailed regulatory requirements and oversight, either by the Federal Energy Regulatory Commission (FERC) under the FERC regulations (18 CFR Subchapter B) or by the Massachusetts Office of Dam Safety under the Massachusetts Dam safety Standards (302 CMR 10.00). These regulations require maintenance and inspection of the dams, as appropriate, as well as review and approval by the relevant governmental authority of any plans for dam modification or removal. In addition, any modification or removal of one of these dams would require review and approval by other agencies, such as a water quality certification from MassDEP, a dredge and fill permit from the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act, etc. Thus, dam failure would be addressed by the regulatory dam maintenance requirements, and potential dam removal would be addressed through the regulatory requirements that would apply to such a project. Such possibilities, therefore, do not provide an adequate basis for selecting the proposed remedy over the less intrusive alternatives.

EPA Response 636: The Final Permit Modification presents no significant interference or conflict with existing regulatory requirements on dam owners. GE's responsibilities under the Final Permit Modification are in connection with minimizing releases of the PCBs that are located behind the dams. As discussed above, the Final Permit Modification was changed to

require GE to implement additional response actions related to inspecting, monitoring and maintaining the Reach 7 dams that remain in place, and to conduct certain response actions should dams be removed in the future. These requirements are in Section II.B.2.j. of the Final Permit Modification and represent a rational approach to ensuring protectiveness. These requirements are not meant to relieve the dam owner of its statutory obligations. If GE believes that the dam owner is currently performing inspections of the dam in a frequency and a manner that will ensure minimization of releases of PCBs located behind the dam, and if GE receives approval from EPA that the activities by the dam owner are adequate to minimize releases of PCBs located behind the dams, then GE does not have to perform duplicative inspection, maintenance and monitoring activities at that dam. See Final Permit Section II.B.2.j.(2)(b). EPA also modified the Final Permit Modification based in part on this comment, to clarify that if GE uses best efforts to fulfill these obligations but cannot fulfill them, GE may submit to EPA for review and approval a plan that includes, without limitation, the reasons why GE cannot fulfill the obligations, any proposed actions GE will take to remediate the PCB contamination behind the dams, any further actions to be taken to obtain agreement from the dam owner, and whether the Engineered Caps will remain effective without GE having fulfilled its obligations regarding dam inspection, monitoring and maintenance.

If, however, the activities performed by the dam owner are not sufficient to minimize releases of PCBs behind the dams, it is appropriate to require GE to maintain responsibility to ensure that the release of PCBs is minimized. It is EPA's responsibility to protect human health and the environment. EPA does not and cannot rely solely upon the regulatory dam requirements to ensure protectiveness of the remedy.

These requirements are clearly necessary to protect human health and the environment. First, EPA's concern toward minimizing releases of PCBs from dams is not theoretical, but based in recent history on this same stretch of the Housatonic. In 1992, releases of contaminated sediment occurred when water behind the Rising Pond Dam was released to facilitate repairs to the dam. According to the Connecticut Department of Environmental Protection's Bureau of Water Management, no apparent measures were employed to contain PCB contaminated sediment in Rising Pond during this work.[14] Following the dam repair, benthic and fish tissue samples collected and analyzed for PCBs downstream of Rising Pond showed an increase in PCB concentrations.[15] Additionally, per Connecticut DEP, GE informed CT DEP that March 1993 data collected at a downstream location during high flow events in April, May and June 1992 exhibited atypically high PCB levels.[16]

The protectiveness of the Engineered Cap called for in the Final Permit is dependent on ensuring the integrity of the dams to minimize PCB releases. Were there to be a significant dam breach or

[14] Connecticut Bureau of Water Management Interdepartmental Message from Charles Fredette (Supervising Sanitary Engineer) to Michael Harder (Director) Regarding Summary of 1992 CT DEP Housatonic PCB Monitoring Re: Rising Dam, Great Barrington, MA. May 18, 1993. ("Fredette Memorandum").

[15] Connecticut Post, "Higher level of PCBs in Housatonic feared," May 23, 1993.

[16] Fredette Memorandum.

failure, the Engineered Cap would also fail to be effective in isolating the PCBs. It is not logical to construct Engineered Caps behind a dam and then not ensure that the dams are properly inspected, monitored and maintained. In effect, the dams are part of the Engineered Cap. Thus, if GE opts to rely on a dam to isolate and contain PCB-contaminated sediment, instead of removing such sediment, then, to ensure a protective remedy, GE must assume responsibility for the minimization of releases from PCB-contaminated sediment impounded by dams.

If EPA had required that GE remediate all PCB-contaminated sediment behind the dams, then the emphasis on protecting Engineered Caps and controlling releases from the dams would not be as important. Moreover, GE has the flexibility in the Final Permit Modification to propose to excavate more sediment as a way of eliminating the need for an Engineered Cap behind a dam. If GE does not choose that approach, GE must construct the Engineered Cap to maintain the protectiveness of the remedy.

With regard to the dam removal requirement, the requirement was modified such that the Final Permit Modification limits GE's obligations to response actions related to Legally Permissible Future Project or Work, including dam removal (as opposed to mandatory cash payments to third parties), sufficient to allow for such Project or Work to be conducted in a manner that maintains Performance Standards and/or maintains the effectiveness of the Rest of River Remedial Action. As described in Section II.B.2.j of the Final Permit Modification, GE may reach an agreement with another party and seek approval from EPA for another party to implement some or all of these obligations.

EPA responses to GE's proposal for potential less intrusive remedies are discussed in Response 538, 625.

Comments 538, 625: GE asserts the following: EPA has attempted to justify its proposed remedy for the Reach 7 impoundments on the grounds that it will "result in achieving cleanup levels in fish tissue, and reducing direct contact risks, ecological risks, and downstream transport of contaminants." None of those grounds provides an adequate justification for the proposed remedy.

Projections using EPA's model indicate that EPA's proposed remedy for the Reach 7 impoundments cannot be justified on the basis of reducing fish PCB concentrations in those impoundments or downstream. To illustrate this point, we have compared the model-predicted fish fillet PCB concentrations resulting from the Region's proposed remedy at the end of the model projection period with those resulting from an alternative that assumes monitored natural recovery (MNR) in those impoundments and another alternative involving implementation of thin-layer capping (TLC) (i.e., placement of a layer of 6 inches of clean material on top of the existing sediments, with no removal) in those impoundments, assuming comparable remediation in other reaches. The following table presents the predicted fish fillet concentrations in the Reach 7 impoundments themselves at the end of the model projection period (i.e., 52 years) for these alternatives (compared to current conditions):

Scenario	Est. Fish Fillet Concentration (in mg/kg)			
	Columbia Mill (Reach 7B)	**Eagle Mill (Reach 7C)**	**Willow Mill (Reach 7E)**	**Glendale (Reach 7G)**
Current conditions (baseline)	11	13.0	9.1	6.4
MNR in Reach 7 impoundments	2.0	1.6	0.9	1.3
Thin-layer capping in Reach 7 impoundments	0.8	0.7	0.7	0.6
Region's removal/capping proposal for Reach 7 impoundments	0.6	0.7	0.8	0.5

As indicated by this table [and GE Attachment F, Figure F-2 Series], the model projections show only small incremental reductions in fish PCB concentrations in the Reach 7 impoundments from the proposed Reach 7 remedy compared to MNR in the impoundments, and even smaller or no incremental reductions compared to use of thin-layer capping in the impoundments. In fact, both of these alternative remedies are predicted to achieve or approach the EPA-approved CTE fish consumption IMPG of 1.5 mg/kg based on a non-cancer HI of 1 for adults in these impoundments.

EPA Response 538, 625: EPA disagrees that MNR or TLC are appropriate for the Reach 7 Impoundments. Neither TLC nor MNR would be a suitable remedy for the Reach 7 Impoundments.

MNR for Reach 7 Impoundments: With respect to MNR, GE states that the model projections show only small incremental reductions in fish PCB concentrations in the Reach 7 Impoundments compared to MNR. GE then argues that MNR would achieve similar reductions in PCB concentrations in the Impoundments and downstream, as well as an equivalent reduction in downstream PCB transport.

EPA does not agree that the results of the modeling carried out by GE indicate "only small incremental reductions" when the proposed alternative is compared with MNR. On the contrary, GE's modeling results (fish fillet PCB concentrations at the end of the 52-yr modeling period) clearly indicate the markedly lower fish tissue concentrations achieved by the proposed remedy as opposed to an MNR-only approach. At the Columbia Mill Impoundment, fish tissue concentrations achieved by the proposed remedy are projected by the model to be 0.6 mg/kg while MNR achieves a concentration of 2.0 mg/kg, over three times higher. In the Eagle Mill and Glendale Impoundments, the concentrations projected to be achieved through MNR are over double those achieved by the proposed remedy (1.6 mg/kg vs. 0.7 mg/kg and 1.3 mg/kg vs. 0.5 mg/kg respectively). Only in the Willow Mill Impoundment do these two alternatives achieve similar concentrations, but even there fish tissue concentration projected with MNR is still over 10% higher than the concentration achieved by the proposed remedy.

These differences matter. The current PCB concentrations in the edible tissues (fillet) of fish inhabiting these Impoundments are significantly elevated and the concentrations achieved by MNR in 52 years would be cause for concern if they were encountered in other water bodies. Not only are the concentrations achieved by MNR projected to be above or close to the Short-

Term Biota Performance Standard of 1.5 mg/kg in all but one Impoundment, but more importantly, the Performance Standard makes it clear that the goal is to achieve a PCB concentration of 0.064 mg/kg in Massachusetts, or at a minimum, monitor progress towards that goal. The remediation required in EPA's Final Permit Modification achieves significantly more progress towards this goal. Furthermore, the added reduction can be very significant for purposes of whether a consumption advisory needs to be maintained by the Massachusetts Department of Public Health, which is currently set at 1 mg/kg. In addition, as shown in GE Attachment F, Figure F-2 Series, EPA's selected remedy achieves several more IMPGs compared to MNR in the Impoundments. Lastly, the selected remedy achieves concentrations below 1 mg/kg in all four of the Reach 7 Impoundments while MNR barely achieves this level in only a single Impoundment (Willow Mill). These are not "small incremental reductions." They have important implications for public health as they significantly reduce the health risk associated with the consumption of fish in these reaches, as well risk to ecological receptors.

TLC for Reach 7 Impoundments: With respect to TLC, GE continues to claim that TLC is equivalent to the protectiveness of Engineered Capping. In fact, these are two very different remedies. (Engineered Caps are discussed in Section III.C.7 below.) Engineered Capping reduces risks posed by contaminants by physically isolating the contaminated sediments from human or animal exposure, by chemically isolating the contaminated sediments from being transported up into the water column, and by stabilizing contaminated sediment to protect it from erosion, particularly in high-flow situations. See Section 5.1 of EPA's *Contaminated Sediment Remediation Guidance* (December 2005). On the other hand, TLC is not designed to provide long-term isolation of contaminants, but rather is a form of Enhanced Monitored Natural Recovery ("Enhanced MNR") in which a thin layer of clean material mixes with or dilutes the existing contaminated sediments to help the natural sedimentation processes. EPA's *Contaminated Sediment Remediation Guidance* at Section 4.5, states, "Thin-layer placement [capping] normally accelerates natural recovery by adding a layer of clean sediment over contaminated sediment. The acceleration can occur through several processes, including increased dilution through bioturbation of clean sediment mixed with underlying contaminants. Thin-layer placement is typically different than the isolation layer caps … because it is not designed to provide long-term isolation of contaminants from benthic organisms."

In response to EPA's comments on GE's 2008 CMS, GE appears to acknowledge this distinction. In its October 2010 Revised CMS, GE defines TLC as the "Placement of a thin-layer (e.g., 3 to 6 inches) of clean material over PCB containing sediment to provide an immediate reduction of PCB concentrations in the biologically active zone and to accelerate natural recovery." GE's Revised CMS, at 1-18. However, despite this acknowledgement, GE, in its comments, continues to claim, based solely on model runs, that TLC is equivalent to Engineered Capping.

In EPA's analysis of alternatives and more recently in its review of these comments, EPA considered the use of TLC in the Reach 7 Impoundments. However, EPA continues to have serious reservations about the overall suitability of TLC under the conditions in these

Thus the effectiveness of thin-layer capping is overstated by GE and the reference in the table to achieving fish tissue concentrations of 0.6 mg/kg using thin-layer capping is not justified. See Section III.B.4 of this Response to Comments for a more thorough response on the effectiveness of thin-layer capping.

GE also proposes alternative (c), sediment removal to a depth of 6 inches in the shallow portions of Rising Pond (approximately 15,300CY) and placement of a 6-inch engineered cap over the entire Pond, assuming the same remediation in the upstream reaches with the exception of assuming MNR in the Reach 7 Impoundments. Note that this alternative was not evaluated by GE in its Revised CMS. However, EPA concurs that the alternative of partial dredging and installation of an Engineered Cap would likely perform similarly (with regard to model predictions of fish tissue concentrations and downstream flux) to EPA's proposed remedy of dredging sufficient sediment to place an Engineered Cap back to existing grade. This is because they are represented in the model as essentially the same remedy, with the only differences being that (1) GE wants to specify an Engineered Cap thickness of six inches in the Final Permit Modification, as opposed to determining the appropriate cap thickness in accordance with the Engineered Cap Performance Standards during design,[20] and (2) GE proposes no removal of sediment in deeper areas of the Pond prior to capping, which would decrease flood storage capacity.

EPA disagrees with both of these concepts. First, with regard to specifying Engineered Cap thicknesses as part of the Final Permit Modification, it is inadvisable as discussed in Section III.C.7 of this Response to Comments. Second, placing the Engineered Cap on top of the existing sediment bed could change the hydrodynamics of the system and would decrease flood storage capacity.

Comment 641: GE asserts the following: EPA claims that its proposed remedy is needed to reduce ecological risks and downstream transport likewise provide no risk-based justification for its proposal. EPA has made no showing that the smaller alternative remedies would result in any incremental increase in ecological risks in Rising Pond compared to the proposed removal/capping remedy. Further, since the smaller removal alternative would include capping the entire Pond, it would reduce exposure to ecological receptors to the same extent as the proposed remedy. With respect to downstream transport, the model runs do not show any incremental decrease in the PCB flux at Rising Pond Dam from the proposed remedy compared to the thin-layer capping or the partial removal/full capping alternatives. Assuming the same upstream remediation (as described above), the proposed remedy is predicted to result in an annual PCB flux past Rising Pond Dam of 2.7 kg/year, while both of the smaller alternatives are predicted to result in an annual PCB flux past that dam of 2.6 kg/year.

EPA Response 641: For purposes of this response, it is assumed that the "smaller alternative remedies" referred to by GE are 1. MNR; 2. Thin-layer capping; and 3. sediment removal to a depth of 6 inches in the shallow portions of Rising Pond (approximately 15,300 CY) and

[20] In estimating volumes and cost for its remedy, EPA estimated cap thicknesses, and associated sediment removal depths, of 1 foot low shear stress areas and 1.5 feet in high shear stress areas. (Attachment 6 of Comparative Analysis). However, as required by the Final Permit Modification, actual cap thicknesses will be determined during design. These were the assumptions used in GE's Revised CMS as well.

placement of a 6-inch engineered cap over the entire Pond. With respect to MNR, the remedy described in the Final Permit Modification will significantly reduce the concentrations and bioavailability of the PCBs in Rising Pond sediment beyond that associated with MNR. These reductions will, in turn, reduce risks to ecological receptors (i.e., benthic invertebrates, amphibians, trout, and piscivorous birds and mammals). Secondly, the performance of the thin-layer capping alternative is uncertain (see below; see also EPA's responses regarding thin-layer capping in III.C.4). For the alternative of six inches of sediment removal followed by the placement of a six-inch Engineered Cap, as noted in Response 640 and as further discussed in Section III.C.7 of this Response to Comments, specifying cap thicknesses at this stage, prior to performing remedial design activities, is not advisable.

GE also made comparisons with regard to downstream transport, or flux for TLC. With regard to the flux comparison, one would expect similar flux estimates because, as discussed above, GE inappropriately modeled thin-layer capping as though it were Engineered Capping. For the "smaller" Engineered Capping remedy, the modeling would be similar because the model was parametrized to assume all Engineered Caps function the same, regardless of actual performance. EPA's evaluation of downstream transport estimates under different alternatives is presented in Attachment 7 of the Comparative Analysis. Additionally, the estimates specified by GE in its comment are based on an inaccurate assumption of MNR in Reach 7 Impoundments, which has not been a component of EPA's proposed or final remedy for Rising Pond. Finally, note that GE did not provide a flux estimate for MNR, so no comparison is made to MNR and EPA's selected remedy.

Comment 642: GE asserts the following: As for Woods Pond Dam and the Reach 7 dams, dam failure is not a realistic risk at Rising Pond Dam because GE owns that dam and conducts the necessary monitoring, maintenance, and repair to prevent dam failure, particularly in light of the fact that the Consent Decree's covenants from the federal and state governments for natural resource damage do not apply in the case of a failure of Rising Pond Dam (CD ¶ 176). Hence, the theoretical potential for dam failure does not provide a justifiable basis for the proposed Rising Pond remedy.

EPA Response 642: GE downplays the potential for dam breach or failure due to its current ownership of Rising Pond.

GE was clearly concerned with a dam breach or failure at Rising Pond as early as 1989 - 91, when GE worked in cooperation with Rising Paper Company to develop sufficient data on sediment quality to determine the impacts on management options. Letter from David R. Baier (HARZA Engineering Company) to Ross Clark (GE), April 12, 1989, Re: Rising Pond Dam; Assessment of Planned Breaching of Dam. Letter (with attached report) from Mary B. Hall and William H. Hover (GZA GeoEnvironmental, Inc.) to Curt Reese (Rising Paper Company), May 30, 1991, Re: Sediment Sampling and Analysis Data Report; Rising Paper Company; Great Barrington, Massachusetts. In addition, shortly after those efforts by GE, as outlined in more detail in Response 626 above in this Section III.C.3., Rising Pond Dam had a significant release of PCBs downstream into Connecticut. In 1992, as outlined in more detail in Response 626 above in this Section III.C.3., releases of contaminated sediment occurred when water behind the Rising Pond Dam was released to facilitate repairs to the dam, and subsequent benthic and fish tissue sampling downstream of Rising Pond Dam showed an increase in PCB contamination.

This event demonstrates that dam breach or failure is a serious risk that EPA was correct to consider. While the dam was not under GE ownership at the time of the breach, it was subject to management under the terms of the Massachusetts dam regulations which GE has claimed prevent such an event. In fact, there have been subsequent issues regarding the integrity of the dam since GE became the owner. In 2003, GE identified issues with the gate assembly in the dam, however did not perform repairs until 2007 (Letter from Kevin G. Mooney (GE) to Dale C. Young (Commonwealth of Massachusetts Executive Office of Environmental Affairs) and Dean Tagliaferro (USEPA), December 7, 2006, Re: Repairs to Rising Pond Dam, Dam ID No. MA 00250, Housatonic River, Great Barrington, Massachusetts). In August 2008, a sinkhole was observed behind the right training wall on the downstream embankment at the top of the riprap toe. The sinkhole was monitored regularly until June 2009, when it was reported that the size of the sinkhole had increased substantially. At the end of June, a contractor excavated the sinkhole so that it could be evaluated by GE and GZA. The groundwater that collected in the bottom of the test pit was observed to be "surging," or alternately flowing towards then away from, the base of the training wall. No indications of active soil movement (e.g., siltation at the toe of slope or in the river) were observed. However, soil similar to the granular embankment fill was observed within the rip rap. This could indicate migration of the embankment fill into the riprap. It was not possible to determine if the migration occurred recently or during original construction. As an interim measure between the test pit excavation and performance of further studies, the excavation was generally backfilled with compacted granular fill and faced with a surficial layer of crushed stone. GZA, GE's contractor concluded, "While there are no known significant spillway or embankment stability issues beyond the ones reported above, it should be noted that dam stability depends on constantly changing internal and external conditions. It should not be assumed that the present condition of the dam will continue to exist in the future." (Right Embankment Sinkhole Investigations and Test Pit Explorations, prepared by GZA for GE, 2009)

Given the catastrophic and unexpected infrastructure failures observed during Hurricanes Katrina and Sandy as well as other concerns regarding climate change, dam failure or breach is not the unrealistic concern that GE claims.

Comments 643, 644: GE asserts the following: In the absence of any appreciable incremental benefits, EPA's proposed remedy for Rising Pond would have greater adverse impacts and costs than the smaller alternatives outlined in Comment 640. For example, GE has estimated that the proposed remedy would require a total of approximately 10,000-11,000 truck trips to import the necessary remediation material, transport the excavated sediments, and dispose of the staging/access material. Thin-layer capping would require only about 3,100 truck trips and the shallow partial removal/full capping alternative would require only 5,000-5,500 truck trips. Additionally, the proposed Rising Pond remedy is estimated to result in 9,600 tonnes of GHG emissions, compared to 1,400 tonnes and 8,800 tones for the thin-layer capping and smaller removal alternatives, respectively.

EPA's proposed Rising Pond remedy with off-site disposal is estimated to cost $30-31 million (depending on whether rail or truck transport is used), whereas thin-layer capping in Rising Pond is estimated to cost $10 million and the partial removal/full capping alternative is estimated to cost approximately $17 million with off-site disposal. The latter alternatives would be protective of human health and the environment and would be virtually as effective as the proposed remedy. In addition, they would also attain ARARs to at least a comparable extent as the

proposed remedy. Thus, the substantial incremental costs of the proposed remedy for Rising Pond (at least $13 million higher than the alternatives) are not proportional to or justified by the incremental benefits (if any).

EPA Response 643, 644: EPA acknowledges that short-term impacts of the proposed remedy (e.g., greenhouse gas emissions, truck traffic) and cost are higher for the remedy in the Final Permit Modification than other, less active alternatives. At the same time, those adverse effects and costs are even higher for other alternatives that EPA has analyzed and not proposed. With respect to ARARs, GE's proposed smaller remedies are not likely to meet the ARARs related to flood storage capacity and would result in potential increase in flooding. EPA evaluated these factors, and other relevant Permit criteria in proposing a remedy to address the risks of PCB contamination in Rising Pond. EPA's proposal includes significant reduction in PCB risks in Rising Pond and in the downstream transport of PCBs, in combination with flexibility for GE to propose an alternative approach to remediation, and without the drawbacks associated with locking in cap thicknesses prior to a design evaluation, and lack of accounting for flood storage capacity and potential increases in water surface elevation/flooding.

Comment 645: GE asserts the following: For the reasons discussed in Comments 640 – 644, adoption of EPA's proposed remedy for Rising Pond would be arbitrary, capricious, and otherwise unlawful.

EPA Response 645: EPA disagrees, as is specified in detail in Responses 640-644 above. Based on its evaluation of the Permit criteria, EPA continues to believe that the remedy in the Final Permit Modification is the best suited remedy based on an evaluation of all of the remedy selection criteria.

Comment 144: We question why Rising Pond is not being deepened in a manner similar to Woods pond. If the proposed cleanup activities at Woods pond will result in an improved trapping efficiency of 30%, would not a similar cleanup at Rising pond result in a greater solids trapping efficiency?

EPA Response 144: The increased solids trapping efficiency resulting from deepening Woods Pond is influenced by changes in circulation patterns within the pond. The pond entrance channels and Woods Pond Dam are separated by a short distance, whereas Rising Pond has a longer distance between the entrance channel and the dam. Under existing conditions, water entering Woods Pond during storms moves along a short path to the dam and does not fully circulate through the pond. Although storm events tend to deliver larger sediment loads, hydrodynamic short-circuiting during periods of high sediment delivery causes much of the incoming sediment to pass through the pond. The deepening of Woods Pond increases the surface area available for particle settling and reduces the short-circuiting effect. As described in Appendix F of the NRRB SIP, "the trapping efficiency of a waterbody depends on how transported solids (and associated contaminants) are removed from the water column by settling due to gravity (sedimentation)." Reducing the short-circuiting of Woods Pond by increasing the depth has the effect of increasing the effective surface area over which the water flows for settling to occur and therefore increases the trapping efficiency. The Rising Pond Impoundment is a run-of-the river system and therefore there is not an opportunity to increase the surface area available for particle settling in the same manner as in Woods Pond.

EPA evaluated 9 potential remediation alternatives in selecting the remedy for Rising Pond as described in Table 1 of the Statement of Basis. Remediation methods included no action, MNR, thin-layer capping, removal of all sediment to 1 mg/kg, removal and the installation of an Engineered Cap, and a combination of these methods. EPA believes that as discussed in the Statement of Basis and Comparative Analysis, that the selected remedy best satisfies the remedy selection criteria. Note, that in response to other comments, the remedy in the Draft Permit Modification was slightly modified in the Final Permit Modification to require GE to conduct pre-and post-capping bathymetry surveys and to require GE to remove contaminated sediment that accumulates on the cap while ensuring the integrity of the Engineered Cap.

Comment 215: Rising Pond sediments should be excavated to achieve a PCB residual concentration <1.0 ppm PCBs. No capping should be performed in Rising Pond.

EPA Response 215: EPA disagrees that the remedy should be limited to excavation to achieve a PCB residual concentration of 1 mg/kg. Based on its evaluation of the Permit criteria, EPA concluded that both excavation and the placement of an Engineered Cap and the excavation to achieve an average concentration of 1 mg/kg of PCBs were appropriate remedies. Section 2 of the Comparative Analysis. The Final Permit Modification allows for either one of these options to be implemented. Final Permit Modification, Section II.B.2.g.

Comment 458: Section (II)(B)(1)(h) of the Draft Permit Modification which addresses remedial actions within Rising Pond should be amended to include monitoring of accumulated sediments above the cap and provide for EPA to require, as necessary, the removal of such accumulated sediments, similar to the requirements for Woods Pond.

EPA Response 458: See Section II.H.18.b. of the Final Permit Modification. The Final Permit Modification establishes Performance Standards for remediation of Rising Pond sediments. These Performance Standards include the option to conduct sediment excavation and install an Engineered Cap. In part based on this comment, the Final Permit Modification has been revised to require GE to submit a plan to inspect and monitor for the accumulation of contaminated sediment on top of the Rising Pond Engineered Cap, if installed. The Final Permit Modification was also revised to require that if an Engineered Cap is installed in Rising Pond, if EPA determines that significant concentrations and depths of PCB-contaminated sediment have accumulated, GE will remove such accumulated sediment while ensuring the integrity of the Engineered Cap, where present. See Final Permit Modification, Section II.B.2.g.(1)(f).

III.C.6 Monitored Natural Recovery (MNR) for Flowing Subreaches in Reach 7 and Throughout Reaches 9 – 16, Including Impoundments

Comment 234: In the discussion of cleanup alternatives in the Statement of Basis, better definitions are needed for thin-layer capping, MNR, and EMNR, particularly the last two which have shown minimal reduction in PCB concentrations.

EPA Response 234: Monitored Natural Recovery, or MNR, is well defined and discussed in the administrative record for the site. Page 7 of the Statement of Basis states that "Rather than requiring active measures such as excavation or capping, MNR typically relies on physical, chemical, and biological processes to isolate, destroy, or otherwise reduce exposure to, or

toxicity of, contaminants in sediment and to achieve Performance Standards." The Draft and Final Permit Modifications define MNR as:

> a remedy for contaminated sediment that typically uses ongoing, naturally occurring processes to contain, destroy, or reduce the bioavailability or toxicity of contaminants in sediment, and requires monitoring the natural processes and/or concentration of contaminants in surface water, sediment, or biota to see if recovery is occurring at the expected rate, and the maintenance of institutional controls until the necessary reductions in risk have occurred. Draft Permit Modification, at definition 16; Final Permit Modification, at definition 19.

Furthermore, Chapter 4 of EPA's 2005 *Contaminated Sediment Remediation Guidance for Hazardous Waste Sites" (hereinafter, "2005 Sediment Guidance")*, titled "Monitored Natural Recovery", devotes 13 pages to a thorough discussion of MNR. That discussion includes Section 4.5, "Enhanced Natural Recovery", which discusses Enhanced MNR (EMNR) and thin-layer capping. In this guidance document, EMNR is described as accelerating the recovery process by engineering means, for example by the addition of a thin layer of clean sediment. (2005 *Sediment Guidance* at 4-11). For a further discussion of thin-layer capping, see Section III.C.7 of this Response to Comments.

Comment 191: MNR is specified in the remediation plan for several areas of the river. The Statement of Basis provides no documentation for using MNR, does not give an evaluation of the approach and gives no examples of where MNR has been used effectively with PCBs or other chlorinated organic contaminants in rivers that have characteristics in common with the Housatonic. There are abundant data that demonstrate that MNR does not work for persistent bioaccumulative chlorinated organic chemicals such as PCBs.

Comment 374: Monitored Natural Recovery (MNR) should not be considered a "cleanup" and should not play a major role in any cleanup plan. In the first two miles of the river, the focus was on removal of the contamination and that should be the case for Rest of River as well.

Comment 503: Monitored Natural Recovery (MNR) is a euphemism for "doing nothing." No detailed procedures or costs for the proposed long-term monitoring program associated with MNR have been submitted, leading to a conclusion that nothing will be done.

EPA Response 191, 374, 503: As discussed in Response 234, the Statement of Basis, the Draft and Final Permit Modification and EPA guidance all provide a description of MNR. Page 7 of the Statement of Basis and the EPA Comparative Analysis (page 5) each provided additional detail about MNR in the Flowing Subreaches in Reach 7 and Reaches 9 - 16.

Regarding examples of sites using MNR for PCBs, EPA offers two. The Fox River in Wisconsin is an example of where MNR has been used as a component of a large sediment remedy. The remedy also included dredging and Engineered Capping. MNR was selected for OU2A, OU2B and most of OU2C. For OU2B and 2C, data showed that in all cases, results are lower in PCB concentration, supporting natural recovery conclusion (average percent decrease from baseline of 82%). (Water and Fish: Long-Term Indicators of Sediment Remediation Progress on the Lower Fox River presentation by Denis Roznowski, Jon Manchester, and Steve Lehrke, Foth

Infrastructure & Environment, LLC, The Eighth International Conference on Remediation of Contaminated Sediments, January 12-15, 2015, New Orleans, Louisiana.)

A second example is the Palos Verde Shelf (OU 5 of the Montrose Chemical Corporation Superfund Site in California). Both MNR and in-situ capping were selected as remedy components. A 2013 report concludes that patterns of contaminants of concern (COCs) [PCBs] have dropped significantly, and "…this phenomenon appears to be related to several factors of monitoring natural recovery (MNR) including dechlorination, sediment erosion, and sediment resuspension coupled with desorption of COCs from sediment into seawater." (Revised Final Data Report for the Fall 2009 Sediment Sampling Program, EPA, November 2013).

EPA disagrees that MNR is a euphemism for "doing nothing." Specifically, as characterized in DOD's 2009 technical guidance, "Monitored natural recovery is not a "no-action" approach." (May 2009. *Monitored Natural Recovery at Contaminated Sediment Sites*. ESTCP Project ER-0622, page 1-4). In EPA's *2005 Sediment Guidance*, there are three primary remediation approaches for contaminated sediment that are considered viable - MNR, in-situ capping, and sediment removal (page 3-1), and that a combination of these approaches is often the most promising (page 3-2). The role of MNR as a component of a contaminated sediment remedy is discussed further in EPA's 2014 *Technical Resource Document On Monitored Natural Recovery* (EPA/600/R-14/083) and in detail in DoD's May 2009 *Monitored Natural Recovery at Contaminated Sediment Sites* technical guidance referenced immediately above.

In the Final Permit Modification, EPA has selected MNR for the flowing subreaches in Reach 7 and in all of Reaches 9 through 16, and Enhanced MNR for Reach 5B (with some exceptions for removal of PCB hotspots).

EPA evaluates remedies for sections of water bodies with differing characteristics or uses, and/or differing levels of contamination. In the first two miles of river, EPA evaluated all of the factors including river characteristics, contaminant concentrations and fate, and risk and determined that removal of much of the contaminated sediment followed by placement of an Engineered Cap was the best approach in those reaches, as is the case in some reaches of the Rest of River. In other reaches with differing characteristics, MNR is considered to be the best suited approach when evaluated under the Permit criteria.

EPA believes that MNR is an appropriate remedy for the flowing sections of Reach 7 and Reaches 9 through 16. MNR in these reaches, coupled with source removal and containment in other reaches, is appropriate for several reasons, including but not limited to:

- PCB concentrations in these flowing sections or reaches are low and are diffuse over large areas;
- The sediment is reasonably stable;
- Human health and ecological risks are generally low; and,
- The effects of MNR are exhibited in decreasing trends in fish and benthic invertebrate PCB levels that have been observed in in Reaches 9-16 during the last 25 years (Academy of Natural Sciences of Drexel University, 2013. PCB Concentrations in Fishes from the

Housatonic River, Connecticut, 1984-2012, and in Benthic Insects, 1978-2012. Prepared for General Electric Company) and in the computer simulations of future conditions (Attachment 10 to Comparative Analysis).

The Remedial Action for Rest of River is consistent with EPA's 2005 *Sediment Guidance*, which identifies MNR, in-situ capping, excavation/dredging, and a combination of these actions, as primary methods for consideration during the feasibility/corrective measures study of alternatives. For the Rest of River, MNR is generally occurring due to source control and the physical processes of sedimentation and dilution of upstream sources. Although the rate of decrease in PCB concentrations via MNR is unacceptably slow for the highly elevated PCB concentrations in upstream reaches and in the Reach 7 and 8 Impoundments, the lower concentrations in the flowing subreaches of Reach 7 and in Reaches 9 through 16 make MNR the best suited approach to remediation in these reaches.

EPA required in its April 13, 2007 letter conditionally approving GE's Corrective Measures Study Proposal that GE provide further justification and discussion on MNR as part of the corrective measure alternatives for Reaches 9 through 16. (See General Condition 1 of the April 13, 2007 EPA letter). The various alternatives were subsequently evaluated using the Permit Criteria in GE's Revised CMS and in EPA's Comparative Analysis.

Long-term monitoring in both Massachusetts and Connecticut is a necessary component of MNR to ensure that PCB concentrations in affected media (including surface water, sediment, and biota) are occurring at the expected rate.

As part of MNR, there are long-term monitoring components and the associated costs are included in the estimated cost for the remedial action. The Corrective Measures for MNR requires that the Permittee [GE] perform monitoring pursuant to Sections II.B.4, II.B.6, and II.H of the Final Permit Modification.

As specified in Section II.B.4. of the Final Permit Modification, prior to the commencement of construction activities, PCB data in surface water, sediment, and biota (and other data) will be collected to serve as a baseline for the evaluation of the potential impacts of the Corrective Measures, including MNR. For areas where MNR is the Performance Standard, monitoring shall continue throughout the Remedial Action and O&M.

Cost estimates for MNR components were also evaluated. In GE's Revised CMS, costs were developed for long-term post-remediation Operations, Monitoring and Maintenance (OMM) plan for each sediment alternative (except SED 1, No Action). Potential components of the OMM plan are provided in Table 3-14 in the Revised CMS. The final plans for implementing MNR will be subject to EPA review and approval. Prior to these plans being approved by EPA, it is not possible or necessary to provide detailed procedures or costs for inspections, monitoring, and maintenance. Nonetheless, for the purposes of estimating cost among remedial alternatives, GE provided estimates in Table 8-34 of the Revised CMS and EPA provided cost estimates in Table 6 of the Statement of Basis. The frequency, duration and types of OMM sampling and inspections vary between alternatives; however, the estimates for SED 2/FP 1, which is MNR in all reaches, has an estimated cost of $5,000,000 (in 2010 dollars) over a duration of 100 years (Statement of Basis, Table 6). In addition, EPA, in Attachment 8 of its Comparative Analysis,

included an estimate of overall long-term monitoring costs SED 9/FP 4 MOD of $8.7M. MNR costs are a subset of these long-term monitoring costs.

Comment 196: There is a substantial body of literature on the harmful effects of PCBs on wildlife and humans, providing justification for a more aggressive remediation based on removal and treatment rather than capping and MNR (literature citations attached as an Appendix A to the comment letter).

EPA Response 196: EPA agrees that there is a substantial body of literature on the risks from PCBs to humans and wildlife. EPA evaluated these risks on a reach-by-reach basis at the site in its comprehensive Peer-Reviewed Human Health and Ecological Risk Assessments. EPA considered these risks, along with the other Permit criteria, in selecting the remedial alternative for a given reach. In some reaches, based on the evaluation of the nine criteria, MNR was best suited to meet the criteria. MNR was selected for those reaches where the PCB concentrations were relatively low or not detected, contamination was more widely dispersed throughout the reach, there was evidence of decreasing risks over time, and/or other alternatives did not result in appreciably different outcomes, as well as other factors.

Comment 199: The Plan relies primarily on capping and MNR for remediation, the result of which is that much of the PCB mass will remain in place. This strategy is based on a series of erroneous assumptions, one of which is that the removal methods are not sufficiently sophisticated to prevent extensive physical damage to the river system. This assumption is not at all supported by the current practices as carried out by the private sector and by the US Army Corps of Engineers.

EPA Response 199: Disruption from remediation is only one of many sub-factors that were considered when EPA performed its comparative analysis. While sediment remediation technologies have become more sophisticated in recent years, there still is a degree of disruption that occurs from sediment removal and the associated infrastructure (e.g., temporary roads, staging areas). EPA considered these impacts while minimizing impacts on river dynamics and other ecological processes, and on the state-listed and other wildlife species and the diversity of their habitats that are supported by the existing river ecosystem. EPA believes that MNR in the flowing subreaches of Reach 7 and in Reaches 9-16 is the best suited approach pursuant to the Permit remedy selection criteria, including consideration of reducing risks to humans and ecological receptors and adverse impacts of active remediation.

Comment 216: In the discussion of the flowing sub-reaches in Reach 7 and 9-14 on p. 7 of the Statement of Basis, MNR is described as typically relying on "physical, chemical, and biological processes to isolate, destroy, [emphasis added] or otherwise reduce exposure…" MNR as a remediation method does not destroy any PCBs or other persistent chemicals.

EPA Response 216: EPA is not assuming that MNR will destroy PCBs in the Housatonic River. The Commenter portrays the text in the Statement of Basis out of context. The Statement of Basis states "Rather than requiring active measures such as excavation or capping, MNR typically relies on physical, chemical, and biological processes to isolate, destroy, or otherwise reduce exposure to, or toxicity of, contaminants in sediment and to achieve Performance Standards." (emphasis added). This is the general description of MNR provided in EPA's 2005

Sediment Guidance (page 4-1), not a claim that MNR will destroy PCBs at the Housatonic River. Furthermore, EPA also states in the Statement of Basis, at page 7, that: "For this site, MNR is generally occurring by the physical process of sedimentation and dilution of upstream sources."

Comment 226: The Statement of Basis acknowledges, on p. 10, that periodic reviews will be required to evaluate the effectiveness and adequacy of remedial measures. Because the selected remedy involves a large amount of capping and MNR, these reviews will likely demonstrate the need for additional cleanup in the future.

EPA Response 226: As the commenter states, there will be periodic reviews of the remedy. EPA will evaluate the remedy's effectiveness in these periodic reviews, but does not presume a particular result.

Comment 261: EPA's discussion of Implementability on p. 32 of the Statement of Basis, EPA acknowledges that alternatives that rely to a greater extent on capping, MNR, and ICs are less reliable than those alternatives that rely more on removal of contamination.

EPA Response 261: While it is correct that EPA made that observation in the Statement of Basis, it was with regard to only one of the nine Permit Criteria - Implementability. As discussed above, in selecting the Proposed Alternative, EPA performed a detailed comparative analysis against the criteria required by the Permit. EPA selected the alternative that is best suited to meet the Permit's General Standards in consideration of the Permit's Decision Factors, including a balancing of those factors against one another.

Comment 461: Section II(B)(1)(i) of the permit currently reads "Flowing Subreaches in Reach 7 and Reaches 9 through 16". The title of this section is confusing. Clarification is needed to clearly indicate that the remedial approach applies to all areas of the Housatonic River in Connecticut extending from the state line with Massachusetts and continuing down to and including the dam in Derby, Connecticut, including flowing reaches, impoundments and any other areas of the river.

EPA Response 461: Based in part on this comment, the language in the Final Permit Modification was modified to clarify this where MNR is the remedy. The revised language is as follows - "Flowing Subreaches in Reach 7 and Throughout Reaches 9 through 16, Including Impoundments in Reaches 9 through 16."

Comment 73: EPA does not have enough data to support a decision of no action in Connecticut. Additional sampling needs to be done in Connecticut, and PCB-contaminated sediment behind the dams should be removed.

Comment 502: We are unaware of any recent or adequate sampling of sediment in front of the dams in Connecticut for PCB contamination. There is no easily accessible single source of data from Reaches 9 through 17 that provides information on the sampling that has been done, including results, locations, dates, protocols, and similar information necessary to judge the representativeness and synopticity of the data. There is also no readily available charting of these data. This lack of information makes it difficult to judge the sufficiency of any proposed remediation.

EPA Response 73, 502: EPA did not select a no action alternative in Connecticut; MNR was selected. MNR includes a continued robust monitoring program to ensure that PCB concentrations in affected media (including surface water, sediment, and biota) are occurring at the expected rate. MNR also requires the maintenance of institutional controls until the necessary reductions in risk have occurred.

EPA disagrees that there are insufficient data to support the selection of MNR in reaches in Connecticut. As discussed in more detail immediately below, sediment data collected in Connecticut shows that, in comparison to other portions of Rest of River, PCB concentrations are relatively very low (or not detected) and more widely dispersed including behind the dams. The Sediment PCB Data Summary for Connecticut Report, (prepared by the USACE March 23, 2015 on behalf of EPA, posted on EPA's web site and the subject of a CT CCC subcommittee meeting on March 15, 2015), summarizes the sediment data collected in Connecticut from 1980 through 2005. This includes 540 samples. For the period prior to 1998, surface sediment (0 to six inches in depth) PCB concentrations ranged from non-detect to 3.16 mg/kg, with an average concentration of 0.53 mg/kg. For surface samples collected 1998 or later, PCB concentrations ranged from non-detect to 0.47 mg/kg, with an average concentration of 0.09 mg/kg. For samples at all depths (540 samples), for samples collected prior to 1998, the average concentration is 0.79 mg/kg and the maximum concentration is 8.2 mg/kg. For samples at all depths collected in 1998 or later, the average concentration is 0.18 mg/kg and the maximum concentration is 2.33 mg/kg.

The effects of MNR are also exhibited in decreasing trends in fish and benthic invertebrate PCB levels that have been observed in in Reaches 9-16 during the last 25 years and in the computer simulations of future conditions. In addition, see Response 504 below summarizing the long-term trend in PCB biota concentrations.

Using the nine criteria specified in the Decree/Permit for selection of the remedy, EPA believes that for the Reaches in Connecticut, MNR is the alternative best suited to meet the general standards in the Permit in consideration of the decision factors in the Permit, including a balancing of those factors against one another.

Comment 371: It is unconscionable that the people of Connecticut, including Native Americans who use the river as a food source, receive no active remediation, not even the removal of contaminated sediments behind the dams.

EPA Response 371: As discussed in Response 73, 502, EPA believes that MNR is the alternative best suited to meet the Permit Criteria in Connecticut, including behind the dams. Long-term monitoring in both Massachusetts and Connecticut is a necessary component of MNR to ensure that concentrations in affected media (including surface water, sediment, and biota) are occurring at the expected rate. MNR also requires the maintenance of institutional controls until the necessary reductions in risk have occurred.

Comment 462.b: The permit identifies that the remedial approach for Monitored Natural Recovery includes baseline and long-term monitoring as well as institutional controls. Connecticut concurs, provided:

- The permit should require the development of a work plan (to be added to Section II.B.11 of the permit) for EPA and Connecticut review and approval for all activities related to institutional controls to take place in Connecticut.

EPA Response 462.b: Section II.H. of the Final Permit Modification requires GE to submit an Institutional Controls and Related Requirements Plan to EPA for review and approval. In accordance with the Decree, EPA has sole approval authority over submittals by GE, subject to providing reasonable opportunity for review and comment by the Commonwealth of Massachusetts and Connecticut Department of Energy and Environmental Protection (CT DEEP). EPA will ensure that CT DEEP has a reasonable opportunity to review and provide comments on all submittals, especially those that are specific to Connecticut. See also Section VIII of this Response to Comments.

Comment 504: The claim that PCB concentrations in Reaches 9 through 16 have been decreasing during the past 25 years is too general. Details of what studies have been done to support this claim should be provided. It should be easy to chart the limited results from Connecticut to make these results understandable.

Comment 505: The data made available to the public are inadequate to allow a determination regarding whether the proposed EPA remediation plan is reasonable, adequate or just.

EPA Response 504, 505: EPA presumes the comment refers to text on p. 7 of the Statement of Basis that refers specifically to PCB concentrations in biota. The text in the Statement of Basis is based on long-term studies of concentrations of PCBs in fish and benthic invertebrates in Connecticut. These studies were conducted by the Connecticut Department of Environmental Protection (CT DEP, now CT DEEP) and, more recently by the Academy of Natural Sciences of Philadelphia (currently the Academy of Natural Sciences of Drexel University) under the oversight of CT DEEP and funded by General Electric. The studies were initiated in 1978 and have been repeated biennially since that time, with the most recent report providing the results of the collections made through 2012 (Academy of Natural Sciences of Drexel University (ANS), 2013. PCB Concentrations in Fishes from the Housatonic River, Connecticut, 1984-2012, and in Benthic Insects, 1978-2012. This series of synoptic collections provides a robust database that is representative of temporal changes in contaminant concentrations in fish and benthic invertebrates, for the river downstream of Rising Pond Dam (Reaches 9 through 16). The applicability of the Connecticut data to these reaches of the river is based in part on the knowledge that there are no additional point sources of PCBs downstream of Rising Pond Dam. The data demonstrate that contamination in fish and benthic invertebrates decreased substantially from 1977 to approximately 2000, with the sole exception of trout in 1992, when an increase was observed, with continued low concentrations since 2000.

CTDEEP and EPA have conducted numerous presentations of these data over the years to the public in both Massachusetts and Connecticut at Citizens Coordinating Council meetings and in other forums. These data are also summarized on a biennial basis in the reports prepared by ANS and made public through EPA's website.

EPA believes there has been sufficient data made available to the public to make a determination on the reasonableness of the proposed remedy. This includes the reports by the ANS and the

Sediment PCB Data Summary for Connecticut Report, as well as other documents in the Administrative Record. In addition, see Response 73, 502 above.

However, in part in response to these comments, the Final Permit Modification now includes a provision that GE provide data and supporting information in electronic format and shall include locational information for all samples collected. This should assist in evaluating data collected as part of this Final Permit Modification.

III.C.7 Engineered Capping

Comment 330: Capping/armoring may not be successful in areas with moderate to high currents, and on sediments which are fine grained and have a high water content, such as those found in Woods Pond. What will be the cumulative effect on the river hydrology, flow velocity, flood storage, and the shoreline and 100 year floodplain configuration of the isolation layer, erosion layer and any other materials when combined? Armoring does not remove the contamination, and it is unclear that it will control the mobility of the PCB sediments in the future. It merely "covers-up" the problem, and subjects the river to future contamination from a major flood event. At a minimum, EPA should require hard capping, as it ordered in the upper two miles of the river. In those projects, GE was required to replace the removed sediments with a cap and armor system consisting of a geotextile bottom layer, a silty sand isolation layer, a geotextile filter layer, a filter protection layer, topped by an erosion protection stone armor layer. The plan requires GE to address any failures of the armoring/capping that will be put in place during the cleanup should any of the remediation measures fail. It would be in the best interests of GE, EPA and the states to implement a cleanup that would provide certainty that the risk of re-opening the process to address any problems would minimal. Therefore, EPA should reduce the risk for the re-transport of PCBs during a catastrophic storm event such as a hurricane [to] be minimal, through at [a] minimum the use of hard capping.

EPA Response 330: EPA believes Engineered Capping following removal of sediment is an appropriate component of the remedy as specified in the Final Permit Modification. Sediment removal followed by capping is suitable where capping alone is not preferred because of issues such as waterway depth, water conveyance and flooding issues. With respect to "hard capping", that approach is among the alternative methods of bank reconstruction provided for in the Final Permit Modification; however, as EPA explains in the Statement of Basis, a focus of the bank work will be to reduce the mobilization of PCBs into the river from the erosion of contaminated banks while maintaining the dynamic nature of the River. (Statement of Basis, pages 4-5.) That being the case, the selected remedy includes "hard capping" among the hierarchy of potential bank restoration options, but as a less favored option than "soft", bioengineering approaches. Final Permit Modification, II.B.2.a.(1)(e).

Caps may be designed with different layers to serve the primary functions of chemical and physical isolation and bed stability, or in some cases a single layer may serve multiple functions. Among the technical guidance used by EPA in developing the Performance Standards for Engineered Caps in the Final Permit Modification are the U.S. Army Corps of Engineers' *Guidance for Subaqueous Dredged Material Capping* (Palermo *et al*. 1998a), *Guidance for In-Situ Subaqueous Capping of Contaminated Sediments*, (Palermo *et al*. 1998b), and EPA's 2005 *Contaminated Sediment Remediation Guidance for Hazardous Waste Sites.* As specified in the Performance Standards, all Engineered Caps shall include the following layers or functions:

- A Mixing Layer to prevent contamination of the chemical isolation layer due to mixing with underlying contaminated sediment;
- A Chemical Isolation Layer sufficient to minimize the flux of PCB concentrations through the Isolation Layer;
- An Erosion Protection Layer to prevent erosion;
- A Geotechnical Filter Layer as needed, to prevent mixing between layers;
- A Bioturbation Layer to prevent bioturbation from impacting underlying layers; and
- A Habitat Layer to provide functions and values equivalent to the pre-existing surface sediment.

The Performance Standards in the Final Permit Modification require GE to ensure that the sediment excavation and installation of the Engineered Cap do not result in the loss of flood storage capacity or an increase in water surface elevations. In addition, the Performance Standards require the inclusion of an Erosion Protection Layer. This Erosion Protection Layer will be designed to withstand storm events and may include "hard" capping in some locations. See Responses 217 and 329 below for the design criteria for storm events.

Engineered Capping has been selected or implemented at many sites throughout the US with differing sediment types and hydrological conditions. For example:

- Fox River WI – This PCB site is a large sediment capping and dredging site, with more than 160 acres of Engineered Caps constructed to date. (EPA Region 5 five-year review, July 17, 2014).
- Onondaga Lake, NY – This large lake site (with mercury as the primary contaminant) is currently undergoing the final stages of capping and restoration, with sediment removal and the placement of over 400 acres of engineered caps, and well as thin-layer capping in deeper areas of the lake. (EPA Fact Sheet; Onondaga Lake Cleanup Process, March 2016).
- Gowanus Canal NY – Capping is an integral part of the selected remedy for the Gowanus Canal site in New York City, with the caps designed to contain polynuclear aromatic hydrocarbon (PAH) contaminants and non-aqueous phase liquid (NAPL). (EPA, Administrative Settlement Agreement and Order for Remedial Design, Removal Action and Cost Recovery for the Gowanus Canal Superfund Site, June 9, 2016).
- Engineered Capping has also been applied to earlier response actions at the GE-Pittsfield/Housatonic River Site, including both the Upper ½-Mile Reach and the 1 ½-Mile Reach, as well as Silver Lake. All caps were installed to address PCB-contaminated sediment. See EPA's GE-Housatonic River webpage at https://www.epa.gov/ge-housatonic.

The commenter raised the overall effectiveness of caps in meeting the goals of the proposed Remedial Action. Field experience with numerous projects with capping as a remedy approach

has shown success in reductions of contaminants in sediments and biota, when caps are constructed in accordance with the designs. For example:

- The most recent Five-Year Review (EPA Region 5, July 17, 2014) at the Fox River Site has shown a 94% reduction in PCB concentrations in surface sediment in Operable Unit (OU) 1 (Little Lake Butte des Mortes) following sediment excavation and capping, and the concentrations meet the surface weighted average concertation goal of 0.25 m/kg PCB for this OU.

- At the General Motors (GM) Site, located on the St. Lawrence River in Massena, New York, PCBs are the primary contaminant of concern. Contaminated areas at the site include sediments in the St. Lawrence River. After dredging alone was unsuccessful in consistently meeting cleanup levels, a multilayer cap was placed in the St. Lawrence River over a 2-acre area, which reduced the surface concentrations of PCBs in the capped area to less than the 1 mg/kg PCB cleanup goal from the prior pre-capping concentration of 3 mg/kg. Based on long-term monitoring results, the remedy appears to be performing as intended and has not needed repairs, although some armoring along the near-shore areas was required. Contaminant concentrations in surface sediment have been reduced to meet the cleanup goal. Fish tissue sampling shows a decreasing trend in PCB concentrations. (EPA. Third Five-Year Review Report, General Motors. September 2015).

- The Puget Sound Naval Shipyard Complex site, also known as Bremerton Naval Complex, located along the shoreline of Sinclair Inlet, Bremerton, WA, includes marine sediments contaminated with PCBs and other chemicals. The sediment remedy included, among other components, dredging and disposal of contaminated sediments and placement of a clean cap over other contaminated sediments. (Bremerton Naval Complex Third Five Year Review, October 2012). Post-remedial monitoring has shown that remedy goals have been achieved in accordance with the target date specified by the ROD. Sediment profile data verifies that caps are intact and functioning as planned. (Addendum to the Third Five-Year Review June 2016). Fish tissue sample data in 2016 showed lower average PCB concentrations than from 2003 to 2012. (Draft 2014 OU B Marine Phase 2 Long-term Monitoring Report, May 19, 2016).

- Excavation followed by the installation of Engineered Caps has also proven effective for the Upper ½-Mile and 1 ½-Mile Reaches of the East Branch of the Housatonic River. Post-remediation sediment sampling in the Upper ½-Mile Reach has shown an average PCB sediment concentration of 0.05 mg/kg in the upper 0-6 inches of sediment 10 years after remediation was completed. This is a greater than 99% reduction in PCB concentration for the surficial sediment (which corresponds to the biologically active zone). Similarly, post-remediation sampling in the 1 ½-Mile Reach has shown an average post-remediation PCB concentration of 0.20 mg/kg in the upper 0-6 inches of sediment (also a greater than 99% reduction in PCB concentration). This reduction in concentrations of PCBs in sediment in the 1 ½-Mile Reach corresponds to a greater than 99% reduction in PCB concentration in macroinvertebrate tissue samples. (EPA Presentation to the Citizens Coordinating Council in September 2012). In addition, two of the four highest flow events on record (2005 and 2011) occurred following cap placement and the cap remained stable.

Comment 25: Capping of residual PCB-contaminated sediments will be difficult to do and will be subject to failure, allowing contaminated sediments to be transported downstream. This is equivalent to sweeping the PCBs under the rug and represents a long-term risk for the community. The cleanup is based on an over-reliance on engineering to encapsulate and control the PCBs being left behind after the cleanup. This approach will be leaving a legacy of contamination in the environment that we pass on to our children and grandchildren. The Housatonic is a naturally meandering river that has changed significantly over the last 100 years in response to both natural and anthropogenic causes. Mass Audubon's map of the river's shifting banks (provided with the comments) provides ample evidence of this. The Housatonic shifts within its oxbow sections by as much as .9 feet per year. On such a river, dramatic changes will disrupt habitat inevitably. Furthermore, such bank shifts tend to accelerate when dramatic measures such as channel straightening are employed as the river attempts to restore equilibrium. Shifting river morphometry eventually jeopardizes the viability of caps as long-term solutions. As such, a more complete cleanup is warranted and can be achieved without long-term damage provided appropriate stream restoration practices are employed. I have grave misgivings about the dredging and capping proposal for this area. Letting GE decide how this is going to be accomplished is not acceptable. In a recent storm 2-3 feet of sand was deposited on the banks- I don't believe the capping is a viable alternative to this issue. This is a remote and secluded section of the river with no entrances or exits nearby, whether by land, rail or river. Also the idea of capping and covering up the problem is ridiculous.

EPA Response 25: See Response 330 above regarding the selection of capping. Regarding channel migration, EPA recognizes the dynamic nature of the river, and has explicitly addressed the challenges it poses in the Performance Standards and Corrective Measures specified in the Final Permit Modification. In Reach 5A, which is the most dynamic section of river, the Performance Standards require the consideration of the use of Natural Channel Design to reconstruct riverbanks to minimize erosion and to result in a channel that is in dynamic equilibrium, balancing flow and sediment loads, and reducing erosive forces. Bank restoration techniques are presented as a hierarchy, with the preferred method being the sole use of bioengineering techniques, and the second method including a component of the Engineered Cap extending into the bank. Whichever method is used, EPA expects that the bank remediation and restoration design will be coordinated with the Engineered Cap design and address site-specific conditions.

With regard to GE's role in deciding how the dredging and capping is to be accomplished, the Decree makes it clear that GE is to submit its proposed details in design documents for EPA to review and approve. For further details, see Section VIII of the Response to Comments.

Comment 26: If capping of contaminated sediments remains part of the remedy, provisions must be made for inspection and repair, particularly after high-flow storm events, in perpetuity.

EPA Response 26: EPA concurs that inspection, monitoring and maintenance of caps is a critical to ensure that the remedy remains protective of human health and the environment. Several sections of the Final Permit Modification address these requirements.

First, the Performance Standards for Engineered Caps includes the following: "Engineered Caps shall be inspected, monitored, and maintained to ensure long-term protectiveness and to ensure that they continue to function as designed" (see Section II.B.2.i.(1)(c).).

Second, the Performance Standards and Corrective Measures for Inspection, Monitoring and Maintenance require an inspection, monitoring and maintenance program. This includes the requirements that program be implemented *throughout* the Remedial Action to evaluate the effectiveness in achieving Performance Standards and to conduct maintenance, repair, or other response actions necessary to achieve and maintain compliance with Performance Standards (see Section II.B.4.). A component of this program is to require a plan for Engineered Caps (see Section II.H.18.). It is anticipated that this program will require inspections after high-flow storm events.

Third, the requirements for Operation and Maintenance to be implemented upon completion of the Remedial Action includes inspection and maintenance of Engineered Caps and inspection and maintenance of other Corrective Measures to ensure that Performance Standards are maintained (see Section II.C.). There is no termination date for these requirements in the Final Permit Modification.

Comment 384: If caps are used in the remedy, how will cap failure be determined? Would it be possible to include some sort of visible "marker" in or below the cap that would be released in the event of a failure?

EPA Response 384: The details of the inspection, monitoring and maintenance requirements will be developed in the SOW and subsequent documents which will be subject to EPA review and approval. Typical inspection requirements for Engineered Caps include visual inspections, surveying, sediment core chemistry (including surface sediment and the isolation layer) to confirm physical and chemical isolation, and pore water sampling. A marker is typically not used. However, if a geotextile layer is used as a component of the Cap, exposure of this layer could serve as a visual marker that there is an issue with the performance of the Engineered Cap.

Comment 66: The cap in place at Allendale School did not work and eventually all of the residual contamination needed to be removed. Capping of contaminated sediments in the river will be even more difficult and subject to failure. The Allendale School experience has shown that caps do not work.

EPA Response 66: EPA recognizes that capping of contaminated sediment is more challenging than capping soil. However, there is no basis for the statement that the temporary cap at Allendale School "did not work."

A temporary soil cap was placed on the Allendale School property to eliminate direct exposure to PCBs present in the soil pending a final remedy decision for the property. Following the placement of the cap, PCBs were detected in soil samples collected outside the cap footprint. However, this was not the result of cap failure or of migration of PCBs. Rather, it was because the initial sampling did not delineate the full lateral extent of PCB-contaminated soil. The decision to remove the cap and underlying soil contamination at Allendale School was made as

than 1 mg/kg was considered as part of Combination Alternative 6, but was not selected as the remedy throughout the river. The rationale for not selecting this alternative is provided in the Statement of Basis and the Comparative Analysis. Lastly, the Final Permit Modification (as did the Draft Permit Modification) does provide the option to remove sediments in Reach 7 and 8 Impoundments and Backwaters to achieve a spatially-weighted average of 1 mg/kg along with removal of all areas exceeding 50 mg/kg.

Comment 459: Section (II)(B)(1)(j) addresses the design of engineered caps. Connecticut supports the use of such caps provided:

a) Engineered caps are designed in a manner which allows for a permanent barrier to prevent unacceptable exposures to people or environmental receptors as well as prevent downstream transport of contaminated materials. The cap must be able to withstand physical forces expected within the Housatonic River under typical and extreme conditions. The cap must provide stability even under high energy or high stress conditions, in order to meet the goals of providing a permanent and effective remedy.

b) Connecticut does not support the use of thin-layer capping methodologies because these techniques are not likely to produce a stable, permanent and protective barrier to PCBs and are not likely to control downstream transport of PCBs.

EPA Response 459: EPA believes the Engineered Cap Performance Standards outlined in Section II.B.2.i. of the Final Permit Modification address the objectives and effectiveness of Engineered Caps described by Connecticut. Also, see Response 25, 217, 329, and 330 above in this section.

EPA concurs that thin-layer capping is not appropriate for Rest of River. See also Section III.C.4 of this Response to Comments.

Comments 539, 653, 654: GE asserts the following: For the various portions of the River for which the Region has proposed engineered sediment capping, the Draft Permit sets forth Performance Standards for the design of the caps (Draft Permit, pp. 21-24). The Region indicates that the actual design and thickness of the caps would be determined during remedial design (Comp. Analysis, p. 5; see also Stmt. Basis, p. 8). However, for some areas, it estimates total cap thicknesses (and thus the corresponding depth of sediment removal) – namely 2.5 feet in Reach 5A (representing an increase from 2 feet from alternative SED 9 in the Revised CMS, with no basis provided) (Comp. Analysis, pp. 2, 6) and 2 feet in Reach 5C (*id*., p. 7).

Based on relevant engineering information and EPA guidance, and considering appropriate performance standards for cap design, the engineered caps can be considerably thinner than estimated by the Region. For example, during discussions with EPA, GE presented detailed information regarding conceptual engineered cap designs and thicknesses, developed in accordance with the principles in EPA's *Contaminated Sediment Remediation Guidance for Hazardous Waste Sites* (EPA. 2005d) and *Guidance for In-Situ Subaqueous Capping of Contaminated Sediments* (Palermo et al., 1998), and using cap design models specified in or

consistent with EPA guidance.[22] That information, including cap modeling, demonstrated that thinner caps would be reliable and effective to: (1) isolate PCBs remaining in the underlying sediments to minimize their transport up through the cap and into the water column; (2) reduce the possibility of direct contact with those isolated sediments; (3) protect against the ability of burrowing organisms to move those isolated sediments to the surface (bioturbation); (4) protect against erosion of the cap material that could expose the isolated sediments; and (5) provide appropriate habitat on the surface. Specifically, that information showed that, subject to confirmation based on site-specific data collected during remedial design, caps with the following thicknesses and layers would be reliable, effective, and stable:

- In Reach 5A:
  - Approximately 4.1 river miles of 1-foot-thick caps consisting of a 0.5-foot layer of fine gravel overlying a 0.5-foot sand layer amended with AC, total organic carbon (TOC), or equivalent as needed;
  - Approximately 0.6 river mile of 1-foot-thick caps consisting of a 0.5-foot coarse gravel layer overlying a 0.5-foot sand layer amended with AC/TOC or equivalent as needed; and
  - Approximately 0.4 river mile of 14-inch-thick caps consisting of 8 inches of cobble overlying a geotextile filter layer, which in turn overlies a 0.5-foot sand layer amended with AC/TOC or equivalent as needed.
- In Reach 5C:
  - Approximately 2.6 river miles of 1-foot-thick caps consisting of a 0.5-foot fine gravel layer overlying a 0.5-foot sand layer amended with AC/TOC or equivalent as needed;
  - Approximately 0.4 river mile of 6-inch-thick caps consisting of sand with a gradation designed to be stable and amended with AC/TOC or equivalent as needed.
- In Woods Pond, Rising Pond, and backwaters:
  - A cap of 6 inches thick, consisting of sand with a gradation designed to be stable and amended with AC/TOC or equivalent as needed, except in limited portions identified as having elevated velocities, where the caps would be similar to one of those in Reach 5A or 5C, depending on local conditions.

The Region should replace its current engineered cap Performance Standards with a substitute set of Performance Standards that not only set forth the cap design principles and objectives, but also specify target thicknesses (as described above), to be confirmed during design based on the principles and objectives presented. Specifically, GE submits that the Performance

[22] This information included an October 1, 2012 presentation entitled Engineered Cap Evaluation, a November 15, 2012 presentation on cap components, an April 3, 2013 presentation entitled Sediment Cap Performance Standards, a May 20, 2013 technical memorandum entitled Housatonic River Engineered Cap Design Methodology and Conceptual Analysis, and a July 2, 2013 memorandum providing updates on conceptual cap design – all of which are in the Administrative Record.

Standards should be revised to reflect the principles, design objectives, and target thicknesses described in the Capping Principles Overview document attached hereto as [GE] Attachment I.

EPA Response 539, 653, 654: EPA disagrees. EPA did consider the information GE presented in October 2012, however, it chose not to incorporate GE's proposal to specify thinner cap layers or set target cap thicknesses in the Final Permit Modification. EPA believes, and has consistently held, that it is critical that the decisions on the thicknesses of different cap components take place during the design of the remedy. The design phase is the appropriate time for determining Engineered Cap thicknesses because the design phase allows collection of information sufficient to support the engineering design; also, it is expected that the design will occur in phases, thereby providing sufficient time to collect additional data. Additional data will contribute to an adaptive management approach that can be used to incorporate lessons learned, and/or new materials, techniques, and/or equipment that become available in the future to improve the cap design.

EPA noted in its September 9, 2008 comments on GE's CMS that "EPA recognizes that it was appropriate to evaluate remedy components on a reach-wide basis in the CMS but notes that it will be necessary and appropriate in the final design to implement different remedies for smaller sections of a floodplain area or reach with unique characteristics." Further, EPA noted that:

> the thickness of an engineered cap (and associated depth of excavation, if required), whether placed with or without prior removal, should be determined in final design based on site-specific requirements using factors such as described in White Paper No. 6B – In-Situ Capping as a Remedy Component for the Lower Fox River (Palermo et al, 2002) and other applicable guidance. The design should consider the underlying sediment PCB profile and associated needs for chemical isolation as well as the need for physical stability. GE shall provide a description of the design process (such as that described in Palermo et al, 2002) that will be used to determine the appropriate cap materials and thickness of materials to be placed.

In addition, in May 2012, EPA's Status Report on potential remediation approaches to the Rest of River provided: "In any proposed remedial approach, EPA would tend to specify certain cap design principles and Performance Standards, but not a particular material thickness."[23]

Thus, EPA has been clear throughout the CMS and remedy selection process of its expectations regarding the appropriate time and scale for the details of cap designs. GE essentially acknowledged this approach in its Revised CMS. Various parameters for Engineered Capping were described by GE in Section 3.1.3 of the Revised CMS, and values for cap thickness and cap composition (materials) were assumed for the caps in various reaches of the river and for various alternatives evaluated to provide the basis of comparison of the alternatives. These assumptions, which included cap thickness ranging from 1.5 to 2 feet, were used to estimate sediment removal volumes, cap material volumes, costs, construction timelines, and other considerations for comparison of the alternatives. At the feasibility study stage of evaluation, assumptions

[23] EPA 2012 Status Report at 6.

regarding remedy design are often used in order to evaluate the feasibility and potential cost of components of a remedy. This feasibility evaluation provides the basis for comparing the alternatives against the criteria and selecting a proposed plan. During the technical discussions between GE and EPA in 2012/2013, GE raised the issue of potentially establishing thinner caps in the Permit, including potential caps as thin as six to nine inches, as opposed to making cap thickness decisions during the design stage. EPA disagrees that it is appropriate to establish cap thickness parameters at this stage in remedy selection.

EPA also disagrees on the appropriateness of setting 'target thicknesses" in the Final Permit Modification for "confirmation" during remedial design. That approach would establish expectations that would not be consistent with performing an unbiased review during remedial design of the important considerations for protective and functioning Engineered Caps. The target thickness approach would likely "anchor" or skew the resulting remedial design toward those "target" levels for confirmation, rather than allowing for an unbiased analysis.

During design, it will be necessary to include the timely collection of information on an appropriate scale for the detailed engineering evaluations needed to support the design. For example, in a given mile or two stretch of the river there can be significant variation in sediment bottom topography and substrate type, water depth, PCB concentrations, and aquatic habitat that currently exist and which may also change over the course of remedy implementation. These fine-scale details need to be identified, researched through data collection, and then the appropriate engineering considerations need to be applied to derive a cap design for each area that best meets the Engineered Cap Performance Standards for those conditions.

Additionally, the target thickness approach is misguided here because technical reviews raised serious questions about GE's "targets". As stated above, EPA did consider GE's input. During the 2012-2013 technical discussions between EPA and GE, GE requested that EPA perform a technical review of a proposal similar to GE's current proposal for caps with defined thicknesses. As a result, in May 2013, EPA obtained review by a number of experienced persons from academia, EPA and the U.S. Army Corps of Engineers. The technical reviews generated many questions regarding the protectiveness of the approach favored by GE.[24] Examples of concerns with GE's approach include the following:

- There was concern that GE's proposed bioturbation layer cannot also serve as the key component of the chemical isolation layer;

- GE's proposed 6-inch cap includes a 2-inch mixing layer and a 4 inch bioturbation layer, but no specific chemical isolation layer;

[24] Documents include: May 31, 2013, EPA, "Initial Review of GE's Conceptual Design", summarizing reviews from U.S. Army Corps of Engineers, Paul Schroeder and Trudy Estes, ERDC; University of Texas, Dr. Danny Reible; EPA (Region 1 and OSWER/OSRTI); May 28, 2013, "Technical review of Housatonic River conceptual cap design", Trudy J. Estes, and Paul R. Schroeder, Research Civil Engineers, US Army Engineer Research and Development Center; May 29, 2013, "Review of Capping Design Proposal for GE/Housatonic River", Danny D. Reible, PhD, PE.

- A separate isolation layer of 7-9 inches is needed to ensure cap effectiveness.
- There are areas where the conceptual design is not appropriately conservative,
- Concerns over improper evaluation of habitat layer restoration;[25]
- Focusing attention on the need for additional design-level data prior to making a decision, such as: erosional forces issues need to be evaluated in Woods Pond and other areas with significant fetch; site-specific data should be collected prior to final cap design; and GE's use of average velocities over large-scale areas underestimates the erosional forces.[26]

Those concerns, mostly from third-party reviewers, reinforce EPA's judgment that the design of Engineered Caps at the Rest of River should be undertaken during the remedial design process, unbiased by preconceived notions of particular target thicknesses.

EPA has long recognized the significance of cap thickness to the amount of removal of contaminated soils and sediments, and the resulting impact on disposal costs. To reiterate EPA's 2012 Status Report, EPA expects that during remedial design GE will seek to optimize cap design to reduce the amount of PCB-contaminated material that requires disposal. Anticipating that scenario, EPA's Engineered Cap Performance Standards represent a reasonable technical approach to ensure that the eventual design, construction and operation of the caps is protective of human health and the environment. It avoids potentially biasing the design and affords GE the opportunity to propose, subject to EPA approval, a cap design consistent with the Engineered Cap Performance Standards.

III.D Floodplain and Vernal Pools

III.D.1 Floodplain

III.D.1.a Floodplain Soil

Comment 280: Numeric cleanup standards for the Floodplain Exposure Areas should be set as minimum guidance standards rather than strict cleanup standards. This will allow the EPA to work with municipalities and other stakeholders to set revised standards if land uses change or user exposure times are found to have changed from the original designation, such as installing recreational amenities. The Permit should stipulate that municipal review and input be included as scopes of work for the individual Exposure Areas for floodplain remediation are being refined.

EPA Response 280: The numeric Floodplain Performance Standards were selected based on parcel-specific exposure scenarios and other factors set forth in the 2005 Human Health Risk Assessment, which was subject to independent peer review. In the 2005 HHRA, future use

[25] May 31, 2013, EPA, "Initial Review of GE's Conceptual Design", summarizing reviews from U.S. Army Corps of Engineers, Paul Schroeder and Trudy Estes, ERDC; University of Texas, Dr. Danny Reible; EPA (Region 1 and OSWER/OSRTI).
[26] *Id*.

ensure the remedy is protective of human health and the environment. See also Section III.G of this Response to Comments for GE's obligations regarding Future Projects, Work, or Future Use.

See also Section VIII of this Response to Comments for the role of municipalities in reviewing design and implementation plans for the remedy.

III.D.1.c Core Areas

Comments 54, 128, 192, 213, 220, 243, 327, 355, 394, 397, 415, 424: There were numerous comments that remediation in the floodplain and backwaters should not be reduced in the floodplain within Core Areas. Specifically, some commenters were not convinced that high value habitats would be irreversibly damaged if remediated and that EPA has shown that ecologically sensitive areas could be restored. Some of these commenters expressed concern that PCB concentrations of up to 49 mg/kg would remain in these Core Areas, remarking that it makes no sense to leave such high concentrations in ecologically important areas and that such an approach is not scientifically justified.

One commenter stated there is no definition with supporting materials for the "Areas of Critical Concern," or Core Habitats. The Statement of Basis and Draft Permit do not provide any documentation of the rationale or technical analysis of habitats to reach a conclusion that these places are "Areas of Critical Concern." Such a major departure from the practice of active remediation should demand thorough documentation and there is none.

EPA Response 54, 128, 192, 213, 220, 243, 327, 355, 394, 397, 415, 424: Based on the context, EPA assumes the comment on the definition of "Areas of Critical Concern" or Core Habitats" is referring to Core Areas, not an Area of Critical Environmental Concern as designated by the Commonwealth. The Definition of Core Areas is provided in the Final Permit Modification under Definitions.

The process, rationale and documentation for incorporating Core Area into the Final Permit Modification is as follows:

EPA evaluated several alternatives for the remediation of floodplain soil, with estimated removal volumes ranging from 26,000 cubic yards to 615,000 cubic yards. There is generally greater reduction in risk to human health and ecological receptors as the volume of material increases, however, there is also associated increasing short-term impacts to floodplain habitat supporting state-listed species.

EPA Region 1 presented a potential "Rest of River" remedy to the EPA National Remedy Review Board (NRRB) in the summer of 2011. A detailed written submittal was provided to the NRRB in June 2011. The potential floodplain remedy at that time was referred to as "Alternative FP3A", a variation on Alternative FP3 from GE's 2010 Revised CMS. FP3A contemplated the removal of approximately 90,000 cubic yards of contaminated soil over approximately 53 acres. As a follow-up to EPA's NRRB presentation and to address concerns raised by the Commonwealth of Massachusetts regarding EPA's potential remedy approach, EPA, Massachusetts, and Connecticut agreed to enter into a confidential mediation process to discuss and attempt to reconcile differences of opinion on the approach to the Rest of River remediation. Those discussions began in October 2011 and culminated in the release of a May

2012 fact sheet, Potential Remediation Approaches to the GE-Pittsfield Housatonic River Site "Rest of River" PCB Contamination, often referred to as the "Status Report".

As part of this process, Massachusetts Department of Fish and Game (MassDFG) presented their compilation of priority habitat areas for state-listed species under the Massachusetts Endangered Species Act (MESA) and outlined mapping of four specific "Core Habitat Areas" (or "Core Areas"). Massachusetts Division of Fisheries and Wildlife (MassDFW) compiled this information based on extensive field reconnaissance by various parties on the locations and occurrence of state-listed species, including but not limited to the information contained in "Rare Species and Natural Community Surveys in the Housatonic River Watershed of Western Massachusetts;" (Natural Heritage and Endangered Species Program Massachusetts Division of Fisheries and Wildlife, July 2010). Note that the description and maps for each of these Core Areas was later memorialized in a letter from MassDFW/NHESP dated July 31, 2012, which is included as an attachment to the Draft and Final Permit Modification.

After reviewing the Core Area information presented by MassDFW, the group then discussed the locations of these Core Areas relative to areas of known PCB contamination based on sampling conducted as part of the RCRA Facility Investigation (RFI) and the various "Exposure Areas" identified in the Human Health and Ecological Risk Assessments. Ultimately, the group settled on an approach that modified Revised CMS Alternative FP4 with an approach to avoid, minimize, or mitigate impacts to different Core Areas, while also considering potential for downstream transport of contamination, via a hierarchy first outlined in the Status Report and later in the Draft Permit Modification and Final Permit Modification. Based on the approach outlined in those documents, EPA estimates that the proposed remedy will address 75,000 cubic yards of contaminated floodplain soil (including Vernal Pools) covering approximately 45 acres (vs. the 90,000 cubic yards and 53 acres originally considered during the NRRB process).

This modest reduction in the scope of the floodplain cleanup (approximately 15% by volume) continues to be protective of human health, in fact providing a more stringent level of cleanup for human health in many areas of the floodplain than contemplated in the NRRB submittal (cleanup to a 1×10^{-5} Excess Lifetime Cancer Risk in non-core areas rather than 1×10^{-4}, or a Hazard Index of 1). It also provides a balance between cleanup for protection of ecological receptors with the need to avoid and minimize impacts to critical habitat areas for state-listed species and Vernal Pools consistent with the substantive requirements of MESA, the Wetlands Protection Act, and other ARARs. See page 13 of the Comparative Analysis.

Specifically to balance these competing goals, as described in the Comparative Analysis, EPA selected as the Primary Performance Standard PCB soil concentrations that would equate to 1×10^{-5} Excess Lifetime Cancer Risks (the mid-point of EPA's acceptable risk range) or an HI of 1, whichever is lower. Then, in Core Areas, the Final Permit Modification allows for less soil remediation, as long as the Secondary Performance Standard achieves both the 1×10^{-4} Excess Lifetime Cancer Risks (the less stringent end of EPA's acceptable risk range) or an HI of 1.

In addition, see Response 354 above in this Section III.D. with regard to leaving concentrations in excess of 49 mg/kg in the Floodplain.

Comment 314: The current Draft Permit Modification specifies no, or limited, remediation in Core Area 1 habitats to preserve unique species and habitats. The effects of such limited cleanup on human health should be considered. For example, establishment of appropriate institutional controls in such areas during and after cleanup is necessary. Any of these areas that are known to be accessed for recreation should be adequately signed to inform individuals of the potential exposure to PCBs in soil/sediment.

EPA Response 314: As discussed above in Response 54 *et al*., the Final Permit Modification requires that in all areas of the floodplain, including Core Areas, remediation be performed to achieve at a minimum the Secondary Performance Standards. While less stringent than the Primary Performance Standards, the Secondary Standards achieve a HI of 1 and an excess lifetime cancer risk of 1×10^{-4}, which are within EPA's acceptable risk range. Therefore, informational signage is not necessary for the remedy to be protective of human health.

Comment 327a: One commenter stated that the high concentrations will also require Massachusetts agencies to place restrictions on public usage over state properties with soil PCB concentrations that exceed the Massachusetts Contingency Plan Method 1 S-1 Soil Standards in Massachusetts.

EPA Response 327a: The Commonwealth agreed as part of the Decree, to place a Notice Environmental Restriction and Easement (Notice ERE) on State-owned land in Rest of River. This Notice ERE will not preclude or prohibit the recreational use of the properties. Moreover, the properties are subject to remediation under the Final Permit Modification to ensure that the cleanup is protective of the use of each property.

Comment 488: As evidenced by EPA's incorporation of NHESP's Core Habitat Area mapping approach, the Proposed Cleanup Plan for the floodplain is responsive to the Commonwealth's concerns about the need for an intentional, balanced approach to remediating this important ecological feature of Rest of River. The Commonwealth intends to be actively engaged with EPA and GE during the design and the implementation phases of this remedial work to ensure its consistency with the permit's avoidance and minimization objectives.

EPA Response 488: EPA acknowledges the comment and looks forward to working with the Commonwealth to achieve the Final Permit Modification objectives.

III.D.2 Vernal Pools

Comment 540: GE asserts as follows: there are many aspects of the proposed plan for remediation of Vernal Pools that are currently unspecified and are left to EPA's subsequent discretion with no standards provided. As such, this proposal does not meet the Decree and Permit requirement that the proposed remedy must specify not only the Performance Standards but also the appropriate corrective measures necessary to meet the Standards. Given the numerous unspecified components of the proposal, EPA could not have considered many of the required remedy selection criteria in the Permit, and the open-ended approach similarly prevents GE, other stakeholders, and members of the public from evaluating the proposal.

Comment 655: GE asserts as follows: for Vernal Pools in the floodplain, EPA's proposed remedy prescribes a number of steps that comprise an iterative approach to remediation that

includes excavation and reconstruction of some pools, pilot testing of sediment amendment, and pilot testing of an unspecified third remediation method. Following the initial round of remediation and pilot studies, EPA will determine the method/approach for remediation of the remaining Vernal Pools with PCB concentrations over 3.3 mg/kg, generally avoiding Vernal Pools within Core Area 1 and attempting to minimize impacts on Core Areas 2 and 3.

Comment 657: GE asserts as follows: there are many aspects of EPA's proposed approach to Vernal Pool remediation that are currently unspecified, including the number and location of the Vernal Pools to be addressed, the number to be subject to pilot testing through application of AC, the "third method" of remediation and the number of Vernal Pools to be subject to it, and the remediation to be required for the remaining Vernal Pools with PCB concentrations above 3.3 mg/kg outside of Core Area 1. These determinations are left to EPA's subsequent discretion with no standards provided. As such, this proposal does not meet the Decree and Permit requirement that the proposed remedy must specify not only the Performance Standards, but also "the appropriate corrective measures necessary to meet the Performance Standards" (Permit Special Condition II.J).

Comment 740: GE asserts as follows: For vernal pools, EPA has left several elements unspecified, including the identification of vernal pools, the initial number of vernal pools to be remediated by AC, the "third method" for vernal pool remediation and the initial number to be subject to it, and the remediation method to be utilized in the remaining vernal pools (after the initial round) that exceed the vernal pool cleanup standard of 3.3 mg/kg and are outside Core Area 1. All of these elements are left for later determinations by EPA with no standards provided. Given the absence of such information, EPA has not considered the protectiveness, effectiveness, impacts, or costs of the proposed vernal pool remediation, as required under the Permit criteria; and it has not provided the information necessary for others to do so.

EPA Response 540, 655, 657, 740: Based in part on these comments, EPA has revised the Performance Standard for Vernal Pools in the Final Permit Modification. As stated in the Final Permit Modification, the revised Performance Standards are:

> In addition to any remediation conducted in Vernal Pools in order to meet the Floodplain Performance Standards in II.B.3.a.(1) above, the Permittee shall place an amendment such as activated carbon and/or other comparable amendments in Vernal Pools that exceed a spatially-weighted average concentration of 3.3 mg/kg total PCBs (based upon risk to amphibians) to reduce the bioavailability of PCBs to a level less than or equivalent to the bioavailability of PCBs associated with 3.3 mg/kg total PCBs in sediment.
>
> If remediating a Vernal Pool using activated carbon or another comparable amendment is determined to be unsuccessful pursuant to the process outlined in Section II.B.3.b.(2) below in meeting the Performance Standard in Section II.B.3.b.(1)(a) above, Permittee shall excavate soil and backfill Vernal Pools to pre-excavation elevations to achieve a spatially-weighted average concentration of 3.3 mg/kg PCBs in each Vernal Pool except for Vernal Pools in Core Area I, where no excavation shall occur. Permittee shall minimize the impacts from

> excavation in Vernal Pools in Core Areas 2 and 3 (as shown in Attachment B) on a case by case basis in the manner described in footnote 11.

In addition, the Final Permit Modification specifies the Corrective Measures necessary to achieve and maintain the Vernal Pool Performance Standards. GE is required to:[27]

- Submit a plan to EPA for review and approval to conduct a site visit(s) to identify potential Vernal Pools.

- Develop a work plan, to be reviewed and approved by EPA to conduct additional sampling and characterization of Vernal Pools (including species presence and abundance). In addition, conduct field reconnaissance to evaluate the potential ecological effects of remediation of the Vernal Pools.

- Identify Vernal Pools that exceed a spatially-weighted average concentration of 3.3 mg/kg total PCBs.

- Submit a plan describing the type of activated carbon or other comparable sediment amendment, application methods, and measures to determine the effectiveness of the activated carbon or sediment amendment to meet the Performance Standard for reduction in PCB bioavailability (the first Performance Standard listed above in italics in this response; in the Final Permit Modification is Section II.B.3.b.(1)(a)). The plan will also include a description on how to measure the ecological effects of activated carbon or comparable amendment placement in comparison to pre-remediation conditions.

- Following EPA approval of the above-mentioned plan, place activated carbon and/or other comparable sediment amendments in an initial set of 10 Vernal Pools, and submit a report describing the effectiveness of placement activities in achieving the Performance Standards for reduction in PCB bioavailability. In addition, the report will describe the ecological effects of the activated carbon and/or comparable sediment amendment, any suggested modification to the procedures, and a proposal for addressing the remaining Vernal Pools to meet the Performance Standards.

- Following EPA review and approval of the above-mentioned report, proceed with the placement of activated carbon and/or comparable sediment amendment for the remaining Vernal Pools for which it is determined that the activated carbon and/or other sediment amendment can meet the Performance Standards. If Performance Standards cannot be met using the method above, then the Permittee [GE] will remediate these Vernal Pools using excavation and backfill (excluding Vernal Pools in Core Area 1, and minimizing the impacts from excavation in Core Areas 2 and 3).

- Submit a remediation plan for an initial number of those Vernal Pools that require excavation and backfill to meet the Performance Standards. Following EPA review and approval of the plan, implement the excavation, backfill, and restoration and submit a report describing the

[27]Bullets paraphrased from Final Permit Modification Section II.B.3.b.(2).

effectiveness of excavation and backfilling in achieving the applicable Performance Standards, the ecological effects of the excavation and backfill on Vernal Pools, and any suggested modifications to the procedures. Following EPA review and approval of the report, conduct subsequent remediation activities using excavation and backfill.

This revised set of provisions in the Final Permit Modification provides more specificity on the Performance Standards and Corrective Measures for Vernal Pools consistent with the comments. Based on the Permit criteria and the administrative record, including the comments received, EPA thoughtfully and thoroughly evaluated alternatives for the Vernal Pools and determined that the remedy selected in the Final Permit Modification is best suited to meet the Permit's general standards in consideration of the Permit's decision factors, including a balancing of those factors against one another.

Comment 656: GE asks the following question: Does EPA intend that its proposed Vernal Pool cleanup standard of 3.3 mg/kg would be applied to the average PCB concentration in each pool?

EPA Response 656: The Final Permit Modification was revised to clarify that the Vernal Pool cleanup standard of 3.3 mg/kg would be applied to the spatially-weighted average PCB concentration in each Vernal Pool subject to remediation.

Comment 658: GE asserts as follows: Given the numerous unspecified components of the proposed approach to vernal pool remediation, EPA has not, and could not have, considered many of the required remedy selection criteria in the Permit as they would apply to its vernal pool proposal, including its protectiveness, effectiveness, ecological impacts, implementability, and costs. By the same token, the Region's open-ended approach prevents GE, other stakeholders, and members of the public from evaluating these important aspects of the proposal.

EPA Response 658: The Performance Standards and Corrective Measures for Vernal Pools have been revised for the Final Permit Modification; the Final Permit Modification clearly specifies the Performance Standards and the Correctives Measures to meet these Performance Standards. The primary method to meet the Performance Standard is through the use of a sediment amendment such as activated carbon to reduce the bioavailability of PCBs. In the event that the sediment amendment is determined to be unsuccessful in achieving a sufficient reduction in bioavailability in any Vernal Pool to achieve the Performance Standards, then the pool must be excavated (with the potential exception for Vernal Pools located in Core Areas) and restored to meet the Performance Standard of a spatially-weighted total PCB concentration of 3.3 mg/kg.

EPA reviewed this component of the remedy against the Permit criteria using reasonable assumptions (e.g., the number, location, size, and concentrations of PCBs in the Vernal Pools identified in the ERA and Revised CMS) in the Comparative Analysis. The use of reasonable assumptions was not unique to the Vernal Pool remedy evaluation; it was done for most other components of the remedy. Both the placement of a sediment amendment such as activated carbon and excavation and restoration via traditional means were included in the Draft Permit Modification, thus GE, other stakeholders, and members of the public had the opportunity to evaluate and comment on these remedy components.

Comment 659: GE asserts as follows: EPA's proposed approach to Vernal Pool remediation would constitute a "contingency remedy" under EPA guidance, because the extent and types of Vernal Pool remediation would be contingent on future events and EPA determinations. Under the RCRA Permit and the guidance, EPA is required to evaluate any proposed contingency remedy under the applicable remedy selection criteria, either at the time of selection or prior to requiring additional response actions. For the many unspecified aspects of the Vernal Pool remediation at the Rest of River, EPA's proposal has not evaluated those criteria and does not call for such an evaluation to be done in the future after the above-mentioned EPA determinations have been made. Accordingly, that proposal would conflict with the RCRA Permit and EPA guidance.

EPA Response 659: As discussed above, based on comments received, the Performance Standards for Vernal Pool remediation have been revised and clarified.

Comment 660: GE asserts as follows: There is no justification at this time for subjecting a portion of the Vernal Pools within the PSA to application of activated carbon (AC). There is no published research on the effect of introducing AC into Vernal Pools on the amphibians and invertebrates breeding in those pools. The case studies referenced by the Region in its Comparative Analysis have no relevance to Vernal Pools. Studies of ecotoxicological effects of AC amendment have had differing results for different target species, types of AC, and application methods, underscoring the need for well-designed pilot studies before widespread use of AC amendment at a particular site. Given the absence of data showing that AC application would not harm the natural local populations of Vernal Pool animals in the PSA, it is unwarranted to test that hypothesis where it could potentially cause such harm.

EPA Response 660: Although it is true that the use of sediment amendments such as AC in remediating Vernal Pools has not, to the Region's knowledge, been specifically studied previously, there are a number of studies that have investigated the use of sediment amendments in various types of aquatic habitats (see Attachment 3 to the Comparative Analysis). These studies clearly do have relevance to Vernal Pools. Results reported to date have been generally positive, with very limited potential for harm to natural biota.

The references in Attachment 3 of the Comparative Analysis are supported by a paper published by SETAC in 2014 summarizing where AC has been used at contaminated sediment sites. Patmont *et al*. The authors conclude that although one study showed impacts to the benthic organisms in one-fifth of 82 tests, community effects have been observed more rarely in field pilot demonstrations and effects often diminish within 1or 2 years following placement. The authors further conclude that the potential negative ecological effects can be minimized by maintaining finer-grained AC doses below approximately 5% (on a dry weight basis).

Lastly, the Final Permit Modification requires GE to place a sediment amendment in 10 initial Vernal Pools. EPA agrees with GE that this effort will need to be well designed prior to widespread application. In the Final Permit Modification, GE is required to perform such a study to evaluate the ecological effects of the application of AC or a similar amendment, and propose modifications to the procedures, if appropriate. If these initial evaluations indicate that the placement of sediment amendments in Vernal Pools is not appropriate, then the Final Permit Modification has provided for an alternate remedy of excavation and restoration.

Comment 221: With regard to the pilot study on Vernal Pools using AC described on Page 8 of the Statement of Basis, why is it necessary to conduct a number of pilot studies on the same thing, i.e. AC; can't EPA rely on published research that already indicates its best use? I am concerned that multiple pilot studies will continue in delayed cleanup.

EPA Response 221: See above Response to Comments in this section, including Response 540 et al. The Final Permit Modification has been revised to require the use of sediment amendments as the primary remediation method. If this method cannot meet the Performance Standards or is otherwise inappropriate, then excavation and restoration of certain Vernal Pools will be required.

Comment 426: We support the remediation of the majority of vernal pools by traditional means, with preservation of sensitive habit features as possible and necessary. A few selected pools may be candidates for pilot testing of alternative technologies, but sensitive species and life stages will benefit most in the long term from comprehensive remediation/restoration of vernal pools and their surrounding habitat.

EPA Response 426: See above Responses in this section, including Response 660. The Final Permit Modification has been revised to require the use of sediment amendments as the primary remediation method. If this method cannot meet the Performance Standards or is otherwise inappropriate, then excavation and restoration of certain Vernal Pools will be required.

Comment 489: The Commonwealth supports the adaptive management framework for the vernal pools, which EPA developed in consultation with us. It appropriately requires an upfront assessment of baseline conditions of the full range of vernal pools in Rest of River. The initial pilot phase of undertaking three different remediation approaches in respective, small subsets of vernal pools will help ensure that the decision on how to remediate the other vernal pools is based on actual outcomes and their effects on the health and abundance of affected wildlife species. Finally, consistent with the Status Report, as a general rule there will be no excavation in vernal pools within Core Habitat Area 1 and a minimization of remedial impacts on vernal pools in Core Habitat Areas 2 and 3.

EPA Response 489: EPA has modified the Vernal Pool approach to narrow the number of remediation approaches, and to provide more clarity on the decision-making process for subsequent Vernal Pools. Despite that difference from the approach supported by the Commonwealth's comment, EPA believes that in most other respects, the Final Permit Modification is consistent with the Commonwealth's comments on the Draft Permit Modification. EPA's approach retains specific areas focused on by the Commonwealth's comments, including requiring an upfront assessment of baseline conditions in the full range of Vernal Pools, EPA's approach to Vernal Pools in Core Area 1, and the provision to minimize the impacts from excavation in Vernal Pools in Core Areas 2 and 3 on a case-by-case basis (as specified in the Final Permit Modification). Additionally, the revised Vernal Pool approach still contains the use of adaptive management along the lines of what the Commonwealth supported in the Draft Permit Modification.

Comment 490: The Commonwealth intends to pay close scrutiny to the outcomes of this adaptive management framework for remediation of vernal pools, consistent with our long-standing concerns about the ecological tradeoff of excavating vernal pools on the assumption

that they can later be fully restored. The Commonwealth knows from its collective mitigation experience how challenging it can be to successfully restore a vernal pool, and the future application of the adaptive management framework for the vernal pools must give proper consideration to the difficulties associated with fully restoring excavated vernal pools.

EPA Response 490: EPA acknowledges this comment and looks forward to working with Commonwealth to successfully implement the Vernal Pool Performance Standards.

Comment 542: GE asserts that the risks to amphibians that the vernal pool remediation is designed to address are, at best, theoretical. EPA's conclusion that, in any vernal pools with PCB concentrations above 3.3 mg/kg, the amphibians that inhabit those pools are at risk is unjustified and is belied by the existence of a thriving healthy wood frog population in the PSA despite the long-term presence of PCBs in the pools.

EPA Response 542: EPA risks to amphibians and the derivation of MATCs was documented in EPA's 2004 peer-reviewed ERA. As discussed in the ERA, EPA recognizes that populations of frogs and other amphibians have reproductive strategies that can withstand losses of individuals during development. EPA's wood frog study was designed to assess the potential impact of PCBs on different amphibian life stages, including reproduction, growth, and maturation, based on known or expected toxicological effects of PCBs on amphibians documented in the scientific literature. However, many of those effects (or combinations of effects) from PCB exposure are biologically relevant at the local population level. The MATC[28] for amphibians was based on two sensitive and biologically relevant endpoints (metamorph malformation and sex ratio), which act in concert to limit the viability of local wood frog populations. The PCB concentration of 3.3 mg/kg corresponds to a 20% incidence of malformation (which would lead to either death or sterility in the adult, among other issues), rather than the more conservative 20% incidence rate for metamorph sex ratio observed at the lower PCB concentration of 0.61 mg/kg.[29] It should be noted that the objective of the MATC, while derived from data on one species, is to provide adequate protection for all amphibian species, including those that may be more sensitive to PCBs than the wood frog (e.g., salamanders).

Therefore, based on the weight of evidence available for the amphibian risk endpoint, EPA disagrees with GE's assertion that 3.3 mg/kg total PCBs is not an appropriate Performance Standard.

Comment 219: What is the basis for the proposed cleanup level of 3.3 ppm for Vernal Pool sediment?

EPA Response 219: See Response 542 above.

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[28] The term used in the ERA was the MATC; the IMPG was developed based on the MATC.

[29] The metamorph sex ratio 20% incidence rate was 0.61 mg/kg. EPA selected the IMPG of 3.27 mg/kg based primarily on metamorph malformations. A Peer Review Panel member noted that Ouellet (2000) suggests that malformation rates greater than 5% are biologically relevant. The stochastic population modeling conducted by EPA and presented in the ERA supports the conclusion that these effects are biologically relevant.

Comment 380: How did EPA arrive at a cleanup target of 3.3 ppm for vernal pools and backwaters in some Alternatives but 5.6 ppm in others?

EPA Response 380: The MATC of 3.3 mg/kg was developed in response to comments from the Peer Review Panel and presented in the Final ERA. However, during the development of GE's IMPG Proposal, to allow for the full evaluation of an appropriate array of remedial alternatives in the CMS, GE proposed ranges of concentrations for some receptor groups. For amphibians, GE proposed the MATC of 3.3 mg/kg as the lower-bound IMPG (the "point of departure"), and 5.6 mg/kg as the upper-bound IMPG. The 5.6 mg/kg concentration selected by GE is the geometric mean of the 20% effect concentration (EC20) for Phase III malformations (3.27 mg/kg) and the EC50 for Phase III sex ratio effects (9.54 mg/kg). GE, in its Revised CMS, evaluated some alternatives to meet the lower-bound IMPG and others to meet the upper-bound IMPG. In the Final Permit Modification, EPA incorporated the lower-bound IMPG of 3.3 mg/kg into the Performance Standard for Vernal Pools. The 5.6 mg/kg concentration is not used in the Final Permit Modification.

Comment 541: GE asserts that EPA's proposed Vernal Pool remediation would cause severe harm to the vernal pools in the floodplain and the amphibians that inhabit them, and there is no basis for EPA's claim that all of the pre-remediation conditions and functions of the impacted vernal pools can be re-established through restoration efforts, since vernal pool creation or re-creation has a very low success rate.

Comment 661: GE asserts that ecological damage from the proposed Vernal Pool remediation would outweigh any theoretical benefits to the amphibians from the PCB removal, with the extent of that damage dependent on the number of pools that are selected for remediation and the type of remediation required. The Commonwealth has recognized this fact. Its remediation proposal did not include ***any*** Vernal Pool remediation because "this would cause more ecological harm than benefit." For this reason, the Region's proposed Vernal Pool remedy is arbitrary and capricious.

EPA Response 541, 661: EPA disagrees that ecological damage from Vernal Pool remediation would outweigh benefits to amphibians, and categorically rejects GE's assertion that the Vernal Pool remedy is arbitrary and capricious. As provided in the Administrative Record, EPA believes that remediating sediment in Vernal Pools to a spatially-weighted average concentration of 3.3 mg/kg total PCB in sediment (i.e., the MATC for amphibians as determined in the Peer-Reviewed 2004 Ecological Risk Assessment) will be protective of amphibians inhabiting the pools. In the ERA, evaluation of risks to amphibians found that there is a high probability of risk of ecologically significant effects at PCB concentrations observed in Rest of River. There were significant correlations between adverse effects in late larval-stage wood frogs and PCB concentrations in sediment and tissue. Of the two species with site-specific studies, leopard frogs appeared more acutely sensitive than wood frogs, with strong indications of toxicity observed through the range of PCB concentrations tested. The life history of other amphibian species (e.g., salamanders) suggests that they may be at greater risk than leopard and wood frogs. The indications of community responses from the population studies (i.e., localized depression of richness and abundance near Vernal Pools with high PCB concentrations, and high incidence of malformations observed), as well as other studies of PCB and dioxin-like contaminant toxicity to amphibians in the peer-reviewed literature, substantiate these conclusions. These findings

suggest that amphibian populations are impacted throughout much of the Rest of River, particularly from the confluence of the East and West Branches of the River to Woods Pond.

Moreover, there is no site-specific basis for GE's claim that long-term ecological damage would result from Vernal Pool remediation. In fact, EPA notes that GE successfully remediated and restored the Vernal Pool (hereinafter the Phase 4C Vernal Pool) located on Parcel I6-1-106 in Pittsfield as part of the Non-Residential Properties Adjacent to the 1 ½ - Mile Reach Remedial Action Area. Pre-remediation field surveys conducted in 1998, 1999, 2000, and 2003 documented the specific physical and biological criteria present to satisfy the Natural Heritage and Endangered Species Program (NHESP) *Guidelines for the Certification of Vernal Pool Habitat in Massachusetts* (1-1/2 Mile Reach Removal, Vernal Pool, Citizens Coordinating Council (CCC) Meeting Presentation, September 29, 2010). Following the remediation in 2006, annual inspections conducted by GE in 2009 through 2011 and by EPA in 2012 through 2015 have documented that the Phase 4C Vernal Pool has met the physical and biological criteria for certification of Vernal Pool habitat by the Massachusetts NHESP Obligate Species Method (GE 2009, 2010, and 2011; Stantec 2012, 2013, and 2014; Avatar Environmental 2014, and 2015).

In addition, see Section III.B.2 of this Response to Comments for additional responses on the effectiveness of restoration of Vernal Pools.

Lastly, GE does not accurately represent the Commonwealth's position on the Draft and Final Permit Modifications. The Commonwealth consulted with EPA and supported the Vernal Pool remediation approach proposed in the Draft Permit Modification. It is misleading for GE to present the Commonwealth's 2011 comments to EPA on the Revised CMS as representative of the Commonwealth's current position on the approach to Vernal Pool remediation. Following the submittal of the aforementioned 2011 comments, GE participated in discussions with the Commonwealth and EPA relative to potential Vernal Pool remediation approaches that were developed in cooperation between the agencies (see the May 2012 Status Report). In addition, after receiving and reviewing the comments on the Draft Permit Modification, EPA and the Commonwealth discussed potential revisions to the Vernal Pool remediation requirements, and the Commonwealth concurs with the language in the Final Permit Modification. Accordingly, the January 2011 comments from the Commonwealth are not representative of the Commonwealth's 2014 comments and current position on the Final Permit Modification's approach to Vernal Pools. See also Response 80 *et al*.

In summary, the Vernal Pool Performance Standards were developed considering all of the Permit criteria, including the risks to amphibians identified in the ERA, the potential short-term effects of remediation, and the state of the science related to the history and efficacy of Vernal Pool restoration as well as the demonstrated site-specific success in remediation and restoration of a Vernal Pool in the Housatonic River floodplain, and with input from the Commonwealth. EPA disagrees that the Vernal Pool remedy is arbitrary and capricious. It is important to note that EPA's evaluation is not simply the comparison of an individual criterion or sub-criterion for the Vernal Pools. Rather, EPA's evaluation, pursuant to the Permit, has been to determine what combination of remedy components is best suited to meet the Permit's General Standards in consideration of the Permit's Selection Decision Factors, including a balancing of those factors against one another. EPA thoughtfully and thoroughly performed that evaluation and balancing in selecting the remedy in the Final Permit Modification.

Comment 127: We are not convinced, and there has been no evidence provided, that Core Area 1 and similar high-value habitats would be irreversibly damaged if remediated. Restoration of a remediate[d] vernal pool has already been demonstrated. Leaving high concentrations of PCBs in vernal pools and other amphibian habitat would diminish the long-term resiliency of amphibian and other species. As such, we believe that all vernal pools and contributing habitats should be remediated to meet the 3.3 mg/kg target.

We are concerned that a proper balance be reached in Core Areas. The remediation pilot project conducted on a vernal pool in Pittsfield indicates that the post-construction functionality of this pool had returned within a breeding season or two after construction. This would indicate that these areas have proven to be resilient and can recover in a relatively short period of time. We ask that cleanup standards in the core areas be revisited to ensure that the long term PCB removal goals have not been unduly compromised based on short term impacts to the core areas.

EPA Response 127: EPA concurs that the 3.3 mg/kg concentration is the appropriate Performance Standard and that habitats will not be irreversibly damaged if remediated. However, EPA also believes that the remedy in the Final Permit Modification properly balances reducing risks to ecological receptors while limiting the impacts to Core Area 1, and minimizing the impacts of remediation on a case-by case basis for Core Areas 2 and 3.

III.E Inspection, Monitoring and Maintenance/Operation and Maintenance

Comment 111: Additional testing will be necessary to confirm patterns of contamination and inform detailed final design plans for the remediation.

Comment 121: EPA should establish a rigorous post-remediation program to monitor the movement of the river channel and establish strict mitigation protocols that can be activated quickly to minimize the amount of new PCB-contaminated soils being released into the water column for transport.

Comment 149: In Section II.B.4.a.(1) of the Permit (Baseline and Construction Monitoring), insert language to state clearly that the pre-construction baseline monitoring program include water, sediment, soils and biota sampling for sites previously tested throughout Reaches 5 through 9 before any cleanup construction is undertaken.

Comment 182: The construction monitoring program should be conducted to determine, within a reasonable period of time, if there is any increased PCB contamination due to downstream transport from the cleanup, severe storm events or other changes to the river. Sampling should be conducted at least every five years during the formal cleanup period and more frequently depending on upstream PCB releases.

Comment 183: The post-remediation long-term monitoring program should require sampling every 5 years, or more frequently, depending on stream, bank and floodplain impacts upriver, and the potential failure of any upstream remediation measure. Measurements of PCBs flowing over Rising Pond Dam should be made and, if a record of stable, acceptable water column PCB concentrations is amassed, the time between sampling could be increased; conversely, more frequent sampling should be required if the data show increased PCB downstream transport.

Comment 150: The section of the Permit dealing with Long-Term Operations, Monitoring and Maintenance needs to be more detailed. The Permit states that long-term monitoring and maintenance shall be conducted until the Long-term Biota Benchmarks have been achieved. For fish, this is 0.064 mg/kg. What if this benchmark is achieved, and severe storm events occur after achievement that reintroduce PCBs into the environment? If monitoring is no longer occurring, how will we know that PCBs have been reintroduced? If PCBs are reintroduced into water and sediment, it could take years for PCBs to again bioaccumulate in fish tissue.

EPA Response 150: Based in part on this comment, the phrase "until Long-term Biota Benchmarks have been achieved" has been deleted. The Final Permit Modification has been revised to require monitoring and maintenance throughout the Remedial Action and during Operation and Maintenance to ensure that Performance Standards are achieved and maintained.

In addition, in part in response to this comment, Section II.A. of the Final Permit Modification, includes ". . .achieve and maintain such Performance Standards. . ." (emphasis added). Similar changes were made in Section II.B. of the Final Permit Modification.

Comment 151: We request that the EPA set specific long-term performance standards and monitoring points all along the length of river where remediation has taken place to ensure encapsulation of PCBs. At a minimum, standards must be set for visual and water quality monitoring at these points to ensure that the caps and armoring are functioning as designed. We urge the EPA to establish environmental conditions, such as a specific flow regimes and/or storm events that will automatically trigger monitoring, inspections of caps and armoring, and possible remedial action. The Permit should outline a framework for setting long-term Performance Standards once cleanup activities have been completed. These Standards would reflect post-construction conditions and incorporate lessons learned throughout the process.

EPA Response 151: Based on current information, EPA believes there are sufficient remedy Performance Standards in the Final Permit Modification. Also, GE's long-term compliance is already covered by the Final Permit Modification. GE will be submitting, for EPA approval, Work Plans for Inspection, Monitoring, and Maintenance and O&M. Examples of requirements related to such compliance include the following, without limitation: Inspection, Monitoring, and Maintenance programs and O&M to evaluate MNR and the effectiveness of the Corrective Measures in achieving and maintaining Performance Standards; and GE's obligation to conduct other response actions necessary to achieve and maintain compliance with Performance Standards. Also see EPA Response 111 *et al.*

Comment 133: The word "Long-Term" and "temporary" are used throughout the Permit, but these terms are never defined. We request that long-term monitoring and response actions remain in place in perpetuity and be clearly stated as such.

Comment 152: There should be a requirement for ongoing, regular monitoring of sediments and sediment transport as long as areas of PCB contamination above specific thresholds are known to remain in the river channel, banks or floodplain. This requirement should remain in place in perpetuity, with commensurate requirements for additional cleanup, without triggering a modification to the Permit, as called for by the monitoring. We are concerned that there is no

language in the Permit stating that GE is responsible for maintaining the performance standards or remediating contamination in perpetuity.

EPA Response 133, 152: EPA concurs that for River of River, GE should be responsible for conducting monitoring for a very long period of time, if not in perpetuity. Section II.B.4. of the Final Permit Modification requires monitoring to be conducted throughout the Remedial Action to ensure that Performance Standards are achieved and maintained, and to monitor the effectiveness of the Corrective Measures. In addition, the Final Permit Modification clarifies that an O&M Plan is required to be developed and implemented upon completion of the Remedial Action for Rest of River. See Section II.C. of the Final Permit Modification. Among other requirements, the O&M Plan requires GE to monitor surface water, sediment and biota.

The Decree and the Final Permit Modification, should monitoring indicate that Performance Standards are no longer being met, include provisions to require GE, as appropriate, to take additional response actions necessary to meet and maintain the Performance Standards. See for example, Final Permit Modification Section II.B.1.a. and b., Decree Section XXVI, and Decree Paragraph 39.

There is no termination date set for these monitoring requirements.

Comment 396: The Long-Term Operation, Monitoring, and Maintenance Plan that is required pursuant to the draft Permit must include regular inspection and monitoring of all armoring and caps, including bathymetric surveys.

EPA Response 396: As discussed above, the Final Permit Modification requires inspection, monitoring and maintenance of all armoring and caps. In addition, based in part on this comment, the Final Permit Modification has been revised to require bathymetric surveys to be conducted both before and after sediment removal and the placement of the Engineered Cap in Woods Pond and Rising Pond. The post-capping bathymetric surveys will be the baseline used in determining the amount of future sediment deposition and will assist EPA in the determination as to whether or not such accumulated sediment needs to be removed. See the Final Permit Modification, Sections II.B.2.e.and g. Therefore, periodic post-removal bathymetric surveys will be required as part of the Inspection, Monitoring and Maintenance Plan.

Comment 441: Connecticut is relying on the remediation of the Massachusetts portion of the river to reduce downstream transport of PCBs and decrease the concentrations of PCBs in fish along with a robust environmental monitoring program in Connecticut before, during and after remediation in order to evaluate the risks from PCBs and the health of the Housatonic River.

EPA Response 441: EPA concurs with Connecticut's comment and, as discussed in Response 111 et al. above in this Section III.E., the Final Permit Modification requires a monitoring program before, during and after remediation both in Massachusetts and Connecticut.

Comment 452: A scope of work should be prepared for both the Baseline/Construction monitoring program as well as the Long-term monitoring program. The requirement for development of this work plan should be added to Section II.B.11 of the permit, and should include EPA and Connecticut review and approval for all monitoring activities to take place in Connecticut.

EPA Response 452: EPA agrees that the requirement for the submission of the Baseline/Construction and Long-term Monitoring Plans was included in Section II.B.11.v of the Draft Permit Modification. These requirements were retained, but slightly modified and relocated into Sections II.H.1.c. (Baseline Monitoring Plan), II.H.18.a. (Construction Monitoring Plan) and b. (Inspection, Monitoring and Maintenance Plan) and II.H.23. (Operation and Maintenance Plan) of the Final Permit Modification. The Performance Standards and Corrective Measures for these programs are described in Section II.B.4. and II.C. of the Final Permit Modification.

The appropriate level of detail and Connecticut's role in reviewing Work Plans is discussed above in Response 111 *et al*. in this Section and in Section VIII of this Response to Comments.

Comment 464: The permit should specify analytical requirements for measuring PCBs. Connecticut recommends that, in addition to measurements of PCBs as individual and total Aroclors, that all samples also be analyzed for individual and total PCBs using either homologs or congeners. As PCBs weather, they undergo chemical changes which may render the Aroclor method insufficient to provide an accurate accounting of the amount of PCBs in the environment. Measuring PCBs via homologs or congeners will allow for measurement of all forms of PCBs and will not under-represent the actual concentrations of PCBs in the environment as might happen with reliance solely on methods deigned to analyze for Aroclors.

EPA Response 464: As discussed above, EPA believes that the details of the monitoring plans, including analytical methods and detection levels, should be proposed by GE in its Work Plans to be submitted to EPA for review and approval. In addition, because analytical methods and detection limits will likely change during the monitoring period, it would be inappropriate to specify analytical methods and detection limits in the Final Permit Modification as they may become obsolete. Lastly, in part in response to this comment, the definition of PCBs was revised to include the word "total" so that regardless of the analytical method used, the amount of PCBs should be the sum of the detected PCB aroclors, congeners, or homologues.

Comment 478: Connecticut concurs with EPA that the final footprint of remediation will need to be informed by updated data on environmental concentrations and erosion potential.

Response 478: EPA acknowledges Connecticut's concurrence.

III.F Treatment/Disposition

III.F.1 General Comments on Treatment/Disposition

Comments 56, 373, 430, 485, 493, 495, 530: EPA received one set of comments objecting to EPA's proposal for off-site disposal of excavated material, and many other comments which were supportive of EPA's proposal. GE stated EPA's proposed requirement that all excavated soils and sediments must be transported to and disposed of at an off-site, out-of-state disposal facility, rather than being disposed of in a secure upland facility, as GE has proposed, abuses the Permit's remedy selection criteria and would be arbitrary, capricious and unlawful. In addition, GE believes EPA incorrectly selected off-site disposal and that an objective application of the Permit Criteria clearly favors the selection of on-site disposal. This is because: (a) both off-site and secure on-

site disposal would meet the Permit's General Standards; (b) the Selection Decision Factors other than cost either favor on-site disposal or favor neither alternative; and (c) the cost factor strongly favors on-site disposal.

Alternatively, many commenters, including all of the affected Massachusetts municipalities and the Commonwealth of Massachusetts, supported EPA's proposed alternative of off-site disposal and opposed on-site disposal. However, some non-governmental commenters noted discomfort with any type of landfilling. In addition, several commenters supported the use of rail for off-site disposal. Specifically, the Commonwealth supports the Proposed Cleanup Plan requirement that GE maximize the use of rail to transport contaminated material to off-site licensed facilities. The Commonwealth further states the current freight rail system owned by Housatonic Railroad Company, Inc. runs adjacent to the portions of the Housatonic River subject to removal actions, including Woods Pond, and should be used to the extent feasible to transport contaminated media from the site. Maximizing the use of rail would reduce the impacts of the remedy on the surrounding communities, particularly with respect to truck traffic.

EPA Response 56, 373, 430, 485, 493, 495, 530: EPA notes the support for off-site disposal and the use of rail transport. EPA disagrees with the assertions, the characterization of EPA's analyses, and the conclusions of GE favoring on-site upland disposal of excavated material. Based in part on GE's evaluation in the Revised CMS, EPA performed a thorough comparative analysis of the alternatives with respect to the criteria specified in the Permit, analyzing the key tradeoffs among different treatment/disposal alternatives. That comparative analysis supports EPA's determination of the selected treatment/disposal alternative as best suited to meet the Permit's General Standards in consideration of the Permit's Selection Decision Factors, including a balancing of those factors against one another. See Comparative Analysis, pages 59-77. Contrary to GE's assertions, as the Comparative Analysis demonstrates, there are distinctions between GE's favored approach and the selected remedy with respect to the Permit's General Standards; additionally, the Permit's Selection Decision Factors other than cost include criteria and sub-criteria clearly favoring off-site disposal, and thus the difference in the cost criterion is by itself not the sole factor to consider. More detailed responses to comments on the individual criteria and sub-criteria are in Section III.F.2 below.

Comment 92: Where is the rail depot large enough to handle 10,000 truckloads per year of material going in and out? Where in Reach 5A could it be located? And how does the material get from the River and Floodplains to that depot and back?

EPA Response 92: A location for the rail facility has not been selected as part of the Final Permit Modification. The Final Permit Modification requires GE to maximize the transport of material to off-site facilities via rail, to the extent practical and requires GE to submit to EPA, for review and approval, a Work Plan for the Siting of the Temporary Centralized Contaminated Materials Processing/Transfer Location(s). It is in this Work Plan that GE is required to propose the rail transfer location. In this Work Plan, the Final Permit Modification requires GE to describe the criteria to be used in proposing the siting of the temporary material processing/transfer location(s), the process to coordinate with affected communities regarding the operation of the temporary location(s), and an evaluation of the potential location(s) using the criteria. GE will also propose in this or other Work Plans the methods to transport the material to this facility(s). Depending on the location of the facility(s) and the type and location of the

material to be transported, the method of transportation to the facility could include trucks, slurries pumped through piping, and/or a combination of these and other methods.

Comment 237: In the discussion of T/D Alternative 2 on p. 25 of the Statement of Basis, it is noted that "material that exceeds the capacity of the CDFs (in the river or backwater, two proposed sites) would be disposed of in existing off-site licensed landfills." What is the potential for exceeding CDF capacity?

EPA Response 237: In its Revised CMS, GE assumed that all sediment dredging from Reaches 5C and 6 and could be placed in CDFs located in Woods Pond and in the Backwaters. Based on the largest sediment removal remedy for these reaches, GE estimated that the CDFs could be constructed to hold up to 800,000 cubic yards of material. Any material generated outside of Reaches 5C and 6 would need to be dealt with separately. For reference, EPA estimated that the remedy selected in the Final Permit Modification would generate approximately 990,000 cubic yards of material that would require treatment and/or disposal. Finally, note that EPA has not selected CDFs as part of the Final Permit Modification.

Comment 238: Is there any calculation of the total capacity for the three potential upland (on-site) disposal facilities?

EPA Response 238: The capacities of the three upland disposal facilities evaluated by GE in its Revised CMS range from 191,000 to 2,000,000 cubic yards for the Woods Pond facility, 191,000 to 1,000,000 for the Forest Street facility and 191,000 to 2,900,000 for the Rising Pond facility. For reference, EPA estimated that remedy for the Final Permit Modification would generate approximately 990,000 cubic yards of material that would require treatment and/or disposal.

Comments 238, 307, 373: Several commenters support EPA's requirement that disposal of hazardous waste take place at a licensed landfill, and note that there are no such facilities currently licensed in Massachusetts. However, the wording of the Permit could be interpreted to allow the establishment of such a facility in state, or even within Berkshire County, at a future date. We oppose any plan from EPA or GE that would result in disposal of contaminated material at any site in Massachusetts. The Permit should be worded to explicitly prohibit such disposal.

EPA Response 238, 307, 373: The Final Permit Modification requires disposal of all contaminated sediment and soil, as well as other waste material, off-site at existing licensed facilities that are approved to receive such waste material and are in compliance with EPA's off-site rule. The Final Permit Modification does not specify that this facility be out-of-state. If an off-site facility was proposed to accept such waste, a facility would have to go through the proper State and federal siting requirements and regulations and be in compliance with EPA's off-site rule prior to being an acceptable disposal facility pursuant to this Final Permit Modification. This process would take place outside of the Final Permit Modification.

Comment 266: The comparative analysis of treatment/disposal alternatives should give more consideration to the potential re-use of soil after treatment.

EPA Response 266: The Comparative Analysis discusses potential reuse after treatment by both TD 4 (chemical extraction) and TD 5 (thermal desorption). Specifically, it states:

> The results of a bench-scale test of a representative chemical extraction process indicate that PCB concentrations in the treated sediment and soil would not be sufficiently low to allow reuse on-site; therefore, the treated sediment and soil resulting from TD 4 would have to be transported to a landfill for disposal. For TD 5, it is assumed that the thermal desorption process would reduce the concentrations of PCBs in the treated solid materials to levels (around 1 to 2 mg/kg) that could allow reuse in the floodplain and that it would not increase the leachability of metals from those materials so as to preclude such use. For reuse as backfill in the floodplain, only 50% of the volume is assumed to be the treated material because following thermal treatment the material would be sterile, requiring amendments to be suitable for floodplain restoration. However, due to uncertainties regarding the ultimate effectiveness of the treatment process (as well as issues relating to the reuse of the treated soil), TD 5 has also been evaluated based on the additional alternate assumption that all the treated material would be transported to an off-site landfill for disposal.

Comparative Analysis, Section 3.1, at 60.

Given the conclusions reached in the Comparative Analysis regarding the low potential for re-use of soil after treatment, no further discussion of this issue in the Comparative Analysis was necessary.

Comment 267: Need a further discussion of types of chemical desorption being considered to better evaluate their use on these contaminants.

EPA Response 267: Chemical desorption was not evaluated. Chemical extraction was evaluated as option TD 4. Section 9.4 of GE's Revised CMS provides a full description of the method evaluated.

Comment 485: The Commonwealth and the affected communities are seeking EPA's affirmation that off-site disposal will remain a legally binding requirement in the Final Cleanup Plan for Rest of River, as well as a more detailed explanation as to how it will be implemented in a manner that is most protective of our interests and concerns.

EPA Response 485: The Final Permit Modification requires off-site disposal at existing licensed facilities that are approved to receive such waste material and are in compliance with EPA's off-site rule. The details of how the remedy will be implemented will be determined as part of the remedial design process under the Final Permit Modification. Also note that the State and municipalities will have an opportunity to provide input during the design and implementation process, as discussed in Section VIII of this Response to Comments.

III.F.2 Comparative Analysis for Treatment/Disposition Remedy

GE provided comments regarding each of the nine remedy selection criteria in the Permit. Those comments and EPA's responses are immediately below, in Comments and EPA Responses 546-576. In addition, there were several non-GE comments that are directly related to the remedy selection criteria and they are also addressed immediately below. See also Section II.A of this Response to Comments for a discussion of the Permit criteria used for evaluation of alternatives.

III.F.2.a Overall Protection of Human Health and the Environment

Comment 546: GE asserts the following: EPA acknowledges that both TD 1 [Off-site Disposal] and TD 3 [On-site Disposal] would provide "high levels of protection to human health and the environment" (Stmt. Basis, p. 35). It explains that TD 1 and TD 1 RR would provide such protection by "providing for permanent disposal of PCB- contaminated sediment and soil in permitted off-site landfills," and that TD 3 would provide such protection by "permanently isolating the PCB-contaminated sediment and soil in an upland disposal facility, which would be constructed with an appropriate double liner, cover, and double leachate collection system" (Comp. Analysis, pp. 60-61). As shown in Table 1, EPA has long recognized that on-site disposal facilities are protective, particularly for sediment and soil containing PCBs, in selecting on-site disposal of such materials as a component of the remedy for numerous PCB sites throughout the country, including in Massachusetts.[30] Indeed, the EPA Region has already approved the use of on-site disposal facilities (the On-Plant Consolidation Areas [OPCAs]) at this very Site, based on determinations that such facilities are appropriate for PCB-containing sediment and soil and would not pose an unreasonable risk of injury to health or the environment. There is no justification for a different conclusion for the Rest of the River.

In an apparent attempt to distance itself from its own prior conclusions, the Region has inserted some qualifications into its discussion of the application of the overall protectiveness criterion in an effort to suggest that TD 3 would be less protective than TD 1 or TD 1 RR. Those qualifications do not withstand scrutiny and do not support the Region's conclusion.

EPA Response 546: EPA disagrees with GE's assertions, the characterization of EPA's analyses, and the conclusions of GE favoring on-site upland disposal of excavated material. Based in part on GE's evaluation in the Revised CMS, EPA performed a thorough comparative analysis of the alternatives with respect to Overall Protectiveness of Human Health and the Environment, analyzing the key tradeoffs among different treatment/disposal alternatives. EPA's analysis is demonstrated in Section 3.2 of EPA's Comparative Analysis. In addition, EPA's analysis of the Overall Protectiveness of Human Health and the Environment is only part of EPA's overall evaluation of the Permit criteria, on which EPA based its determination of the selected remedy as best suited to meet the Permit's General Standards in consideration of the Permit's Selection Decision Factors, including a balancing of those factors against one another. See Comparative Analysis, pages 60-62. Moreover, except as otherwise specified in the Responses to Comments, the comments, upon EPA evaluation, do not make a significant difference to the Comparative Analysis or EPA's determination.

GE's comment also include two specific assertions, which are addressed immediately below.

1. Protectiveness of on-site versus off-site permanent disposal: Pursuant to the Permit, EPA considered several factors in analyzing on-site vs. off-site permanent disposal. For example,

[30] [footnote from GE's comment] As noted in Table 1, for example, the EPA New England Region has approved the use of an on-site Confined Aquatic Disposal (CAD) cell for disposition of PCB-contaminated sediment in New Bedford Harbor (EPA, 2011). It is inconsistent for the Region to conclude that disposition of such material within that waterbody is acceptable, but that disposition of similar materials in a secure on-site upland disposal facility outside the floodplain in Berkshire County is not.

on-site disposal facilities may be less effective at containing waste than an off-site disposal facility because the locations identified in the Revised CMS do not meet TSCA's siting requirements for PCB landfills. See 40 C.F.R. § 761.75(b)(1). (Although it is possible for TSCA siting requirements to be waived, doing so would have to be based upon a determination by EPA that it is appropriate to do so, and EPA believes that it is not appropriate to do so here). GE's Revised CMS acknowledges that none of the three proposed landfill sites meet TSCA's requirements for soil characteristics including permeability. In addition, Woods Pond is located near a drinking water source and is located above a medium yield aquifer. The Revised CMS also notes that none of the three sites meet all of TSCA's requirements for a landfill site's hydrological characteristics and all three sites are located within close proximity to the Housatonic River. By contrast TSCA requires that the bottom of the landfill liner be more than 50 feet above the historical high water table, that groundwater recharge areas be avoided, and that there is no hydraulic connection between the site and a surface waterbody. See 40 C.F.R. § 761.75(b)(3). Similarly, as stated in the Revised CMS, the Forest Street Site would not meet the TSCA requirement that a landfill be located in a relatively flat area to minimize erosion or landslides.

These TSCA criteria are meant to be protective of human health and the environment in the event of leaks or failure in the landfill technology. As explained in EPA's Statement of Basis, "there is the potential for PCB releases to the Housatonic watershed if the landfills are not properly operated, monitored and maintained." Statement of Basis at 36. Moreover, the potential extended duration of the operation of the proposed on-site landfills, given the range of sediment and soil volumes at issue here and the length of remedy implementation, likely necessitates that the proposed on-site facilities operate for an extended period of time. Comparative Analysis at page 64. These factors increase the risks of potential future releases to the Housatonic watershed, compounded by the poor suitability of the proposed locations given such factors as soil permeability, proximity to the Housatonic watershed, and/or drinking water sources. Accordingly, use of on-site landfills would "rel[y] heavily on proper long-term operation, maintenance, and monitoring activities." Comparative Analysis at page 65.

In addition, GE's proposed on-site disposal sites are located within areas zoned for residential and/or conservation purposes and/or are within a designated Area of Critical Environmental Concern. By contrast, suitability and protectiveness of off-site facilities are not affected by such contrary zoning regulations or the ACEC designation, both of which call into question the protectiveness and suitability of on-site disposal locations. Indeed, an off-site disposal facility would pose no risk of release to the Housatonic watershed, and would be fully licensed and regulated under TSCA and/or other applicable federal and state requirements. Such facilities are generally constructed in the area best suited to that use considering the hydrology and soil characteristics. Here, no on-site locations have been identified that would meet the TSCA PCB landfill siting requirements. In addition, an off-site disposal landfill will already contain hazardous substances whereas none of the proposed locations identified in the Revised CMS are known to be contaminated, making them a less suitable alternative. These types of considerations are important when considering siting of a new land disposal facility (as opposed to the decision to consolidate or cap wastes in an already contaminated area).

2. EPA's past practice regarding on-site and off-site disposal: GE cites a Table (Table 1) with 24 sites where it asserts that PCB-contaminated sediments and soil were disposed on-site or at local landfills. More complete and accurate information for each of the sites listed in GE's table is provided in EPA's Table 1 to this Response to Comments. While it is true that EPA has successfully implemented on-site disposal of dredged sediments at several sites around the country, GE's table is misleading because it lumps local landfills together with true on-site disposal. For instance, GE's Table 1 cites 250,000 cubic yards of non-TSCA sediment locally disposed at the Ottawa River Site. These non-TSCA sediments were actually disposed at an off-site landfill owned and operated by the City of Toledo, while the TSCA-regulated sediments from that site were disposed out of state at a hazardous waste landfill. This "local disposal" at a fully-regulated municipal landfill is not comparable to on-site disposal, where regulations may be waived. GE's table also does not differentiate where wastes were consolidated in areas already impacted by contamination (much like the On-Plant Consolidation Areas at the Pittsfield facility, for which limited disposal was allowed under the Decree), versus construction of a new facilities in previously uncontaminated areas, as is contemplated by alternative TD-1.

   GE's Table 1 also stretches the term "on-site disposal" beyond its logical limits. For instance, Table 1 calls the disposal of roughly 100,000 cubic yards of less-contaminated sediment at the River Raisin Site "on-site disposal," but this sediment was actually disposed at an off-site pre-existing confined disposal facility two miles away operated by the US Army Corps of Engineers for disposal of contaminated sediments unearthed during navigational dredging. This disposal in a pre-existing federally-managed facility outside site borders cannot be considered "on-site disposal," and is not comparable to building a new upland disposal facility outside the area of contamination, adjacent to the Housatonic River site, where GE has argued that EPA should waive relevant and applicable regulatory requirements.

   For nearly half of the Sites listed in GE's Table 1, only a portion of the wastes was disposed on-site while the remainder was shipped off-site to a licensed and regulated landfill. For instance, at Lower Fox River more than 95% of the contaminated sediment and soils were disposed off-site at TSCA and municipal landfills, but Table 1 mentions only the small amount disposed at an off-site landfill owned by a PRP. Similarly, at the Fields Brook Site, the vast majority of contaminated sediment and soil was disposed off-site: roughly 700,000 cubic yards out of a total of roughly 750,000. But Table 1 mentions only the first Operable Unit, where 14,000 cubic yards of contaminated sediment and soils were treated on-site or disposed on-site.

   GE also cites the on-site disposal (On-Plant Consolidation Areas) of contaminated soil and sediment in the prior non-Rest of River Decree removal actions as its principal example of on-site disposal. The Decree allowed GE to dispose of dredged contaminated soil and sediment in two consolidation areas: the first on top of an existing landfill, the "Hill 78", and the second adjacent to the existing landfill, in an area called "Building 71." GE fails to mention that Hill 78 was a pre-existing landfill, not an area with no known contamination as contemplated in TD-3 (on-site disposal). Moreover, the Decree limited the footprint and height restriction for Hill 78 and Building 71 and required off-site disposal of remaining wastes. As a result, GE could only dispose approximately 245,000 cubic yards of soil,

sediment and building debris at these facilities, far less than the volume anticipated for Rest of River. GE and EPA have to date transported approximately 100,000 cubic yards of material from non-Rest of River areas off-site for disposal. Any additional material generated by GE in completing the non-Rest of River cleanups will also be transported off-site for disposal.

Comment 67: A citizen commented that there is a precedent [for] EPA allowing a landfill next to Allendale School [as part of the Consent Decree] (Hill 78 and Building 71). I think GE could go to before a judge and use this precedent to say on-site landfills were used before, so you should allow us to do it again. Furthermore, there are rumors that GE is purchasing land in the County and that indicates that GE does in fact plan to create landfills in Berkshire County for materials excavated from the river and floodplain.

EPA Response 67: See Response 546 above.

i. Potential Habitat Impacts

Comment 547, 562, 564, GE Attachment A: GE asserts the following: The Region notes that TD 3 (on-site disposal) would cause a long-term or permanent habitat change in the footprint of the upland disposal facility, although it recognizes that the capped disposal area would be replanted with grass and that the support areas would be restored (Comp. Analysis, p. 61). In addition, EPA claims that TD 3 would cause a permanent alteration of the existing habitat in the Woods Pond disposal facility, which is located within an ACEC. Contrary to the EPA's claims, any habitat impacts of TD-3 do not undermine the protectiveness because two of the potential on-site disposal facility locations are primarily forested and there would be no permanent impacts on wetlands, rare species, habitat, or other valuable or protected types of habitat and the third is currently a sand and gravel operation (the Woods Pond Site). Although the Woods Pond Site identified for a disposal facility is located within the boundaries of the ACEC, the facility would be located predominantly (over 90%) within disturbed land used for quarry operations and would not affect any outstanding resources of the ACEC. The landfills, if constructed, could be planted with native grasses to create grassland/open field habitats. This would be a habitat improvement for the Woods Pond Site. In addition, in its evaluation, EPA did not consider the habitat impacts of the rail loading facility necessary under Alternative TD 1.

EPA Response 547, 562, 564, GE Attachment A: EPA concurs that the footprint for two of the areas considered for on-site disposal (the Forest Street Site and the Rising Pond Site) are primarily forested. EPA also concurs that if these sites were to be used for disposal facilities, the habitat would change from forested to native grasslands. Note that these two facilities currently contain prime forest land as designated by the State. After tree removal and prior to final capping, which may take 15 years, the habitat value at these two locations, which are otherwise unimpacted by the site contamination, would be significantly decreased. EPA concurs that if the Woods Pond Site was selected for a disposal facility the habitat would be improved for a majority of the area after final capping was completed if the area is restored with a grassland community. However, note there is a small portion of the footprint located in prime forest habitat.

Furthermore, there are other potential adverse effects to habitat at these potential landfill locations. The Forest Street Site requires an access road that would have to be constructed over Goose Pond Brook. As stated in the Revised CMS, the access road would also be located within the 100-foot buffer zone of the brook and in addition, portions of the operational footprint would be within the 200-foot riverfront area of Goose Pond Brook (a jurisdictional resource area under the Massachusetts Wetland Protection Act). For the location referred to as the Rising Pond site, the proposed landfill operational area directly abuts 25 acres of Priority Habitat for the state-listed Wood Turtle. As a result, further confirmation would be needed to conclude if there are any effects on priority habitat of rare species in the operational area of the landfill, and depending on the significance of such effects, compliance with, or a waiver of, the Massachusetts Endangered Species Act would be required. In addition, the Woods Pond site would require a waiver of the ARAR related to permanent disposal locations within an ACEC. (See Section IV of this Response to Comments for additional responses on compliance with ARARs.)

The location of a potential rail transfer facility not been proposed or selected, so a delineation of specific habitat impacts necessarily has not been done. The Final Permit Modification requires that GE propose criteria and evaluate potential rail transfer locations using that criteria and submit this evaluation to EPA for review and approval. Final Permit Modification at II.H.1.d. (Work Plan for Siting of Temporary Centralized Contaminated Materials Processing/Transfer Locations). This process will be used to evaluate any potential effects on habitat. Based, in part, on this comment, EPA clarified Section II.H.1.d. to note that this plan covers a rail transfer facility as well.

Comment 269: One commenter asserts that each of the on-site T/D alternatives will result in a loss of habitat.

EPA Response 269: EPA concurs that some of the alternatives impact the habitat more than others. The response above, the Statement of Basis (page 37) and the Comparative Analysis (page 68) discuss the effects on habitat for various alternatives. In addition, see Response 547 *et al.* above.

ii. Risk of Leaks, GHGs

Comment 548: GE asserts as follows: EPA claims that Alternative TD 3 will have greater short-term impacts than Alternatives TD 1 and TD 1 RR due to the potential leaks during transport of leachate over public roads to GE's water treatment facility in Pittsfield. Yet EPA made no effort to quantify such risks. EPA states that, alternatively, GE would have to construct and operate a treatment facility at the upland disposal facility, and that if that facility was not operated properly, there could be releases of PCBs into the environment. EPA acknowledges that leaks during transport would occur only in the case of "malfunctioning equipment or an accident" (*id*., p. 69) and that leaks from an on-site treatment plant would occur only if the plant "were not operated properly." Any trucks used to transport leachate would be water-tight and the total mass of PCBs transported over the life of the project would only be approximately 2 lbs. TD 1 RR would involve similar, if not greater, potential for the release of PCB-contaminated materials.

EPA Response 548: EPA's statement that there is the potential for spills of leachate (which is a liquid) during transport is accurate, even if one concludes the likelihood and environmental impact is low. Also, spills of liquid-contaminated material spread more quickly and may cause more environmental harm than spills of PCB solids that would be transported off-site via truck or rail. Similarly, if GE were to construct a water treatment facility at the location of the landfill, there is the possibility, despite best efforts to properly operate the treatment facility, to have releases of PCBs to the river.

Comments 549, 565: GE asserts as follows: TD 1 and TD 1 RR would each result in considerably more greenhouse gas (GHG) emissions than TD 3 and would have a larger carbon footprint. EPA compares the range of GHG emissions resulting from TD 1 to those resulting from TD 3, correctly noting that TD 3 would result in much lower emissions. EPA does not estimate the GHG emissions resulting from TD 1 RR, although it notes that those emissions would be "significantly lower" than under TD 1 due to the use of rail instead of truck transport. GE has estimated the total GHG emissions from each of these three TD alternatives for the removal volume represented by the proposed sediment/floodplain remedy. TD 1 would result in the greatest amount of emissions (approximately 165,000 tonnes), but TD 1 RR would result in a considerably greater amount of emissions (approximately 70,000 tonnes) than TD 3 (6,600 to 36,000 tonnes, depending on the disposal facility site used). Thus, TD 3 is much more compliant than either TD 1 or TD 1 RR with EPA's general and EPA's specific "green remediation" policies to minimize GHG generation.

EPA Response 549, 565: In the Comparative Analysis, the total GHG emissions estimated for the treatment/disposition alternatives were provided as ranges based on the potential volumes of sediment and soil that would require disposal or treatment. For TD 1 (off-site disposal to a licensed facility by truck) the GHG emission estimates ranged from 19,000 to 290,000 tonnes. GHG estimates for TD 1 RR (off-site disposal to a licensed facility by rail) were not presented in the Comparative Analysis.

GE's estimate of GHGs for TD 1 is within the ranges estimated by EPA in its Comparative Analysis. These GHG calculations are largely based on estimated roundtrip miles from the site to the off-site disposal facilities multiplied by vehicle and fuel emission factors, fuel economy values and other factors. Estimates of GHG emissions can vary extensively based on the assumptions (e.g., the assumed disposal facilities and associated roundtrip distance) used in the calculations.

EPA assumed different disposal facilities in its Comparative Analysis for off-site disposal via truck and via rail. In response to this and other comments (See Response 7, Section IX.E of this Response to Comments), EPA used GE's methods with EPA's assumed disposal facilities and conducted an additional analysis to refine the estimate of GHGs, including an estimate for GHGs for off-site disposal using rail. Based on EPA's assumptions and the estimated volume of the remedy, EPA calculates the GHGs for off-site disposal via trucks to be approximately 100,000 tonnes and for off-site disposal via rail to be 50,000 tonnes, both of which are below GE's estimates. For additional details, see Response 7. Although these estimates are greater than those for on-site disposal, they are less than estimated by GE, and are within the range of GHGs used in EPA's Comparative Analysis. Since both EPA's and GE's estimates are within the range

cited in the Comparative Analysis, neither of these estimates would change the overall evaluation of remedy selection criteria.

III.F.2.b Control Sources of Releases

Comment 550: GE asserts the following: The EPA Region recognizes that both off-site disposal and on-site disposal would control the potential for releases of PCB-containing materials into the environment through placement of those materials into engineered disposal facilities, but it then asserts that TD 1 and TD 1 RR would better meet this criterion than TD 3 (Comp. Analysis, p. 62). To support this claim, the Region states that while TD 3 would "most likely" isolate the removed material from being released into the environment, "the potential remains for releases to occur to the Housatonic River watershed both during operations and in the long term if the facility, including potentially a water treatment plant, was not properly operated and maintained."

This is not a supportable distinction. Given that all aspects of this remedial action, including the construction and operation of any on-site disposal facility, would be subject to EPA approval and under close EPA oversight, EPA could and would ensure that an on-site disposal facility is properly designed, operated, maintained, and monitored. As such, the facility would provide the same control of releases as an off-site disposal facility. The Region has provided no data on releases from either on-site or off-site disposal facilities, even though it admits that on-site disposal of PCB-containing material "has been used as part of a final remedy at a number of sites and is an effective and reliable means for permanently isolating such materials" (*id*., p. 64). The fact that any potential releases from an on-site disposal facility, in the unlikely event that they should occur, would be within the Housatonic River watershed, whereas any potential releases from an out-of-state disposal facility would take place within the area of that facility, does not affect the ability of the facility to meet the standard of control of sources of releases. The fact that the Region raises the potential for improper operation and maintenance as a shortcoming of an on-site but not off-site disposal facility reveals its bias against on-site disposal.

EPA Response 550: EPA disagrees with GE's assertions, the characterization of EPA's analyses, and the conclusions of GE favoring on-site upland disposal of excavated material. Based in part on GE's evaluation in the Revised CMS, EPA performed a thorough comparative analysis of the alternatives with respect to Overall Protectiveness of Human Health and the Environment, analyzing the key tradeoffs among different treatment/disposal alternatives. EPA's analysis is demonstrated in Section 3.3 of EPA's Comparative Analysis. In addition, EPA's analysis of the Control of Sources of Releases is only part of EPA's overall evaluation of the Permit criteria, on which EPA based its determination of the selected remedy as best suited to meet the Permit's General Standards in consideration of the Permit's Selection Decision Factors, including a balancing of those factors against one another. See Comparative Analysis, pages 62-63. Moreover, except as otherwise specified in the Response to Comments, the comments, upon EPA evaluation, do not make a significant difference to the Comparative Analysis or EPA's determination.

In a comparison of Rest of River cleanup alternatives, it is fair to distinguish, as EPA did, the disposal of PCBs at a landfill in close proximity to the Housatonic River and its watershed from the disposal off-site far from the Housatonic River watershed. Even with close EPA oversight of GE's design, construction and operation of a landfill, there remains a non-zero potential for

issues in the ability long-term for a landfill next to the River to control the sources of PCBs. This concern is accentuated by the fact that the locations proposed by GE would not meet the substantive standards for a TSCA landfill, the proximity of the proposed Wood Pond and Rising Pond facilities to the Housatonic River, and the proposed location of the Woods Pond site within the ACEC. In addition, EPA provides a more detailed response at Response 546 above.

Comment 265.a: One commenter asserts the following: The Comparative Analysis of treatment/disposal should acknowledge the possibility of releases from CDFs, upland (on-site) disposal and even landfills (off-site disposal).

EPA Response 265.a: The Comparative Analysis evaluated these concerns. See Sections 3.3 and 3.5 of the Comparative Analysis, and the Response 546.

III.F.2.c Compliance with Federal and State ARARs (or Waivers of ARARs)

General Comments

Comment 551.a: GE asserts the following: With respect to the criterion of compliance with federal and state applicable or relevant and appropriate requirements (ARARs) (or the basis for a waiver of such ARARs), the Region asserts the following: (a) TD 1 and TD 1 RR have fewer ARARs and are the only TD alternatives that would attain all of them (The Region's Statement of Basis asserts in one place (p. 25) that the state requirements regarding disposal of removed sediment and soil would not constitute ARARs for TD 1 because ARARs apply only to on-site activities and, under TD 1, those materials would be disposed of off-site. However, as the Region acknowledges elsewhere, TD 1 and TD 1 RR would involve on-site staging of the removal materials and, for TD 1 RR, transfer of the materials to an on-site rail loading station, dewatering them there, and loading them into rail cars. Thus, as discussed further below, those alternatives would be subject to some of the same state requirements regarding the handling of waste as on site-disposal); (b) TD 3 "has ARARs associated with being a hazardous waste and solid waste disposal site, and possibly impacts on wetland areas"; (c) two of the three identified sites for an on-site upland disposal facility "are in, or in close proximity to, a state-designated Area of Critical Environmental Concern (ACEC)" and thus would not meet the requirements of the Massachusetts site assignment regulations for solid waste facilities (310 CMR 16.40(3)&(4)) or the Massachusetts hazardous waste regulations (310 CMR 30.708), which (the Region says) prohibit a solid waste facility and a hazardous waste facility within or adjacent to or in close proximity to an ACEC; and (d) certain of those sites would not meet the Massachusetts hazardous waste facility site safety council regulations (990 CMR 5.04), which provide criteria for evaluating such a facility, including that it is not within an ACEC. See Comp. Analysis, p. 63; Stmt. Basis, p. 36. These erroneous assertions are insufficient to support the Region's position.

Comment 493: The Commonwealth of Massachusetts asserts the following: On-site or near-site PCB disposal facility would not meet the requirements of several of the Commonwealth's regulations including, without limitation, the Massachusetts Water Quality Certification regulations (314 CMR 9.06), the Massachusetts Wetlands Protection Act regulations (310 CMR 10.59), the Massachusetts Hazardous Waste regulations (310 CMR 30.700), and the Massachusetts Site Assignment regulations (310 CMR 16.40).

EPA Response 551.a, 493: Except as discussed specifically below**,** EPA disagrees with GE's assertions, the characterization of EPA's analyses, and the conclusions of GE's favoring on-site upland disposal of excavated material. Based in part on GE's evaluation in the Revised CMS, EPA performed a thorough comparative analysis of the alternatives with respect to Compliance with ARARs, analyzing the key tradeoffs among different treatment/disposal alternatives. EPA's analysis is demonstrated in Section 3.4 of EPA's Comparative Analysis. In addition, EPA's analysis of the Compliance with ARARs is only part of EPA's overall evaluation of the Permit criteria, on which EPA based its determination of the selected remedy as best suited to meet the Permit's General Standards in consideration of the Permit's Selection Decision Factors, including a balancing of those factors against one another. See Comparative Analysis, page 63 and Attachment 13. Moreover, except as otherwise specified in the Response to Comments, the comments, upon EPA evaluation, do not make a significant difference to the Comparative Analysis or EPA's determination. See response to individual ARAR comments below and responses in Section IV of this Response to Comments. Specifically, with respect to any on-site temporary stockpiling of hazardous or solid waste, EPA has modified the discussion of the ARAR and the remedy's ability to attain the ARAR. See EPA Responses 727-728, 474-476, 497, 498, 499; 729-731, 500. With respect to TD 3 having ARARs associated with being a hazardous and solid waste disposal site, and possibly having impacts on wetland areas, that EPA statement remains accurate.

i. Massachusetts Solid Waste Facility Site Assignment Regulations

Comments 551, 552, 553, 554: GE asserts the following:

1. The Massachusetts solid waste facility site assignment regulations should not be considered as an ARAR for this site. These regulations do not apply to facilities that manage hazardous waste; therefore, EPA cannot rely on both the solid waste regulations and the hazardous waste regulations. If one set applies, the other does not.

2. In addition, EPA has not identified the solid waste regulations as an ARAR at this and other sites in Massachusetts where an on-site disposal facility was part of the remedy, and the State has not consistently applied them to such on-site disposal facilities. CERCLA and the National Contingency Plan (NCP) provide that a state ARAR should be waived where the State "has not consistently applied (or demonstrated the intention to consistently apply)" that requirement in similar circumstances at other sites.

3. The prohibition in the solid waste regulations on siting a solid waste management facility in an ACEC, even if applicable, would not bar the implementation of TD 3. Two of the three sites identified for an on-site upland disposal facility are not within or adjacent to the ACEC and thus they would not be affected by this prohibition even if it was applicable. Although the Woods Pond Site is located within the boundaries of the ACEC, the ACEC prohibition should not be applied because, as shown above, the disposal facility at that site would be located predominantly (over 90%) within previously disturbed land that has been used for long-term sand and gravel quarry operations and thus is of no environmental value.

4. Other state regulations contain ACEC prohibitions which EPA has ignored. Specifically, the Massachusetts Waterways Law regulations prohibit dredging in an ACEC (except for the sole purpose of fisheries or wildlife enhancement or as part of an Ecological Restoration

Project, neither of which is the case here); and regulations under the Massachusetts Wetlands Protection Act prohibit alteration of Bordering Vegetated Wetland in an ACEC. EPA has not cited any of these ACEC-based prohibitions as ARARs for the proposed remedy, let alone addressed whether they are properly waived. This selective memory about the Commonwealth's ACEC-based prohibitions is further evidence that EPA's reliance on such prohibitions to reject on-site disposal is arbitrary and capricious.

5. To the extent that the solid waste assignment regulations, including the ACEC prohibition, are applicable, they would likewise apply under TD 1 to the sediment/soil staging areas and under TD 1 RR to those staging areas and the rail loading facility. EPA does not mention these prohibitions, which further demonstrates its selective and arbitrary consideration of these regulations.

EPA Response 551, 552, 553, 554:

1. The Massachusetts solid waste facility regulations and the Massachusetts hazardous waste facility regulations are properly potential ARARs for the Site. See the Summary of ARARs table, which is Attachment C of the Final Permit Modification. The PCB-contaminated sediment and soil to be excavated as part of the remedy may be regulated under 40 C.F.R. Part 761, under the Massachusetts Hazardous Waste regulations at 310 CMR 30, or, if the remedy involves sediments and soils with PCB concentrations below 50 mg/kg, and such sediments and soils are not commingled with sediments and soils with PCB concentrations at or above 50 mg/kg or other hazardous wastes, the standards at 310 CMR 16 are potentially applicable (based on the conditions listed in the Summary of ARARs table). Conversely, if the sediments and soils have PCB concentrations at or above 50 mg/kg, or include commingling of sediments and soils with PCB concentrations below 50 mg/kg, and are not otherwise regulated under 40 C.F.R. 761, the Massachusetts Hazardous Waste regulations at 310 CMR 30 are potentially applicable (based on the conditions listed in the Summary of ARARs table).

2. The state solid waste landfill regulations are potentially applicable to the remedy, as described immediately above and in the Summary of ARARs table. Moreover, one provision of those regulations is the prohibition of permanent solid waste disposal within an ACEC. With respect to identification of the solid waste regulations as ARAR at other sites, EPA is unaware of other sites in which the permanent disposal will take place within an ACEC. Thus, EPA is unaware of any inconsistencies.

3. EPA agrees with GE that two of the three sites identified for an on-site upland disposal facility are not within or adjacent to the ACEC and thus they would not be affected by the 310 CMR 16 prohibition on permanent disposal facilities. However, the Woods Pond Site is located within the boundaries of the ACEC. The provision at 310 CMR 16.40(4) provides that no site is suitable where it would be located in an ACEC, or would fail to protect the outstanding resources of the ACEC if the solid waste management facility is to be located outside, but adjacent to the ACEC. Based on that provisions, the Woods Pond site is prohibited for permanent disposal under 310 CMR 16.

4. In response to this and other comments, EPA has revised its Summary of ARARs table to reflect the ACEC limitations on the selected remedy. See, for example, Response 721

regarding the Massachusetts Waterways Law regulations, and Response 722 *et al.* regarding the Massachusetts Wetlands Protection Act regulations, in Section IV of this Response to Comments.

5. In response to this comment and others, EPA has made clear in its Summary of ARARs table that to the extent that the solid waste regulations at 310 CMR 16 do potentially apply to the temporary stockpiling or storage of excavated PCB-contaminated sediment and soils, EPA is considering as waived the prohibition on temporary storage or stockpiling of material in an ACEC. See Summary of ARARs table.

ii. Federal and State Hazardous Waste Management regulations

Comments 555, 556, 557: GE asserts the following:

1. The Federal and state hazardous waste management regulations should not be considered as an ARAR. Based on prior experience at other portions of this Site, it is not anticipated that the excavated sediment or soil would constitute hazardous waste under RCRA, and thus would not be subject to the federal hazardous waste regulations. Further, in the unlikely event that future testing showed that some of those materials did constitute such hazardous waste, the upland disposal facility would be designed and operated to meet the substantive technical requirements for a RCRA hazardous waste landfill. In the further unlikely event that that facility were determined not to meet any requirements of the RCRA hazardous waste regulations, GE could arrange to transport those wastes off-site to a RCRA hazardous waste landfill for disposal.

   These same considerations would apply to the Massachusetts hazardous waste regulations insofar as those regulations apply to materials that would constitute hazardous waste under the RCRA criteria. In addition to using the RCRA criteria, the Massachusetts hazardous waste regulations also identify wastes with PCB concentrations at or above 50 ppm as hazardous waste. However, those regulations provide that, with the exception of the prohibition discussed in the next paragraph (and one other exception not pertinent here), their requirements do not apply to facilities that manage such wastes in compliance with EPA's regulations under TSCA, which the on-site upland disposal facility would do. See 310 CMR 30.501(3)(a).

2. One recently adopted provision of the state hazardous waste regulations was specifically developed to apply to waste with PCB concentrations at or above 50 ppm, and prohibits siting of a hazardous waste management facility within or in proximity to an ACEC if it would "fail to protect the outstanding resources" of the ACEC." This ACEC prohibition would clearly not apply to two of the three sites identified for an on-site disposal facility because neither is within or in proximity to the ACEC. With respect to the Woods Pond Site, this prohibition should not be identified as an ARAR or should be waived, because the facility would only affect previously disturbed quarry land and two small wooded areas that are not subject to any special protections.

3. The timing and context of the adoption of this provision, coupled with its vigorous opposition to on-site disposal for the Rest of River, indicate that MassDEP's adoption of this

provision was calculated to bolster its opposition to an on-site disposal facility at this site and to provide additional ammunition to assist EPA in rejecting that option. As such, waiver of this provision is warranted on the ground that the State has not "demonstrated the intention to consistently apply" this prohibition at other sites – which is a basis for waiver of a state ARAR under CERCLA and the NCP. Furthermore, EPA disregards and does not even mention the fact that this prohibition would also apply under TD 1 or TD 1 RR.

EPA Response 555, 556, 557:

1. The federal RCRA regulations and the Massachusetts hazardous waste facility regulations are properly potential ARARs for the Site. See the Summary of ARARs table at pages C-6, C-12 to C-13, C-20 to C-22. The PCB-contaminated sediment and soil to be excavated as part of the remedy, if the sediments and soils have PCB concentrations at or above 50 mg/kg, or include commingling of sediments and soils with PCB concentrations below 50 mg/kg, and are not otherwise regulated under 40 C.F.R. 761, the RCRA regulations and the Massachusetts Hazardous Waste regulations at 310 CMR 30 are potential ARARs (based on the conditions listed in the Summary of ARARs table). See also Section IV of the Response to Comments.

2. EPA agrees with GE that two of the three sites identified for an on-site upland disposal facility are not within or adjacent to the ACEC and thus they would not be affected by the 310 CMR 30 prohibition on permanent disposal facilities. However, the Woods Pond Site is located within the boundaries of the ACEC. The provision at 310 CMR 30.708 clearly prohibits permanent disposal within the boundary of an ACEC. 30.708: Areas of Critical Environmental Concern. Notwithstanding any other provision of 310 CMR 30.000, no facility shall be located where such location or any portion thereof:

    a. Would be within an Area of Critical Environmental Concern (ACEC), as designated by the Secretary of the Executive Office of Energy and Environmental Affairs; or
    b. Would fail to protect the outstanding resources of an ACEC as identified in the Secretary's designation if the facility is to be located outside, but adjacent to or in close proximity to, an ACEC.

3. EPA is unaware of any situation with a potential permanent facility for Massachusetts hazardous waste that is also in an ACEC where, subsequent to the promulgation of 30.708, Massachusetts has not identified the provision as an ARAR. That being the case, EPA sees no basis for determining that the State has not consistently applied the regulation.

iii. Massachusetts Hazardous Waste Facility Site Safety Council Regulations

Comment 558: GE asserts the following: These regulations set forth criteria for the Hazardous Waste Facility Site Safety Council to consider in determining whether a proposed project is feasible and eligible for certain state assistance and special permitting procedures for hazardous waste siting and licensing (990 CMR 5.04). These regulations do not establish substantive requirements or restrictions on disposal facilities, and GE would not seek the Commonwealth's assistance and special permitting procedures under these regulations. As such, these regulations are totally irrelevant to this project and thus to the ARARs evaluation here.

EPA Response 558: Based on this comment, EPA has deleted reference to 990 CMR 5.04 as a basis for an ARAR. Also, see EPA Response 727 *et al.*, Section IV of this Response to Comments.

iv. "Possible" Wetlands ARARs

Comment 559: GE asserts the following: EPA asserts that TD 3 has ARARs "possibly" associated with wetland impacts, but provides no further details as to what such ARARs might be. The operational footprints of the upland disposal facilities at the Woods Pond and Rising Pond Sites would not impact any wetlands, and thus would not be subject to ARARs associated with wetlands impacts.

At the Forest Street Site, shown on Figure 3, the operational footprint of the disposal facility would require construction of an access road that would involve the crossing of a small stream in the southern portion of the site; and the facility would be located, in part, within the 100-foot buffer zone and the 200-foot Riverfront Area of that stream, which are subject to the Massachusetts Wetlands Protection Act regulations. However, given the limited nature of this work, the Region could readily find, as it did in the discussion of these regulations in the ARARs tables relating to the proposed sediment/floodplain remedy (Draft Permit, Attachment C), that the work would be conducted in accordance with the substantive requirements of these regulations.

EPA Response 559: EPA concurs there are no currently identified wetland ARAR issues for the Woods Pond Site. For the Rising Pond Site, see Response 547 *et al.* above in this Section. For the Forest Street Site, the proposed landfill location is within a regulated wetland area and a waiver may also be required of regulations or requirements designed to protect such areas including: EPA's and the Corps of Engineers' regulations under Section 404 of the Clean Water Act (40 C.F.R. Part 230, 33 C.F.R. Parts 320-323); the federal Executive Order for Wetlands Protection (E.O. 11990); the Massachusetts water quality certification regulations for discharges of dredged or fill material into waters of the U.S. (314 CMR 9.06); and the Massachusetts Wetlands Protection Act regulations (310 CMR 10.53(3)(q)). EPA can only waive ARARs under specific circumstances, including where compliance is technically impracticable. Since there is a technically practicable alternative to constructing a landfill at the Forest Street Site, namely off-site disposal, there is no justification to granting a waiver to these ARARs. For the Rising Pond Site, and for further information on the Forest Street Site, see Response 547 *et al.* above in this Section.

III.F.2.d Long-Term Reliability and Effectiveness

Comments 560, 561: GE asserts the following: EPA states that both an off-site disposal facility and an on-site disposal facility would isolate the PCB-containing materials from direct contact with human and ecological receptors but claims, without providing any support or basis, that TD 3 would have "a greater potential" for exposure to such material and thus pose a greater "residual risk" than TD 1 and TD 1 RR. TD 3 involves no greater potential for exposure to the PCB-containing material than TD 1 and TD 1 RR.

The Region also claims that off-site disposal is more reliable than on-site disposal because "it does not rely on operation, monitoring, and maintenance requirements (except at the receiving

facility)" (Stmt. Basis, p. 36). This claim is disingenuous. Both an on-site disposal facility and an off-site disposal facility require long-term operation, maintenance, and monitoring. EPA has long recognized the reliability of on-site disposal facilities by including such facilities as the component of the remedies at numerous sites, as discussed above and shown in Table 1.

EPA Response 560, 561: In evaluating long-term reliability and effectiveness, it is entirely reasonable for EPA to draw a distinction between on-site landfilling along the Housatonic River, under the potential landfill facility conditions present, as opposed to disposal in an off-site disposal facility designed and sited for disposal of PCBs. For more detail, see Response 546. Similarly, in evaluating long-term reliability and effectiveness, EPA appropriately can draw a distinction with respect to operation, monitoring and maintenance. While the objective with any on-site facility would be to minimize any issues arising with long-term operation, monitoring and maintenance, if such issues arise with off-site disposal, the Housatonic watershed is unaffected. Conversely, if during long-term operation, monitoring and maintenance at a riverfront permanent disposal facility abutting the Housatonic River, the watershed will bear any negative impacts of any adverse circumstances in long-term operation, monitoring and maintenance. For more details, see EPA Responses 546 and 550 above.

III.F.2.e Reduction of Toxicity, Mobility, or Volume of Waste

Comment 563: GE asserts the following: EPA does not draw a distinction between the off-site and on-site disposal alternatives in terms of reduction of toxicity, mobility, or volume of waste; however, EPA does state in the Statement of Basis that off-site disposal "would reduce the volume of material that remains at the Site." That statement is disingenuous and not pertinent to this criterion. Neither off-site nor on-site disposal would reduce the volume of waste material, but would just affect where it is placed.

EPA Response 563: The language in the Statement of Basis is correct. However, even if the term "reduction of … volume" in the Permit criterion were not meant to include the reduction of volume of waste on-site due to disposal offsite, it would not be significant enough to alter the conclusions EPA reached in it Comparative Analysis evaluation of T/D alternatives.

III.F.2.f Short-Term Effectiveness

Comment 268: In its comparative evaluation of the Short-Term Effectiveness, of the T/D alternative, EPA acknowledges that each of the alternatives has the potential for short-term impacts to the community. Given that be the case, long-term effectiveness should be the primary consideration.

EPA Response 268: EPA disagrees. The Permit states that Short-term Effectiveness and Long-term Reliability are both Selection Decision Factors. The Permit does not establish weighting factors to distinguish between these factors. See Section II.A of this Response to Comments for a further description the remedy selection process.

i. Habitat Impacts

Comment 564: GE asserts the following: EPA states that TD 1 would have the fewest habitat impacts, requiring only access roads and staging areas; that TD 1 RR would also require construction of a rail loading facility; and that TD 3 would cause a short-term loss of habitat and

loss or displacement of wildlife at the upland disposal facility and adjacent areas during construction and operation (Comparative Analysis, p. 68). In fact, both TD 1 RR and TD 3 would cause a loss of habitat and loss or displacement of the associated wildlife at the location of the facility involved – the rail loading facility for TD 1 RR and the disposal facility for TD 3. In both cases, the habitat impacts would be limited to the operational footprint of the facility.

EPA Response 564: As EPA stated, TD-1 RR would have habitat impacts at staging areas. Within that term EPA included any rail loading facility, which could have temporary habitat impacts during the temporary period the rail loading facility was used. The habitat impacts at a permanent landfill operation would include the temporary habitat impacts during implementation, and any impacts permanently from the use of that property for permanent disposal of contaminants. EPA discusses the habitat impacts of GE's different TD-3 locations in EPA Response 547 *et al.* above.

ii. Greenhouse Gas Emissions

Comment 565: GE asserts the following: EPA compares the range of GHG emissions resulting from TD 1 to those resulting from TD 3, correctly noting that TD 3 would result in much lower emissions. EPA does not estimate the GHG emissions resulting from TD 1 RR, although it notes that those emissions would be "significantly lower" than under TD 1 due to the use of rail instead of truck transport. GE has estimated the total GHG emissions from each of these three TD alternatives for the removal volume represented by the proposed sediment/floodplain remedy. TD 1 would result in the greatest amount of emissions (approximately 165,000 tonnes), but TD 1 RR would result in a considerably greater amount of emissions (approximately 70,000 tonnes) than TD 3 (6,600 to 36,000 tonnes, depending on the disposal facility site used). Thus, TD 3 is much more compliant than either TD 1 or TD 1 RR with EPA's general and EPA's specific "green remediation" policies to minimize GHG generation.

EPA Response 565: See Response 549, 565 above.

iii. Local Community Impacts

Comment 566: GE asserts the following: EPA erroneously concludes that ["d]epending on the location of the upland disposal facility under TD 3, TD 3 may have truck traffic comparable to TD-1" and that this truck traffic "may be greatly reduced by reliance on rail transportation" (Stmt. Basis, p 37).

The region correctly notes that TD-3 would involve far fewer off-site truck trips that TD-1; but it then states that TD 1 RR would greatly reduce the amount of off-site truck traffic associated with off-site disposal, erroneously claiming that that alternative would involve ***no*** off-site truck trips (Comp. Analysis, pp. 69-70). Similar to TD 3, TD 1 RR ***would*** involve off-site truck trips for importation of construction materials and equipment for construction and closure of the on-site facility (the rail loading facility for TD 1 RR and the upland disposal facility for TD 3). GE has estimated the number of off-site truck trips that would be required for TD 1, TD 1 RR, and TD 3 for the volume of materials required for disposal under the proposed remedy. Those estimates are summarized in Table 4. They show that TD 1 would require a total of approximately 83,000 off-site truck trips to transport excavated materials to the out-of-state disposal facilities, while TD 1

RR would require approximately 1,200 off-site truck trips to import materials and equipment for construction/closure of the rail loading facility and TD 3 would require approximately 2,400-2,600 off-site truck trips to import materials and equipment for construction/closure of the on-site disposal facility (except at the Forest Street Site, where, due to constructability issues, 68,000 trips would be necessary).

In addition, TD 1 RR would require ***on-site*** truck trips to transport the removed materials from their excavation location to the rail loading facility, just as TD 3 would require on-site truck trips to transport such materials to the upland disposal facility. Estimates of these on-site truck trips are provided in Table 5. As shown in that table, assuming the use of trucks for such transport, the number of such truck trips under these alternatives would be the same – approximately 103,000 (~ 8,000 per year).

EPA Response 566: EPA disagrees with GE's assertions and conclusions. First, GE ignores the term "impacts to nearby communities" taken directly from the Permit's description of the Short-Term Effectiveness criterion. That being the case, EPA's Comparative Analysis used as an appropriate metric the amount of truck miles travelled (both on-site and off-site) that affects the community, which would exclude truck traffic once vehicles are on major limited access highways such as the Massachusetts Turnpike. Using this metric, as summarized in the tables below, total truck traffic impacts for TD-1 are approximately 16% greater than for TD-3 (Woods Pond), whereas, truck traffic impacts from TD-3 (Forest Street) are almost 5 times greater than for TD-1, and truck traffic impacts from TD-3 (Rising Pond) are more than 3 times greater than for TD-1. (See table below). Clearly TD-3 has community impacts from trucking that are comparable to, and in fact in 2 of 3 scenarios, are significantly greater than, the impacts of TD-1.

Second, with respect to on-site truck trips required by TD 1 RR, EPA's Comparative Analysis in fact pointed out that it would require truck trips to transport materials to the rail loading facility. The complete sentence referenced by GE from the Comparative Analysis is: "The alternative with off-site disposal (TD 1/TD 1 RR) will have short term impacts during transport of the waste material; however the impacts of truck traffic may be greatly reduced by reliance on rail." Statement of Basis, at page 37. The comparison is between transport of waste to off-site facilities via rail or via truck. As shown in the tables below, transport of waste by rail would result in approximately 53% (72% using EPA estimates) of the truck miles needed to transport the waste by truck to the Massachusetts Turnpike. (See table below). Even accounting for the construction of a rail facility, transport by rail would be 58% (78% using EPA estimates) of the truck miles as opposed to that by truck. (See table below). Clearly, the truck traffic impact to the community for the transport of waste is reduced by using rail compared to the transport of waste to on-site facilities.

GE states correctly that EPA did not factor in the truck miles needed to construct the rail facility. Given the lack of detail supporting GE's estimate of the miles of truck traffic needed to construct the rail facility, EPA cannot comment on the accuracy of GE's estimates. However, accepting GE's assumptions for the number of truck miles needed to construct the rail facility and the three Upland Disposal Facilities, the amounts of truck traffic are considerably less for the rail facility than for any of the upland disposal facilities.

Estimated Vehicle Miles on Local Roads Required for Construction of Rail and Upland Disposal Facilities.

	TD 3- Upland Disposal Facility			TD -1 Off-site	TD-1RR
	Woods Pond	**Forest Street**	**Rising Pond**	**N/A**	**Rail loading Facility**
GE Estimate	118,100	3,399,200	131,200	0	61,700

From GE Table 4.

For an appropriate comparison of the traffic impact, EPA derived the estimated truck mileage that affect the community for the on-site and off-site transportation of waste material:

For TD 1 GE has estimated 82,599,200 vehicle miles would be required to transport materials to licensed disposal facilities (GE 2014, Table 4).[31] EPA estimates less than 1.5% or approximately 1,100,000 vehicle miles of the total TD 1 vehicle miles would be on local roads[32]. In Table 5 of its 2014 comments, GE provided estimates of vehicle miles required for TD 1 RR, and the three proposed TD 3 Upland Disposal Facilities. For the removal volume associated with SED 9/FP 4 MOD, GE has estimated a total of 835,000 vehicle miles, 1,584,800 miles, and 3,100,100 miles would be required to transport removed material on local roads to Woods Pond, Forest Street, and Rising Pond, respectively. In addition, EPA performed an independent calculation of GE's mileage calculations for the three Upland Disposal Facilities to ensure that EPA's calculations for truck mileage to the Massachusetts Turnpike were performed consistently with the calculations for estimates to the Upland Disposal Facilities. The following table provides the estimated vehicle miles on local roads required for transportation of soil and sediment removed for SED 9/FP 4 MOD. As is shown in the Table, EPA and GE's estimates are similar.

[31] These mileage estimates are for disposition of excavated sediment and soils only and do not include import of materials for backfill, capping, access roads and staging material and dispositions of staging area and access road material. For TD 1, GE has assumed non-TSCA material would be transported to Kersey, PA (roundtrip distance of 832 miles) and TSCA material would be transported to Belleville, MI (roundtrip distance of 1,362 miles).

[32] Assumes material is transported in 20-ton trucks from approximate midpoint of each Reach to the closest Massachusetts Turnpike entrance. Vehicle miles on local roads assume a round trip.

Estimated Vehicle Miles on Local Roads Required for SED 9/FP 4 MOD for Transport to Upland Disposal Facility, Rail Loading Facility or Entrance to Massachusetts Turnpike.

	TD 3- Upland Disposal Facility			TD -1 Off-site	TD-1RR[33]
	Woods Pond	**Forest Street**	**Rising Pond**	**Massachusetts Turnpike**	**Rail loading Facility**
EPA Estimate	837,250	1,469,500	3,016,600	1,110,200	799,250
GE estimate –Table 5	835,200	1,584,800	3,100,100	N/A	581,900

Notes:

Cubic yards removed is based on volumes from Table 1 of Attachment 6 to the Comparative Analysis with an assumed density factor of 1.62 tons per cubic yard.

Assume approximate midpoint of each Reach.

Assumes 16-ton trucks for transportation to TD 1 RR and TD 3 Upland Disposal Facilities and 20-ton trucks for disposal to TD 1 off-site facilities.

Combining the two tables above gives the following overall truck miles in the community associated with different disposal options.

Estimated Vehicle Miles on Local Roads Required for SED 9/FP 4 MOD for Construction of Facilities and Transport of Waste.

	TD 3- Upland Disposal Facility			TD -1 Off-site	TD-1RR
	Woods Pond	**Forest Street**	**Rising Pond**	**Massachusetts Turnpike**	**Rail loading Facility**
EPA Estimate	955,350	4,868,700	3,147,800	1,110,200	860,950
GE estimate – Table 5	953,300	4,984,000	3,231,300	N/A	643,600

Therefore, using these truck miles as a metric for the effect on the community of truck traffic related to disposal options, the option with the least impact is TD-1RR, followed by TD-3 (Woods Pond) and TD-1. TD-3 (Forest Street) and TD-3 Rising Pond have significantly greater impacts than the other options. Thus EPA's conclusions in the Statement of Basis are correct.

Comment 567: GE asserts the following: Moreover, if the Woods Pond Site were used for the on-site disposal facility, the number of such on-site truck trips could be reduced due to the capability for pumping of sediments from nearby areas (i.e., Reach 5C, Woods Pond, the nearby backwaters) to a disposal facility at that location, thus avoiding the need to truck those

[33] GE assumed a location immediately upstream of Woods Pond (GE 2014, Table 5). Although EPA does not know the exact location used in GE's estimate, to be comparable to GE's estimate, EPA also assumed a location immediately upstream of Woods Pond on the West side of the channel for this analysis. EPA mileage estimates for TD-1 RR do not consider temporary new construction roads, bridges, or river crossings, which may provide for reduced mileage estimates to the loading facility.

sediments. As shown in Table 5, the use of such a pumping approach would reduce the on-site truck trips for TD 3 by more than half – to approximately 40,000 trips (~ 3,000 per year).

EPA Response 567: EPA recognizes that pumping from Woods Pond would reduce truck traffic for TD 3. The same method could also be used for TD 1 RR, for which GE has assumed that the rail facility would be close to Woods Pond. Similarly, a reduction in off-site truck mileage for TD-1 could also be achieved by this method, since the pumping of sediment would move material closer to the Massachusetts Turnpike entrance prior to the placement into trucks.

EPA has estimated the use of a pumping approach for dredged materials removed from Reach 5C, Woods Pond and nearby Backwaters to the TD-1RR loading facility would reduce the on-site truck trips for TD-1 RR by more than half – to approximately 43,000 trips (~ 3,300 per year).

Comment 568: GE asserts the following: Overall, considering both off-site and on-site truck trips, TD 1 would involve the most truck traffic, and TD 1 RR would involve comparable truck traffic to TD 3 (or much more truck traffic if the Woods Pond Site were used for TD 3 and sediments were pumped to the Site from nearby areas). Thus, the Region's assertions in the Statement of Basis that "TD 3 may have truck traffic comparable to TD 1" and that this truck traffic "may be greatly reduced by reliance on rail transportation" are without foundation and another example of its bias against TD 3.

EPA Response 568: EPA disagrees with GE's conclusions. As described above in Response 566, EPA used an appropriate metric for evaluation of impact to local communities, and the comparisons in the Comparative Analysis are appropriate. In addition, EPA has responded to the comment on pumping from Woods Pond in Response 567.

Comment 569: GE has estimated the incidence of accident-related injuries and fatalities due to off-site truck traffic or, for TD 1 RR, off-site rail transport. These estimates indicate that a total of approximately 39 (truck) and 34 (rail) non-fatal injuries and 1.8 (truck) and 6.5 (rail) fatalities associated with off-site transport, while TD 3 would result in approximately 0.06 to 1.6 non-fatal injuries and 0.003 to 0.075 fatalities associated with such transport (depending on the disposal facility site) – more than 20 times lower.

EPA Response 569: EPA considered the estimated injuries/fatalities of different alternatives in EPA's Comparative Analysis (Section 3.8.3, Table 25, page 71). The Comparative Analysis provides a quantitative estimate of the range of injuries/fatalities for off-site disposal via trucks and for on-site disposal. With respect to off-site disposal via rail, the Comparative Analysis does not include a similar level of quantification, but EPA explains "no injuries or fatalities are associated with the alternative because it was assumed for purpose of this analysis that there would be zero off-site truck trips; however, it may be necessary to use trucks instead of rail under certain conditions." Comparative Analysis, Section 3.8.3, page 71.

EPA has not independently verified GE's estimates, but even assuming GE's estimates to be accurate, GE's estimates generally fall into the ranges of the EPA Comparative Analysis for TD 1 and TD 3.

	EPA Comparative Analysis	**GE's estimates**
TD 1 (Off-site disposal via truck)	4.34 - 67.03 non-fatal injuries and .2 - 3.14 fatal injuries	39 non-fatal injuries and 1.8 fatal injuries
TD 3 (On-site disposal)	0.03 – 1.6 non-fatal injuries and 0.002 - 0.07 fatal injuries	0.06 to 1.6 non-fatal injuries and 0.003 to 0.075 fatal injuries

iv. Risk to Remediation Workers

Comment 570: GE asserts the following: For TD 1 and TD 1 RR, EPA did not quantify risks to truck drivers and (for TD 1 RR) railroad employees and to the employees of the off-site disposal facilities, but did provide an estimate of risks to on-site remediation workers for TD 3. Even excluding risks to off-site workers, TD 1 RR would have risks to on-site remediation workers, just as TD 3 would, due to the need under TD 1 RR for local truck trips to the rail loading facility and for material processing and rail car loading operations at that facility. Moreover, the risks to off-site truck, railroad, and disposal facility workers under TD 1 and TD 1 RR cannot be ignored just because they occur outside of this Site (or outside Massachusetts). GE estimates the risk to on-site truck transport would be approximately 3 non-fatal injuries and 0.02 fatalities for off-site disposal via rail and approximately 4.8/0.04 for on-site disposal. As a result, worker risks do not provide a basis for selecting off-site disposal over on-site disposal.

EPA Response 570: EPA's Comparative Analysis is clear that EPA considered health and safety risks for all alternatives, including the off-site disposal alternatives (TD 1, and TD 1 RR):

> There would also be health and safety risks to site workers implementing each of these alternatives. For TD 1 and TD 1 RR, these risks would consist of risks to the truck drivers and, in the case of TD 1 RR, railroad employees, and to the employees of the off-site disposal facilities, rather than to on-site remediation workers, and thus, were not quantified. Comparative Analysis at 3.8.5.

While not quantified for all aspects of the remedy, EPA plainly did consider the risks to remediation workers from the selected remedy.

Additionally, GE's conclusion about worker risks not providing a remedy selection basis misses the point of the Permit's remedy selection process. Pursuant to the Permit, EPA performed a thorough comparative analysis that included each sub-criterion of a Permit criterion, and of each Permit criterion itself. Based on that and other information in the Administrative Record, EPA based its determination of the selected remedy as best suited to meet the Permit's General Standards in consideration of the Permit's Selection Decision Factors, including a balancing of those factors against one another. EPA's determination was not based on any individual sub-criterion such as worker risks, but by an analysis of all nine criteria (and their sub-criteria) pursuant to the Permit.

v. Summary of Short-Term Effectiveness

Comment 571: GE asserts the following: Overall, the short-term negative impacts from transport and disposal activities would be, depending on the types of impacts, either comparable among TD 1, TD 1 RR, and TD 3, or less for on-site disposal than for off-site disposal.

EPA Response 571: EPA has, through the 2014 Comparative Analysis and the Responses above, identified the short-term impacts from the relevant alternatives, and would not necessarily agree with GE's conclusion to the extent it differs with EPA's Comparative Analysis or the Responses above. In general, both TD 3 and TD 1 RR are preferable for certain components of this criterion, while less preferable for other components. TD 1 and TD 1 RR are have similar results except for, most notably, the truck-related impacts of TD 1. Overall, EPA's analysis of the Short-term Effectiveness is only one part of EPA's overall evaluation of the Permit criteria, on which EPA based its determination of the selected remedy as best suited to meet the Permit's General Standards in consideration of the Permit's Selection Decision Factors, including a balancing of those factors against one another. Any clarifications or information presented in the comments on Short-term Effectiveness has not altered EPA's overall determination.

III.F.2.g Implementability

Comments 572, 573: GE asserts the following: The EPA Region concludes that TD 1 and TD 1 RR are more readily implementable than TD 3. This conclusion is based on several indefensible assertions.

First, the Region claims that on-site upland disposal would be "difficult, and potentially not feasible, to implement" (Stmt. Basis, p. 38; Comp. Analysis, p. 75) – or, in another place, "very difficult, if not impossible, to implement" (Comp. Analysis, p. 76). The basis for this claim is that TD 3 would require "extensive coordination with state and local officials," as well as with "the public," and would encounter substantial local and state opposition, which could render that alternative infeasible (Stmt. Basis, p. 38; Comp. Analysis, p. 75). These claims are unsupportable. Given the CERCLA and CD exemption from state and local permit requirements for on-site remedial work (CERCLA § 121(e)(1); CD ¶ 9.a), construction and operation of such a facility would not require any state or local permits or other approvals, including those relating to siting of the facility. As a result, there would be no need to seek approvals from the state or local governments, and there would be no need to "coordinate" with "the public." Thus, despite the opposition of some state and local officials and members of the public, TD 3 is plainly administratively implementable.

The Region is clearly attempting to use implementability as a surrogate for state and community acceptance, which are "modifying criteria" in the remedy selection process under the NCP (40 CFR § 300.430(f)(1)(i)(C)), but are *not* remedy selection criteria under the Permit. Since the Region cannot rely on these factors directly, it has attempted to incorporate those factors into the implementability criterion in an attempt to find support in the Permit criteria for its bias against on-site disposal. Even under the NCP, the state and local community acceptance factors are only "modifying criteria" to be considered, not criteria that should drive the decision or justify EPA's deference to the state. By contrast, the other criteria are either "threshold criteria" or "primary balancing criteria" (which include costs) (40 CFR § 300.430(f)(1)(i)), and are to be given greater weight than state and community acceptance.

EPA Response 572, 573: GE questions the support for EPA's analysis that TD 3 is difficult and potentially not feasible to implement. GE's own support for its assertion consists of the permit exemption from the Decree and CERCLA, and from that, its speculation that EPA's Implementability analysis places too much weight on State acceptance or community acceptance.

For the reasons cited below, EPA disagrees with GE's assertions, the characterization of EPA's analyses, and the conclusions of GE favoring on-site upland disposal of excavated material. Based in part on GE's evaluation in the Revised CMS, EPA performed a thorough comparative analysis of the alternatives with respect to Implementability, analyzing the key tradeoffs among different treatment/disposal alternatives. EPA's analysis is demonstrated in Section 3.9 of EPA's Comparative Analysis. In addition, EPA's analysis of Implementability is only part of EPA's overall evaluation of the Permit criteria, on which EPA based its determination of the selected remedy as best suited to meet the Permit's General Standards in consideration of the Permit's Selection Decision Factors, including a balancing of those factors against one another. See Comparative Analysis, pages 73-76. Moreover, except as otherwise specified in the Response to Comments, the comments, upon EPA evaluation, do not make a significant difference to the Comparative Analysis or EPA's determination.

First, EPA's analysis regarding the implementability of TD 3 has multiple lines of support taken directly from the Permit language on the Implementability criterion. The multiple sub-criteria of the Implementability criterion demonstrate the reasonableness of EPA's analysis of the implementability of TD 3. And while the statutory permit exemption has been and is relevant to EPA's analysis, the exemption does not negate the obligation under the Decree and Permit to evaluate all the Implementability sub-criteria set forth in the Permit. For example, if the statutory permit exemption negated consideration of zoning restrictions, zoning restrictions would not be listed for consideration as one of the Implementability sub-criteria. Indeed, this sub-criterion is consistent with EPA's 1988 Guidance, which provides that in addition to ARARs, "other federal and state criteria, advisories, and local ordinances should also be considered, as appropriate, in the development of remedial action alternatives." *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA.* Overall, the Comparative Analysis clearly shows that EPA has not imported new criteria into the nine criteria analyzed.

Second, GE's desire to minimize the significance of Implementability among the Permit criteria is clearly inconsistent with the Permit and with EPA guidance. In fact, the 1994 EPA RCRA Corrective Action Plan guidance highlights the potential significance of the Implementability criterion as follows:

> Implementability will often be a determining variable in shaping remedies. Some technologies may require state or local approvals prior to construction, which may increase the time necessary to implement the remedy. In some cases, state or local restrictions or concerns may necessitate eliminating or deferring certain technologies or remedial approaches from consideration in remedy selection.

EPA, Final RCRA Corrective Action Plan, OSWER Directive 9902.3-2A, Office of Waste Programs Enforcement, Office of Solid Waste, May 1994.

Third, while not necessary for this analysis in light of the multiple lines of support, as described in Section II.A of this Response to Comments, EPA's decision-making process under the Permit includes "any other relevant information in the administrative record." For example, the Decree requires EPA to examine the views of the State and community by providing multiple opportunities for public comment and input.

A. Multiple Lines of Support for EPA's Implementability Determination are Squarely Within the Permit Criteria:

The Permit criterion of Implementability includes eight sub-criteria, including, relevant to this comment, the following:

- Coordination with other agencies,
- Regulatory and zoning restrictions; and
- Availability of suitable on-site and off-site treatment, storage and disposal facilities and specialists

1. Coordination with other agencies: This Permit provision requires an analysis of different alternatives on such coordination. It is eminently reasonable for EPA to consider the views of other state and local agencies in comparing off-site disposal and on-site disposal. The other agencies have very substantial support for off-site disposal and opposition for on-site disposal. For example, as discussed in more detail in Response 546, GE has stated that its proposed locations do not meet specific technical requirements for a TSCA landfill, including permeability and hydrogeology. Clearly GE would need to coordinate with state and local entities on the prospect of placing in their community a permanent PCB disposal facility at a location that would not meet the relevant PCB landfilling requirements. In fact, GE in its Revised CMS under the heading "Coordination with Agencies", states that "both prior to and during implementation of TD 3 at any of the three potential locations, GE would need to coordinate with EPA, as well as state and local agencies to provide support with public/community outreach programs."

   Additionally, given the proposed locations' potential deviations from local zoning (discussed below), and the Commonwealth's statutory prohibition on permanent disposal facilities in an ACEC, an evaluation of the "coordination with other agencies" sub-criterion can reasonably be seen to strongly favor off-site landfilling over on-site landfilling.

2. Regulatory and zoning restrictions: Similarly, an analysis of "regulatory and zoning restrictions" could easily yield a negative comparison for on-site disposal. For example, multiple TSCA landfilling requirements will not be satisfied, nor will local zoning restrictions, or Massachusetts' ACEC prohibition. All of these are regulatory and zoning restrictions to be considered under the Permit. As noted above, the statutory exemption set forth in CERCLA for obtaining permits does not override the Decree's and Permit's specific requirement that EPA consider "regulatory and zoning restrictions" in selecting a remedy for the Rest of River. Indeed, this sub-criterion is consistent with EPA's 1988 Guidance, which provides that in addition to ARARs, "other federal and state criteria, advisories, and local

ordinances should also be considered, as appropriate, in the development of remedial action alternatives." EPA, Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA, OSWER Directive 9355.3-01, 1988.

The multiple TSCA requirements that would not be met, and that would require waiver for the onsite disposal locations, are discussed above at Response 546. In addition, it is very hard to interpret the ACEC prohibition in any way other than to eliminate permanent landfilling in areas of critical environmental concern. Moreover, the Massachusetts Executive Office of Energy and Environmental Affairs' designation of the ACEC, which triggers the prohibition on permanent disposal of hazardous or solid waste in the ACEC, makes that alternative infeasible to implement.

Similarly, the current zoning for the three on-site disposal locations reinforces the difficulty in implementing on-site disposal, which results in greater favorability of off-site disposal for implementability purposes. For example, the Forest Street Area of Lee is zoned primarily as Conservation – Residential, with a small part of the footprint zoned as industrial. Permitted zoning uses for Conservation – Residential are limited to one or two family houses, agriculture, horticulture, or floriculture and uses associated with these. Special permits from the Board of Selectman or Board of Appeals are required to use property in this area as a resort, private club, hospital, farm, livery. The town zoning requirements provide no indication that property in a Conservation – Residential zone can be used for permanent disposal of any waste material. Similarly, according to the May 2015 Zoning By-Laws of the Town of Great Barrington, the area between Van Deusenville Road and Rising Pond, where GE has proposed the Rising Pond landfill location, is zoned by Great Barrington as R-2 meaning residential property with land size of at least 1 acre. That zoning prohibits explicitly a number of less intrusive and likely less permanent uses than a permanent landfill, such as the following: Fuel storage and sales, Public Garage, Large Scale Commercial Development, Lumberyard, Motor Vehicle fuel station, Commercial parking lots, Freight terminals, truck or rail, Contractor's and Landscaper's yards, Light Manufacturing. For the Woods Pond location, a significant portion of the proposed operational area is currently zoned by the Town of Lenox as Conservation-Residential.

3. Availability of suitable on-site and off-site treatment, storage and disposal facilities and specialists. The "suitability" of a disposal facility includes consideration of a number of factors. For example, whether a disposal facility is "suitable" includes consideration of zoning and regulatory restrictions. After all, zoning and regulatory restrictions are often developed to protect public health and/or the environment. Therefore, in evaluating whether to locate a landfill within an area designated as an ACEC, for residential use, or for conservation purposes, EPA necessarily undertook an evaluation as to whether other locations off-site were more appropriate or suitable for disposal. These issues do arise at off-site disposal facilities and on-site locations where material was consolidated with existing waste. Similarly, Woods Pond may be unsuitable due to its location in a medium yield aquifer and proximity to a non-community groundwater source. All three proposed facilities may be considered unsuitable because they would be located in areas with no known contamination (unlike off-site disposal and the Decree's prior use of limited on-site disposal in the OPCAs). Moreover, as discussed in Response 547 above, there are engineering and topography issues at the Forest Street location. Furthermore, the Rising Pond and Woods

Pond facilities are located directly adjacent to the Housatonic River, thus any inadvertent releases would directly affect the remediate river. All of these factors make the proposed upland disposal facilities unsuitable compared to off-site disposal facilities. See also Response 546 for a discussion of TSCA site suitability criteria. Finally, as discussed further immediately below, the suitability of a disposal facility also depends to an extent on the likelihood of the facility eventually being constructed and operated, and that likelihood is greatly compromised by State, municipality and community members' resistance.

These three sub-criteria discussed above fit into the overall Implementability criterion and support consideration of factors that could affect the ability to carry out the remedy. GE argues that EPA is using implementability as a surrogate for state and community acceptance. But to implement means to "put into effect," or "to carry out." The public and legal opposition to on-site disposal is squarely within the plain meaning of the term "implementability" because it will jeopardize EPA and GE's ability to carry out the entire remedy.

For example, those who oppose on-site disposal have several mechanisms to severely delay or block implementation of the remedy. As discussed in more detail below in this Response, the opposition to on-site disposal at Rest of River has been persistent and vigorous. The Decree itself recognizes the Commonwealth's right to appeal the remedy pursuant to 40 C.F.R. § 124.19 before the EAB and Section 7006(b) of RCRA before the 1st Circuit. But the Commonwealth is not the only party with this right. In fact, any party that commented on the draft permit or participated in a public hearing on the draft permit may petition for review of the permit before the EAB. 40 C.F.R. § 124.19. Similarly, under Section 7006(b) of RCRA, "any interested person" may seek review of a permit modification under the Administrative Procedures Act in the relevant Circuit Court of Appeals.

With respect to GE's assertions on the CERCLA and Decree permit exemption, EPA has considered the exemption in the analysis, but the exemption does not negate the need to perform those Permit sub-criteria analyses. The parties to the Decree agreed to the Permit exemption provision (Decree, Paragraph 9.a.) at the same time as the parties agreed to the Permit provision that requires the analysis of those three sub-criteria within the Implementability criterion, including an analysis of regulatory and zoning restrictions.

Furthermore, the permit exemption outlined in the Decree and the NCP, 40 C.F.R. Part 300, while exempting the project from administrative approvals, does not eliminate the need to comply with substantive requirements. Implementation of an on-site disposal alternative clearly would require compliance with substantive requirements.

The off-site disposal alternatives (TD 1 and TD 1 RR) do not have these implementability issues, so on that basis alone, TD 1 and TD 1 RR are more readily implementable than TD 3.

Finally, with respect to GE's assertions as to the weight placed on state or community concerns, EPA had no cause to use anything as a surrogate for those concerns. EPA did a fair and reasonable analysis of the nine criteria, and within the analysis of the Permit criteria, the Implementability criterion included multiple specific sub-criteria that dictated EPA's consideration of State and community concerns. To do so was very appropriate on EPA's part and required by the Decree comment procedures.

EPA's interpretation of the nine permit criteria takes into account its CERCLA and RCRA guidance documents. These guidance documents call for EPA to consider state and local acceptance in remedy selection. The National Contingency Plan, which is the set of regulations governing Superfund cleanups, includes "state and community acceptance" as "modifying criteria that shall be considered in remedy selection." In accordance with this regulation, EPA's Superfund Community Involvement Handbook notes "The agency may alter the preferred alternative or shift from the preferred alternative to another if public comments or additional data indicate that these modifications are warranted."

As in CERCLA, EPA's regulations for issuing RCRA permits (along with other types of permits) require public comment and public hearing opportunities on draft permits, allowing EPA to alter the Final Permit Modification in response to public views. EPA's March 30, 2012 RCRA Public Participation Manual states, "Public participation plays an integral role in the RCRA permitting process." As this Response to Comments evidences, 40 C.F.R. Part 124 requires the solicitation of public comment on proposed decision and the Agency's response to those comments.

B. GE Overstates Potential Limit on Consideration of Community and State Concerns

As shown above, the Implementability criterion and its sub-criteria explicitly support the consideration of public and State views. EPA very reasonably included those within EPA's overall evaluation, and reached reasonable conclusions based on that evaluation. Therefore, one does not need to look further to conclude that EPA's evaluation is supportable and reasonable.

However, even if the Permit criteria did not do so, the Permit does not limit EPA to these criteria in selecting its remedy. When EPA is selecting the Corrective Measures and Performance Standards for the Rest of River, the Permit directs EPA to consider the submissions from GE, such as the nine criteria analysis in the Corrective Measures Study report, along with "any other relevant information in the Administrative Record for the modification of this Permit." Permit, Section II.J.

Public and governmental comments, minutes of the Citizens Coordinating Council, and other information relating to the many public engagement sessions sponsored by EPA are within the Administrative Record for the modification of the Permit. The Administrative Record also includes EPA regulations and guidance documents, including guidance documents for selection of CERCLA remedies and RCRA corrective actions. As explained below, these guidance documents call for consideration of community and state acceptance in remedy selection.

The Decree envisions active public and state participation in the remedy selection process. This public participation would be empty if, as GE asserts, EPA cannot consider the wishes of the community in remedy selection. For instance, Decree Paragraph 22.n calls for EPA to propose the Draft Permit Modification pursuant to EPA's RCRA regulations, "including the provisions requiring public notice and an opportunity for public comment . . ." Similarly, Paragraphs 22.j and 22.k require GE to submit a CMS Proposal and CMS Report to Massachusetts and Connecticut. Comment periods and opportunities for coordination with the states would be meaningless if public and state opinions were irrelevant to remedy selection. EPA's consideration of public or governmental comment is required by the Decree and Permit and the

procedures outlined within those documents encompass consideration of community, local government and state views.

Additional support for the need for state and community concerns to be considered comes from EPA's 1996 RCRA Advanced Notice of Preliminary Rulemaking ("Notice"). At that time, EPA's national RCRA corrective action program championed strong public participation at the same time as proposing use nationally of Corrective Action Permit criteria similar to those being used in the Rest of River permit. The 1996 Notice stated that "EPA is committed to providing meaningful public participation in all aspects of the RCRA program, including RCRA corrective action" and that among EPA's key goals and implementation strategies for corrective action was to "Continue to involve the public in all stages of the corrective action process." In that same Notice, EPA proposed to implement RCRA corrective action remedy selection through use of ten remedy selection criteria, none of which were Community Acceptance or State Acceptance.

Admittedly, the Permit does not explicitly list public and state acceptance as individual stand-alone remedy selection criteria. Nonetheless, the Permit's detailed description of the Implementability criterion, such as its specific subsections on coordination with other agencies, regulatory and zoning restrictions, and availability of suitable on-site or off-site treatment, storage, and disposal facilities and specialists, clearly is meant to accommodate public and State views. Moreover, to interpret the nine criteria otherwise leads to a result totally inconsistent with EPA guidance, the clear direction of the Decree, and RCRA and CERCLA desire for public participation. Moreover, it cannot be considered arbitrary for EPA to follow its own RCRA and CERCLA guidance in interpreting the permit criteria, and to follow the Permit direction to factor in any relevant information in the Administrative Record, in selecting the remedy. If GE intended for EPA to depart from this longstanding EPA practice codified in EPA's RCRA and CERCLA regulations, GE should have negotiated for an explicit prohibition in the Decree or Permit, but there is no prohibition in these documents. In short, far from being "arbitrary," EPA's decision to consider public and state views on the disposal alternatives was authorized by the text of the Decree, CERCLA's regulations, RCRA guidance, and overall EPA policy.

C. Persistent and Vigorous Opposition to a New Local PCB Landfill Affects Potential Implementability

GE stands alone in its advocacy of on-site disposal. Local communities and governments strongly oppose on-site disposal of PCB-contaminated material in Berkshire County. EPA has encountered this opposition from numerous Berkshire County residents, community groups, municipalities along the Housatonic, and from Massachusetts government agencies. Many residents worry about the risks posed by a PCB landfill in Berkshire County, and public opposition only intensified after GE's disposal of PCBs at the "Hill 78" landfill near a Pittsfield elementary school. Community groups have historically taken legal action to contest EPA's choices related to the cleanup. Citizens nominated, and the Commonwealth designated, the Upper Housatonic as a protected area, which activated a state prohibition on permanent landfills. Berkshire County residents have expressed their objections to siting a new PCB landfill in their community in hundreds of public comments, protests at public meetings, and letters to newspaper editors over the last decade. For example, residents submitted comments to EPA identifying this widespread sentiment, saying that creating a landfill in Berkshire County "is unacceptable to the people of this county," and "will not be tolerated by its populace."

A common theme among commenters has been a concern about the ongoing negative environmental effect of a dump or landfill in Berkshire County, which has already endured decades of impacts from GE's contamination.

Massachusetts has also declared vigorous disapproval of a new local landfill in public comments and meetings with EPA officials. From 2007 through 2014, EPA received comments from seven offices within the Commonwealth of Massachusetts, including the Departments of Fish and Game, Environmental Protection, Conservation and Recreation, and Public Health, advocating against disposal within Massachusetts. For example, the Commissioners of three Commonwealth offices wrote that "[t]he Commonwealth vigorously opposes two disposal options outlined in the Revised CMS that call for disposal of removed material to be sited within Berkshire County" because:

> Installation of a disposal facility in Berkshire County would also have extremely negative impacts to the communities surrounding the facility including economic aesthetic, recreational, and potential health impacts should the facility fail. Further, construction of yet another such facility just expands the number of locations that would be affected by PCB-contamination, requiring additional long-term monitoring, operation and management beyond what is already a long-term burden on the community, and which runs counter to the concept of the anti-degradation provisions incorporated into the Massachusetts site cleanup regulations.

MA EEA letter to EPA, January 31, 2011.

In addition, every Berkshire County city or town government along the Housatonic (Pittsfield, Lee, Lenox, Stockbridge, Great Barrington, and Sheffield) submitted at least one comment against any additional landfills. For instance, the chair of the Lenox Board of Selectmen wrote: "We find it unacceptable that there could be a new, permanent hazardous waste landfill constructed in our community. We wish to state in very clear terms that such a facility will be vigorously opposed." In 2008, Pittsfield's city council unanimously passed a resolution stating its opposition to any upland disposal facility for dredged sediments in the city of Pittsfield or Berkshire County.

In addition to voicing disapproval, the Commonwealth and public have taken action to protect the unique ecosystem of the Upper Housatonic. For example, 43 community members, including several members of the Massachusetts legislature, nominated the Upper Housatonic for designation as an ACEC, in 2008. Nearly 1000 area residents signed petitions supporting this nomination. In response, the Secretary of the Executive Office of Energy and Environmental Affairs designated the Upper Housatonic River as an ACEC in March 2009. This designation automatically activated State-wide environmental protections provided for ACECs to the 13-mile corridor of riverbed, riverbank, floodplain and riverfront land running from Pittsfield to Lee, including the prohibition of siting permanent Solid Waste facilities within or adjacent to ACECs. The Commonwealth later amended its statewide Hazardous Waste Facility Location Standards to prohibit permanent hazardous waste facilities in or adjacent to any ACEC in the Commonwealth.

Several advocacy groups have sought to shape the Housatonic River remedy, and have opposed on-site disposal. A Citizens Coordinating Council has been meeting since 1998, with

participation from groups including Mass Audubon, and the Berkshire Natural Resources Council. A community group called the Housatonic River Initiative has sponsored "No More Dumps" conferences and meetings for more than five years. Several of the groups have used legal action to oppose EPA's work at the Site. When EPA moved to enter the Decree in 2000, Housatonic River Initiative and Housatonic Environmental Action League, among other entities, moved to intervene to overturn the Decree, in part because they opposed the Hill 78 landfill.

EPA's experience at other sites lends credence to its fear that opposition to on-site disposal at the Housatonic will bar completion or timely completion of the remedy. In Bloomington, Indiana, a 1985 consent decree called for the construction of an incinerator to treat the PCB wastes from six area Superfund sites, all contaminated by Westinghouse industrial activities. The public opposed the consent decree but it was entered despite this opposition in 1985. At that point, the public successfully lobbied the Indiana legislature to pass laws that delayed construction of the incinerator, in part by forbidding local disposal of the incinerator ash. In 1994 the parties to the decree began to explore alternative remedies. Consent Decree amendments memorializing agreements for alternative remedies were entered in 1997, 1998, 1999, and 2008. In the end, cleanup was delayed for over a decade.

Similarly, in New Bedford, Massachusetts, a 1990 Record of Decision selected dredging, on-site incineration, and on-site disposal of incinerator ash for the PCB hotspot in New Bedford Harbor. In response to strong local opposition including a letter-writing campaign and other community activism, in 1993 New Bedford passed a city ordinance banning transportation of the incinerator within city limits in an attempt to prevent the cleanup. Congressional involvement from Representative Barney Frank, Senator John Kerry, and Senator Ted Kennedy, as well as the Massachusetts Department of Environmental Protection convinced EPA Region 1 to plan a new remedy with community support. The new remedy, selected in a 1999 ROD amendment, included dredging and off-site disposal of hot spot sediments without incineration. In the end, cleanup of this most contaminated area of New Bedford Harbor was delayed for nine years.

Having learned from these experiences, EPA takes community opposition seriously in its remedy selection process. In part due to strong public opposition, EPA has chosen off-site disposal at some of the nation's largest PCB-contaminated sediment sites, such as the Hudson River site. There, more than 2.7 million cubic yards of contaminated sediment have already been disposed off-site. EPA has proposed off-site disposal for the anticipated 4.3 million cubic yards of contaminated soil and sediment at the Passaic River Diamond Alkali Site after the public and state of New Jersey expressed opposition to on-site confined aquatic disposal. And at the Lower Fox River site, more than 3.6 million cubic yards of dredged sediments were disposed at off-site licensed and regulated landfills. Taken together, the volume of sediments disposed off-site at these three sites alone exceed the volume of sediments disposed on-site at other sites around the country.

Comment 574: GE asserts that EPA suggests that if additional remediation beyond the currently proposed remedy should be required later, the capacity of the on-site disposal facility would represent a constraint. This hypothetical constraint does not affect the implementability of TD 3. Off-site landfill capacity is also an issue for TD 1 and TD 1 RR. In any case, under TD 3, if additional removal were required later, that additional material could be transported to an off-site disposal facility at that time (assuming there is sufficient capacity). This possibility provides no

basis for not selecting an on-site disposal facility for the volume of the currently proposed remedy.

EPA Response 574: The language in the Comparative Analysis is correct in that the capacity of the on-site disposal facility would represent a constraint on the future placement of additional waste, beyond site capacity, if it is required later. While EPA understands GE's point that in both situations the future disposal location could be off-site disposal, it still is accurate that on-site landfilling would be subject to the capacity of that facility alone, where a choice of off-site disposal without specification of a particular individual facility could conceivably be limited only by the capacity of all appropriate locations.

Comment 494: The Commonwealth concurs with EPA's assessment in the Statement of Basis that the likely significant local and state opposition to the on-site disposal alternatives would render these alternative more difficult, and potentially not feasible to implement.

EPA Response 494: EPA acknowledges this comment.

III.F.2.h Cost

Comment 575: GE asserts that they developed cost estimates for TD 1, TD 1 RR, and TD 3 (for each site) for the volume of materials that would require disposal under EPA's proposed sediment/floodplain remedy – approximately 1 million cubic yards – using cost estimating methodologies that were previously discussed with EPA without its objection. These estimates confirm that on-site upland disposal (TD 3) would be far less costly than off-site disposal – by up to approximately $305 million compared to TD 1 and up to approximately $250 million compared to TD 1 RR.

GE's estimated costs are: $368 million for off-site disposal with trucking; $314 million for off-site disposal via rail; and $63 million to $127 million for on-site disposal (depending on the selected disposal site).

EPA Response 575: In the Comparative Analysis, EPA included one cost for on-site landfilling of $100 million, regardless of the landfill location. This estimate is within the range provided by GE. For disposal by rail, the primary difference between EPA's estimate of $287 million and GE's $314 million estimate appears to be the construction of the rail transfer facility, which GE estimates at between $20 and $30 million. EPA's estimate for a rail facility is approximately $300,000. All other costs appear to be in the same range. For off-site disposal via truck, EPA's estimate of $308 million was based on unit pricing provided in the 2008 CMS and 2010 Revised CMS developed by GE. GE apparently did not use that pricing to prepare its comments. However, disposal pricing via trucking is highly dependent on current fuel prices, and the availability and pricing from disposal facilities. As has been demonstrated in the last three years, the price of fuel has extremely large fluctuations. Thus, if one were to obtain overall disposal pricing today, they would likely be less than GE estimated. Also, it is not practical to continually revise cost estimates after a corrective measures study is conducted, and then continually conduct analysis comparisons. Therefore, EPA believes its cost estimates of $287 million for rail and $308 million for disposal via trucking is appropriate for comparison purposes. Thus, EPA estimates the difference in cost for off-site and on-site disposal ranges from $160 to $245 million, whereas GE's range is $250 to $305 million.

Regardless of the method used to estimate disposal costs, EPA acknowledges that the cost difference between on-site and off-site disposal is significant. Based in part on GE's evaluation in the Revised CMS, EPA performed a thorough comparative analysis of the alternatives with respect to Cost, analyzing the key tradeoffs among different treatment/disposal alternatives. EPA's analysis is demonstrated in Section 3.10 of EPA's Comparative Analysis. In addition, EPA's analysis of Cost is only part of EPA's overall evaluation of the Permit criteria, on which EPA based its determination of the selected remedy as best suited to meet the Permit's General Standards in consideration of the Permit's Selection Decision Factors, including a balancing of those factors against one another. See Comparative Analysis, pages 76-77. Moreover, except as otherwise specified in the Response to Comments, the comments, upon EPA evaluation, do not make a significant difference to the Comparative Analysis or EPA's determination. Any clarifications or information presented in the comments on Cost has not altered EPA's overall determination.

III.F.2.i Conclusion

Comment 576: GE asserts the following: As shown in the preceding sections, TD 1, TD 1 RR, and TD 3 would all meet the General Standards of the Permit, and the Selection Decision Factors clearly favor TD 3 since that alternative is at least comparable to, if not better than, TD 1 and TD 1 RR in terms of the Permit criteria other than cost and is much less costly. Accordingly, TD 3 best meets the General Standards of the Permit in consideration of the Selection Decision Factors. This conclusion is supported by EPA guidance on RCRA corrective action, which states:

> EPA believes that many potential remedies will meet all the threshold criteria. In that situation, cost becomes an important consideration in choosing the remedy which most appropriately addresses the circumstances at the facility and provides the most efficient use of Agency and facility owner/operator resources (emphases added).[34]

That is the situation here. Given the overall comparability of off-site disposal and on-site upland disposal in terms of the General Standards and the other Permit criteria, cost becomes a key factor; and given the substantially lower costs of on-site upland disposal, application of the Permit criteria compels selection of that alternative. The above quotation reflects a concept of cost-effectiveness similar to that in the NCP, which requires that a remedy be "cost-effective" and provides that a remedy "shall be cost-effective if its costs are proportional to its overall effectiveness" (40 CFR § 300.430(f)(1)(ii)(D)). The preamble to the NCP explained: "In comparing alternatives to one another, the decision-maker should examine incremental cost differences in relation to incremental differences in effectiveness. Thus, for example, if the difference in effectiveness is small but the difference in cost is very large, a proportional relationship does not exist" (55 Fed. Reg. 8666, 8728 (1990), emphasis added). In such a situation, the more costly alternative would not be cost-effective. Since on-site upland disposal

[34] Advance Notice of Proposed Rulemaking on Corrective Action, 61 Fed. Reg. 19432, 19449 (May 1, 1996), which EPA has stated is to be used as guidance for activities under RCRA corrective action permits (64 Fed. Reg., 54604, 54607, Oct, 7, 1999).

here satisfies the threshold criteria, is as effective as off-site disposal, and would cost much less, off-site disposal would not be cost-effective.

For the reasons given above, the Region's selection of out-of-state disposal over secure on-site upland disposal would be arbitrary and capricious and inconsistent with the Permit criteria.

EPA Response 576: EPA disagrees. EPA was well within its discretion to choose off-site disposal from the range of alternatives. EPA disagrees with GE's contention that the alternatives were comparable but for the cost criterion. EPA's Comparative Analysis and Statement of Basis, as further informed by the comments and responses herein, demonstrate clear distinctions between GE's favored approach and the selected remedy with respect to each of the Permit's threshold General Standards – Overall Protection of Human Health and the Environment, Control of Sources of Releases, and Compliance with ARARs. Moreover, as required by the Permit, EPA also evaluated all six of the Permit's Selection Decision Factors, including balancing of those factors against each other. Based on that evaluation, EPA has selected the alternative best suited to meet the Permit's General Standards, in consideration of the decision factors, including a balancing of those factors against each other. EPA's decision-making process under the Permit also includes consideration of "any other relevant information in the administrative record." In doing so, EPA follows the Decree, including the Permit criteria, and fulfills its duty to protect the public, and furthers the objectives of CERCLA and RCRA.

Comment 736: GE asserts that EPA's proposal includes, as Attachment D to the Draft Permit, a proposed determination by EPA under § 761.61(c) of the Agency's TSCA regulations that the sampling, storage, cleanup, and disposal of PCB-containing materials in accordance with the proposed requirements would meet the requirements for risk-based approval under TSCA – i.e., that they will not result in an unreasonable risk of injury to human health or the environment. That determination, however, would be based on the condition that "[a]ll contaminated sediment and floodplain soil that is removed will be disposed of off-site" at an existing approved disposal facility."

The TSCA risk-based determination should not be dependent on off-site disposal. As demonstrated in Section II of these comments [see comments above in this section], even with on-site upland disposal, the PCB handling and disposal activities would not result in an unreasonable risk of injury to human health or the environment. For the reasons given in Section II [see comments above in this section], GE submits that the Region is required to change its proposed disposal method to disposition in an on-site upland disposal facility; and it should issue a TSCA risk-based approval determination for that approach. Indeed, at both this Site and numerous other sites, EPA has issued risk-based determinations under the TSCA regulations that on-site disposal facilities will not result in an unreasonable risk of injury to human health or the environment or has otherwise waived specific TSCA requirements as not necessary to protect against an unreasonable risk of injury to human health or the environment.[35] The same should be done here.

[35] [footnote from GE comment] See, e.g., the TSCA risk-based determinations for the OPCAs at this Site (Decree Appendix D, pp. 41-43) and for the Confined Aquatic Disposal cell at the New Bedford Harbor Site (EPA, 2011) and the TSCA risk-based determinations or waivers issued by EPA for the on-site disposal facilities at the Norwood PCBs Site (EPA, 1996), the Sullivan's Ledge Site (EPA, 1989, 1991a), the Silresim Chemical Corporation Site (EPA, 1991b), the Allied Paper/Portage Creek/Kalamazoo River Site (EPA 1998, 2001b), and the Fields Brook Site (EPA, 1997c, 1997d).

EPA Response 736: EPA disagrees. Neither the Permit nor the Decree require EPA to make a risk-based determination pursuant to TSCA Section 761.61(c) for all the alternatives evaluated. That being the case, EPA appropriately has not made a risk-based determination for any of the alternatives not proposed or selected, which includes GE's favored approach for disposal.

III.F.3 New and Innovative Technologies

Comments 60, 75, 100, 155, 200, 201, 202, 203, 204, 210, 214, 222, 264, 267, 271, 362, 385, 414, 431, 514, 527: Several commenters encouraged the use of new and innovative technologies as part of the Rest of River remediation. Some recommended pilot programs to test new technologies that could then be incorporated into the cleanup. Some of the innovative technologies mentioned included bioremediation (including the vendor, Biotech), soil washing by Biogenesis, phytoremediation, ozonation, the use of fungi and activated carbon as a sediment amendment. One commenter mentioned that it was unlikely that any in situ treatment alternative will become viable during the life of the project and another stated that the river should not be remediated until a less invasive technology is found.

EPA Response 60, 75, 100, 155, 200, 201, 202, 203, 204, 210, 214, 222, 264, 267, 271, 362, 385, 414, 431, 514, 527:

i. Delay Cleanup until a Viable Less Invasive Technology is Found.

Due to the unacceptable threats to human health and environment posed by the PCBs and the need to control the sources of releases of PCBs, EPA believes that the cleanup cannot be indefinitely delayed until a less invasive technology is found that is appropriate for all components of the cleanup. Where appropriate, innovative and/or less invasive technologies have been incorporated into the Final Permit Modification. Specifically, the Final Permit Modification requires the use of an amendment such as activated carbon and/or other comparable amendment in lieu of excavation/dredging in Reach 5B sediment in certain Backwaters, and as an initial remediation measure in Vernal Pools.[36]

ii. Evaluation of New and Innovative Treatment Technologies

Prior to proposing the Draft Permit Modification, EPA required GE to investigate technologies to treat the PCB contaminated soil and sediment.

In GE's 2007 CMS Proposal, several alternative methods/innovative technologies were evaluated for further consideration in the CMS. In place, or *in-situ*, methods evaluated included

[36] In the Draft Permit Modification, the use of sediment amendments was required as the remediation method for sediment in Reach 5B and in certain Backwaters, and as one of three potential remediation methods for Vernal Pools. In the Final Permit Modification, as discussed in Section III.C., the approach to Vernal Pools was revised to require the use of sediment amendments as the preferred remedy, with excavation in the event the sediment amendment method was not effective.

physical immobilization (agents include coal, coke, activated carbon and others), biological treatment (aerobic and anaerobic), chemical treatment (surfactants, solvents, and oxidants), and thermal processes (stream, direct heat, high energy vitrification).

The 2007 CMS Proposal concluded that no sites had been identified where *in situ* biological, chemical, or thermal treatment were successfully demonstrated full scale to address PCBs in sediment or soil. In addition, there were implementation issues identified with physical stabilization. Therefore, no in situ treatment methods were retained for further consideration in the CMS. See CMS Proposal Section 4.4.6. Note that since that time, advancements have been made on AC/sediment amendments. See below.

Similarly, GE's 2007 CMS Proposal also evaluated *ex situ* (material removed from the river/floodplain and staged for treatment) biological treatment, chemical extraction (e.g., soil washing), chemical destruction, and thermal desorption. As discussed in the CMS proposal, ex situ chemical extraction/soil washing and thermal desorption were retained for further analysis in the CMS. For the reasons cited above for in situ treatment, ex situ biological treatment was not retained.

In its Revised CMS, GE included a demonstration project on soil washing (also referred to as chemical extraction) as part of its evaluation of treatment/disposition options. That demonstration project was conducted by Biogenesis and was referred to as TD-4. As discussed in the Statement of Basis, TD-4 was not selected in part because it may not be able to effectively treat PCB contamination from the Site (Statement of Basis, page 35). As discussed in GE's Revised CMS and EPA's Comparative Analysis, the long-term reliability and effectiveness of chemical extraction has not been demonstrated for Housatonic River sediment. A bench-scale study using material from the Rest of River failed to demonstrate that site sediment and soil can be treated effectively. Revised CMS at Section 9.4; Comparative Analysis at page 61. Also, material treated by chemical extraction may not reduce levels to allow for unrestricted reuse and the material may need to be further treated or disposed of (Statement of Basis, page 36). For a more detailed evaluation of TD-4 (soil washing), see the Statement of Basis, pages 35-39, Comparative Analysis of Treatment/Disposition Alternatives, Section 3 of the Comparative Analysis, and Section 9.4 of the Revised CMS.

GE also evaluated thermal desorption (TD-5) in its Revised CMS. Revised CMS at Section 9.5. Due in part to its high cost, and the likelihood that all of the treated material could not be reused in Rest of River, thermal desorption was not selected for use. See the Comparative Analysis at 59-77 and the Statement of Basis pages 35 to 39 for the full rationale for not selecting thermal desorption.

Although the use of activated carbon/sediment amendments was screened out as a viable option in GE's 2007 CMS proposal, there have been significant advances in its effectiveness to reduce the bioavailability of PCBs in soil and sediment. Studies published since 2007 have documented the effectiveness in the use of these amendments. See Attachment 3 to the Comparative Analysis. In addition, since the Draft Permit Modification was issued, additional studies and

reports further confirm its effectiveness in certain situations.[37] Based on this information, EPA determined it is appropriate to require the use of an amendment such as activated carbon and/or other comparable amendment in lieu of excavation/dredging in Reach 5B sediment, in certain Backwaters, and as an initial remediation measure in Vernal Pools. Sediment amendments may be particularly effective in Vernal Pools since the sediment/soil is in a depositional area as opposed to an erosional area, thus the amendments will remain within the Vernal Pool.

In addition, there has been a renewed request for EPA to mandate bioremediation as the primary remedy. However, as was the case in 2007, there has not been to date sufficient demonstration that bioremediation would be effective and meet the project goals. For example, for one of the projects cited, New England Log Homes, the Massachusetts DEP terminated the pilot project, in part, because it determined in a letter dated August 18, 2015 that:

> There is no documented evidence found nor are sufficient measures proposed that will conclude that any reduction in dioxin concentrations can be attributed to bioremediation. In fact, all evidence to date points to dilution and redistribution of the dioxin contaminated soil across the site and at depth.

Therefore, bioremediation has not been incorporated into the Final Permit Modification.

iii. Evaluation of Innovative/Alternative Technologies Going Forward

EPA recognizes that there may be future advances in innovative or new technologies that could result in these technologies being appropriate for use in Rest of River. As the project goes forward, phytoremediation, ozonation, and the use of fungi, as well as soil washing and bioremediation (including incorporating biological agents into sediment amendments), and other technologies can be among the advances in innovative technologies to be identified pursuant to the adaptive management requirements specified in the Final Permit Modification. Pursuant to the Final Permit Modification, GE is required to implement an adaptive management approach to adapt and optimize project activities to account for "lessons learned," new information, changing conditions, evaluations of the use of innovative technologies, results from pilot studies, if any, and additional opportunities that may present themselves over the duration of the project, including during periodic reviews. See Section II.F of the Final Permit Modification. (emphasis added). Those requirements are reflected also in the requirement for a Rest of River Statement of Work, which includes an Adaptive Management Plan. See Section II.H.13. Should these technologies become viable, they can be implemented at any point during the remediation. In addition, in part in response to these comments, Section II.B.5.b.(2) of the Final Permit Modification has been revised to include the following:

> During the implementation of Corrective Measures, the permittee [GE] may propose to EPA for approval the use of innovative treatment technologies as part of an adaptive management approach as outlined in Section II.F. below.

[37] Patmont, *et al*.; Assessment and Treatment of Contaminated Sediments, October 29, 2015, DOD, EPA, DOE Webinar.

Comment 47: Contaminated soils and sediments should be sent to a centrally located processing area, where new techniques for PCB detoxification, dechlorination, and elimination can be pilot tested.

EPA Response 47: The Revised CMS contemplated transporting sediment and soil to a central processing location for potential treatment via chemical extraction and thermal desorption. See Revised CMS at 9-77 and 9-107. If ex situ treatment methods are implemented during the response action, the optimal location or locations will be determined during design.

Comments 257, 260.a: Reduction of toxicity is not achieved only by amendment with activated carbon, and this amendment could be tacked on to any of the other Alternatives. It is not an exclusive technology to Alternative 9 [the selected remedy]. These techniques should be looked at as tools across the alternatives.

EPA Response 257, 260.a: EPA concurs that the use of a sediment amendment such as activated carbon could conceivably be used as a component of any selected remedy. A number of factors must be evaluated such as, level of contamination, sensitivity of surrounding habitat, and/or river velocity. As discussed above, EPA selected a sediment amendment such as activated carbon as part of the overall balanced approach to address the unacceptable threats posed by the PCB contamination, while also taking steps to avoid, minimize and mitigate effects on the ecosystem and to reduce the amount of material to remove and disposed of at an off-site disposal facility.

Comment 383: One commenter asked how activated carbon works and what the long-term implications are for the future of the river. Does it encapsulate PCBs or break them down? If the cap containing activated carbon fails, what are the implications for redistribution and downstream transport of PCBs?

EPA Response 383: PCBs have been found to sorb, or bind, to activated carbon or sediment amendments. Sorption to the carbon does not destroy or break down the PCBs, rather it binds the PCBs to the carbon, thus reducing the PCB pore water concentrations and bioavailability of PCBs to ecological receptors. If the sediment amendments redistribute downstream, the PCBs are expected to remain sorbed (bound) to the amendments and continue to have reduced bioavailability.

Long-term implications for the use of sediment amendments include the effect on ecological receptors. A recent review found that negative impacts to benthic organisms resulting from activated carbon exposure were observed in only one-fifth of 82 tests (primarily laboratory studies). Importantly, such negative community effects have been observed more rarely in activated carbon in field pilot demonstrations compared to laboratory tests and often diminish within 1 or 2 years following placement, particularly in depositional environments where new (typically cleaner) sediment continues to deposit over time. (Patmont *et al.*). Therefore, there is evidence to support the conclusion that there will not be long-lasting adverse effects to the environment.

III.G Institutional Controls and Related Requirements

Comment 225: The institutional controls discussed on page 10 of the Statement of Basis will have to be enforced in perpetuity. This is not a permanent, proactive solution.

EPA Response 225: The Statement of Basis, page 10, outlines a number of different Institutional Controls and related requirements that were in the proposed remedy. EPA has revised some of these requirements for purposes of the Final Permit Modification, and the revised requirements are designed to ensure protectiveness of the remedy in perpetuity. EPA and/or the States will enforce compliance with those controls as needed going forward. There is no termination date in the Final Permit Modification for these requirements.

EPA agrees that there are limitations to the effectiveness of Institutional Controls, including the lack of effectiveness on ecological receptors, as well as the possibility of human non-compliance with the controls. Institutional controls are employed by EPA in the Final Permit Modification to supplement the engineering controls such as excavation and containment. The remedy primarily relies upon excavation and containment of contaminated media, with an estimated 990,000 cubic yards of contaminated sediment and bank soil being removed from the River. Containment measures, such as Engineered Caps, will isolate remaining contamination. Institutional Controls are included in the remedy to provide added protectiveness by, among other things, restricting land uses incompatible with the remedy, addressing future uses and future use changes, and protecting remedy components.

Institutional Controls are a remedy component in many Superfund and RCRA cleanups, and their use is fully consistent with regulations and guidance under Superfund. The NCP provides that "EPA expects to use institutional controls such as water use and deed restrictions to supplement engineering controls as appropriate for short- and long-term management to prevent or limit exposure to hazardous substances, pollutants, or contaminants." 40 C.F.R. 300.430(a)(1)(iii)(D)(3). See also *Institutional Controls: A Site Manager's Guide to Identifying, Evaluating and Selecting Institutional Controls at Superfund and RCRA Corrective Action Cleanups*, September 2000, OSWER 9355.0-7-4FS-P, EPA 540-F-00-005. As EPA stated in the Preamble to the NCP, "EPA agrees that institutional controls should not substitute for more active response measures that actually reduce, minimize, or eliminate contamination unless such measures are not practicable, as determined by the remedy selection criteria. … EPA believes, however, that institutional controls have a valid role in remediation … [and] are a necessary supplement when some waste is left in place." 55 Fed. Reg. 8706. The NCP also states that in evaluating remedies for source control actions EPA should develop one or more alternatives that prevent or control exposure to hazardous substances through engineering controls, and as necessary, institutional controls. 40 C.F.R. 300.430(e)(3)(ii). As pointed out in 1996, EPA strives to have parity between cleanups under the NCP and cleanups under RCRA Corrective Action, September 24, 1996 EPA *Coordination between RCRA Corrective Action and Closure and CERCLA Site Activities.*

As provided in Section II.B.6, "Institutional Controls and Related Requirements," specific controls in the Final Permit Modification include the following:

- Biota Consumption Advisories: The Final Permit Modification provides that GE will cooperate with and support EPA and the States with respect to all advisories until such time that the advisories are discontinued.

- Environmental Restriction and Easements: EREs are required in Section II.B.6.b, and are defined to mean "an instrument that grants rights and imposes restrictions and obligations running with the land in perpetuity, for the purpose of implementing, ensuring non-interference with, and/or ensuring the integrity and protectiveness of the response actions performed, and to be performed, pursuant to this Consent Decree …". Decree, Para. 4.

- Conditional Solutions: Conditional Solutions are an alternative to an ERE when a property owner declines an ERE, and are a requirement of the Final Permit Modification to ensure protectiveness if future uses change and for Legally Permissible Future Projects or Work. The Permit does not have an expiration time period for the Conditional Solution requirements.

Additional requirements related to Institutional Controls and continuing obligations are contained in Sections II.B.2.j, k, and l and II.B.6.c of the Final Permit Modification.

Comment 263: On page 32 of the Statement of Basis, under the criterion of Implementability, EPA acknowledges that alternatives that have little or no active remediation are less reliable, would require more extensive monitoring, and would require more institutional controls than alternatives where more active remediation is performed.

EPA Response 263: The comment accurately summarizes the text in the Statement of Basis. However, as discussed in Section II and elsewhere in this Response to Comments, EPA's analysis of the Implementability factor (or any of the Selection Decision Factors) is only one part of EPA's overall evaluation of the Permit criteria, on which EPA based its determination of the selected remedy as best suited to meet the Permit's General Standards in consideration of the Permit's Selection Decision Factors, including a balancing of those factors against one another. Based on this analysis, EPA selected a balanced remedy. EPA's rationale for the extent of remediation in the Final Permit Modification is documented in its Statement of Basis and Comparative Analysis, as supplemented by this Response to Comments.

In addition, as explained in Response 225, EPA, consistent with the NCP and EPA guidance on Institutional Controls, uses Institutional Controls in the Final Permit Modification as a supplement to other engineering controls, not as the primary mechanism for reducing risks.

Comment 312: EPA should ensure that signage providing current consumption advice to the public be monitored and maintained during all phases of the remediation.

EPA Response 312: Final Permit Modification Section II.B.6.a provides Performance Standards and Corrective Measures for Biota Consumption Advisories. The Corrective Measures specifically refer to GE's obligation to cooperate with and support EPA and the States to improve public awareness of the advisories by conducting the following: preparing, distributing, inspecting, monitoring and maintaining educational and outreach activities, including the production and posting of signs; providing to hunting and fishing license distributors appropriate written notices regarding such advisories to be included with licenses;

and performing all other related activities. These GE obligations continue until the Biota Consumption Advisories are discontinued.

Comment 381: The Statement of Basis references establishing a mechanism for additional response actions in the case of land use changes in the future. What are these mechanisms and how will land use changes be facilitated? We are concerned that the "mechanisms" will actually be simply institutional controls, which have been used too often and too extensively in Pittsfield.

EPA Response 381: The Final Permit Modification does use Institutional Controls, along with other mechanisms, to restrict unacceptable and unprotective land use changes and to ensure protectiveness when land use changes. Specific mechanisms used for land use changes include EREs, which provide notice of contamination and prevent a property from being used in a manner that generates unacceptable exposure to residual PCBs, or Conditional Solutions, which require GE to respond to a Legally Permissible Future Project or Work by undertaking additional response actions to ensure protectiveness. GE is required to offer appropriate compensation for the placement of EREs to private land owners. Final Permit Modification, Section II.B.6.b. In the non-river parts of the Site, the Conditional Solution mechanism has been used to provide additional excavation of PCBs based on a change in use of a property. In addition, Conditional Solutions provide a mechanism that requires GE to implement, if necessary, additional response actions to be protective any Legally Permissible Future Use.

Moreover, even where formal Conditional Solutions or EREs are not required, the Final Permit Modification has requirements for GE response actions, upon the occurrence of a Legally Permissible Future Project or Work or a Legally Permissible Future Use. Final Permit Modification, Section II.B.6.c.

Comment 387: Institutional controls will do nothing to prevent those determined to eat fish and other species from doing so. The[y] will also have no effect on ecological receptors. The only sure way to reduce exposure to both human and ecological receptors is to remove the PCBs from the river.

EPA Response 387: As explained further in Response 225, EPA understands that there are limits to the effectiveness of Institutional Controls, including for ecological receptors. As explained in those responses, Institutional Controls are being used to supplement the active components of the remedy, which do involve removing PCBs from the River and containing remaining PCBs.

Comment 465: The Statement of Basis does not include the requirement for Institutional Controls related to GE's responsibility for incremental costs due to the impact of PCBs on allowable land uses and permitted activities in Connecticut. These requirements are included in the draft RCRA permit. The Statement of Basis should be modified to include these requirements.

EPA Response 465: The Final Permit Modification contains the requirements for the Rest of River remedy. EPA reviewed the public comments on the Statement of Basis and on the Draft Permit Modification, and has selected the remedy in the Final Permit Modification. As explained in Response 687, 688 and 744, EPA has modified the requirements for the impact of

PCBs on Legally Permissible Future Projects or Work or Legally Permissible Future Uses, and the Final Permit Modification does not include the responsibility for incremental costs. Instead GE has responsibility for undertaking specific actions when necessary with respect to Legally Permissible Future Projects or Work or Legally Permissible Future Uses. Final Permit Modification at Sections II.B.2.l. and II.B.6.c.

Comment 462.a: The State of Connecticut has the following comments on the requirements for Biota Consumption Advisories specified in the Draft Permit Section II.B.7 Institutional Controls:

- In Connecticut, fish consumption advisories are set by the Connecticut Department of Public Health. GE cannot set, maintain or eliminate an advisory.

- GE must be responsible for the outreach activities outlined in the permit. In Connecticut, signs must be posted in whichever languages are needed to reach the populations using the river. Currently this includes translating signs and educational materials into several south eastern Asian languages and Spanish. Translation into other languages may be needed in the future depending upon the use of the resource.

- GE should provide support for periodic creel surveys of the river to document use of the resource and consistency with advisory provisions.

EPA Response 462.a: EPA concurs that the fish consumption advisories are typically set by state health departments, although EPA has authority to issue warnings and advisories. EPA also concurs that warning signs and educational materials be provided in languages other than English to generally match the populations using the river and that GE should perform and maintain educational and outreach activities. Based in part on these comments, the Final Permit Modification has been revised to address the comments. Final Permit Modification at II.B.6.a. Additional requirements to support the biota consumption advisories, such as the need for a creel study, will be determined during the submission, review, and approval of GE's Institutional Controls and Related Requirements Plan required pursuant to Section II.H of the Permit.

Comment 462.d: The State of Connecticut has the following comments on the requirements in the Draft Permit Section II.B.7.b. Institutional Controls and Related Requirements:

- GE should be required to pay for costs associated with and attributable to the presence of PCBs for management and maintenance of structures in Connecticut (e.g. dams, docks, bridges, etc.). This provision should not be restricted to costs associated with PCB concentrations greater than 1 mg/kg. For example, there is a sampling and analysis cost to determine whether or not PCBs are present within a project area. This cost is independent of the analytical results which may be below, equal to or above 1 mg/kg. GE should be responsible for such cost without consideration to the analytical results. Similarly, there are costs associated with handling, managing or disposing of PCBs regardless of whether the concentration of PCBs is above or below 1 mg/kg. GE should be responsible for these costs.

- The provisions for Institutional Controls and Related Requirements should cover all regulated activities and permissible land uses as well as removal of dams in Connecticut if owners of the dams choose to remove or modify them.

EPA Response 462.d: EPA agrees that GE should be responsible to address the issues associated with contaminated sediment when there is a Legally Permissible Future Project or Work in Connecticut, including, but not limited to, dam maintenance, removal, repair, upgrades, and enhancement activities; flood management activities; road and infrastructure projects; and activities such as the installation of canoe and boat launches and docks. In part in response to this comment, the Final Permit Modification was modified to define the term Legally Permissible Future Project or Work. See Definitions Section and Section II.B.2.l. of the Final Permit Modification. However, instead of requiring a cash payment to any entity conducting the work or project as was required by the Draft Permit Modification, Section II.B.2.l. of the Final Permit Modification now requires GE to perform actions such as engineering controls and materials handling and off-site disposal for the contaminated sediment. However, for sediment with less than 1 mg/kg PCBs, and for the sampling to determine whether sediment contains PCBs greater than 1 mg/kg, EPA has not included those responsibilities in the Final Permit Modification since risks to human health posed by such material are relatively low and disposal of material with PCBs less than 1 mg/kg is generally not regulated by Connecticut. GE's obligations related to Legally Permissible Future Projects or Work, however, are triggered once there is documentation that such Project or Work requires the handling or disturbance of sediment with total PCBs greater than 1 mg/kg.

Similar requirements for GE's obligations related to Legally Permissible Future Projects or Work or changes in use in floodplain soil in CT are specified in Section II.B.6.c. of the Final Permit Modification.

Comment 462.e: The State of Connecticut has the following comments on the requirements in the Draft Permit Section II.B.7.b. Institutional Controls and Related Requirements: The provision under paragraph (3) of this subsection pertaining to dam failures and unpermitted releases should compel recovery of any released materials to the greatest extent practicable.

EPA Response 462.e: EPA concurs that GE should be held responsible to address the release of PCBs from dams. To address this issue, Sections II.B.2.j and l. of the Final Permit Modification require that if there is a catastrophic failure and/or a material breach of any dam or component of the dam that results in a release of PCBs that is materially greater than the PCB transport from that dam under the normal range of flow conditions, then GE shall propose and implement a response to protect human health and the environment.

EPA has not, however, incorporated a requirement to compel recovery of *any* released material in such situations. EPA has focused its requirements on ensuring a remedy that is protective of human health and the environment.

Comment 143: The language in Section II.B.I.g.(2) of the Permit regarding dam removal should be strengthened to ensure a prompt response by GE when circumstances require such action. GE must be required to make progress at the speed an improvement or redevelopment opportunity requires, not at a pace which could forestall opportunities that are presented. Specific cleanup plans should be developed for each impoundment in the very near term (years 1-2), with a requirement that the work be initiated and completed in an expedited fashion (within one year of notification that work is required to respond to an improvement or redevelopment opportunity) as needed to take advantage of opportunities which are not yet known. Cleanup

plans which are not yet implemented should be required to be updated on a regular basis in order to account for the active adaptive management approach which the permit favors. This should not be limited to impoundments only in Reaches 7B and 7C but include all of Reaches 7 and 8.

Comment 382: GE should not be allowed to remove any dams along the river without full EPA involvement. We are concerned that dam removal projects will be used a means to delay the larger cleanup of the river. The draft Permit includes provisions for GE to coordinate in good-faith with entities planning to remove dams, including additional costs and permit requirements attributable to PCB contamination. However, this provision only applies until the Conceptual Remedial Design/Remedial Action Work Plan for the affected reach is required to be submitted to EPA. The contamination was caused by GE and GE should remain responsible for associated additional costs to other landowners in perpetuity. River restoration projects such as dam removals should not be hindered by GE's environmental contamination. Given that some dam removal projects may not proceed until many years in the future, we urge EPA to require that the provisions for GE cooperation on dam removals not be limited in time.

EPA Response 143, 382: Requirements for GE to participate in activities related to dam removal have been revised in the Final Permit Modification. Section II.B.2.f.(1)(e) [the equivalent of Section II.B.1.g.(2) in the Draft Permit Modification] was revised to allow for GE to provide a proposal, to EPA for review and approval, that proposes coordination with any entity planning to remove a dam. Such proposal shall include a schedule for reaching an agreement with an entity conducting dam removal on the scope and extent of the work performed, and the allocation of costs. If GE fails to secure this agreement, then GE will be required to implement other response actions behind the dams per Section II.B.2.f.(1)(a)-(c), and/or implement Section II.B.2.f(1)(d).

In addition, the Final Permit Modification was revised to clarify the requirements for GE's continuing obligations for PCB-contaminated sediment that remains behind a dam, should GE not reach an agreement to coordinate dam removal activities in accordance with Section II.B.2.f.(1)(e). The Final Permit Modification now requires that GE conduct response actions in Impoundments for any Legally Permissible Future Project or Work, which includes dam removal. These requirements include the following:

> Within 30 days of Permittee [GE] receiving notification from EPA that EPA has determined that an entity has met the criteria for a Legally Permissible Future Project or Work, Permittee [GE] shall submit to EPA for review and approval, a work plan and schedule to respond to such Legally Permissible Future Project or Work.

This revision is intended to ensure a prompt response for situations such as dam removal or any other Legally Permissible Future Project or Work and to ensure that GE's obligations remain in perpetuity. Final Permit Modification at II.B.2.k. Similar language is included for potential dam removal in Reaches 10-16 (Connecticut Reaches). Final Permit Modification at II.B.2.l. The GE responsibilities in II.B.2.k and l for dam removals are not limited in time.

Lastly, the Draft and Final Permit Modifications require GE to submit on an expedited basis Work Plan for Reaches 7B (Columbia Mill) and 7C (Eagle Mill). These are the Reaches where dam removal is most likely.

Comment 352: Article 7(b)(2) on p. 32 of the Draft Permit should be modified to require GE to respond with a work plan within 60 days if any party is required to disturb sediment-laden PCBs for business or infrastructure purposes. Any work that would disturb PCB-contaminated sediment near dams should require a formal submittal and review process and should include a dispute resolution provision.

EPA Response 352: See above Response 143, 382. More specifically, the Final Permit Modification has been revised to require GE to submit a Work Plan within 30 days for any Legally Permissible Future Project or Work for work in Reaches 5-9 that would disturb any sediment, and work in Reaches 10-16 that disturb sediment with total PCBs greater than 1 mg/kg. Final Permit Modification Sections II.B.2.k. and l. The definition of Legally Permissible Future Project or Work includes, but is not limited to, construction and repair of structures; utility work; flood management activities; road and infrastructure projects; dam removal, maintenance, repair, upgrades, and enhancement activities; and activities such as the installation of canoe/boat launches. Final Permit Modification, Definitions.

With respect to dispute resolution between EPA and GE, the Decree already has provisions for Dispute Resolution that govern EPA's responses to GE's submittals, so a new dispute resolution section is not be necessary. See Section XXIV of the Decree. The Final Permit Modification does not provide for potential disputes between a third party and GE; however, the Final Permit Modification does not affect the rights of third parties to proceed with claims independent of the Final Permit Modification requirements. See also Response 113 *et al.* in Section IX of this Response to Comments.

Comment 491: The Commonwealth appreciates EPA's efforts to identify approaches that better integrate the remediation of the Reach 7 impoundments with potential scenarios to remove one or more dams in the future and/or address the use and maintenance of these impoundments. The Commonwealth supports EPA's efforts to structure the remediation of the impoundments in a way that may facilitate the future removal of one or more dams, while at the same time being clear in the Draft Reissued Permit about GE's obligations to make a good faith effort to reach a cost agreement with any entity interested in dam removal and to promptly pay sediment-related costs attributable to the presence of PCBs. EPA's implementation of the Final Reissued Permit must guard against creating practical disincentives to third party entities undertaking future actions to further restore of Rest of River through dam removals.

EPA Response 491: EPA acknowledges the comment of support from the Commonwealth and believes that the revisions incorporated into the Final Permit Modification discussed above do not create disincentives for dam removal.

Comment 333: If GE acquires undeveloped land within the remediation corridor, they should be required to place conservation restrictions over the properties, preventing further development. Should new technologies that will destroy PCBs in-situ evolve, these properties will help protect the river and provide for future public recreation.

EPA Response 333: Conservation restrictions, as suggested by the commenter, are not required for the protectiveness of the remedy. Consistent with the Decree, the Final Permit Modification requires GE to place an Environmental Restriction and Easement (ERE) on all GE-owned property located within Exposure Areas in Reaches 5 through 8. These EREs typically place restrictions for converting the property to residential use and also restrict certain soil disturbance activities, such as the excavation of soil. There is no requirement in the Decree or the Final Permit Modification to require GE to place additional conservation restrictions on any other property in Rest of River for purposes of keeping the land undeveloped for potential use in the cleanup.

Comment 462.c: The State of Connecticut has the following comments on the requirements in the Draft Permit Section II.B.7.b. Institutional Controls and Related Requirements: GE should be required to operate, inspect, monitor and maintain Woods Pond and Rising Pond dams even if the surficial sediment concentrations behind the dams are 1 mg/kg total PCBs or less if the PCB concentrations are based on a cap or other similar management measure.

EPA Response 462.c: Section II.B.2.j(2)(a) of the Final Permit Modification requires GE to operate, inspect, monitor and maintain Woods Pond and Rising Pond dams, even if GE transfers ownership interest in the dams. Based in part on this comment, the 1 mg/kg threshold requirement has been eliminated from the Final Permit Modification, and there is now no threshold for allowing the discontinuation of GE's responsibilities.

Comment 159: We request that a new subsection be added to Section II.B.10. of the Permit (Other Measures and Requirements) addressing wastewater and stormwater discharges and uses. The wording should be similar to subsection c., Water Withdrawals and Uses. A primary concern is that there are five municipal wastewater treatment plants in Massachusetts along the river, several industrial wastewater permittees, and that Pittsfield and a portion of Lenox are also governed by the 2014 Draft Massachusetts Small MS4 General Permit covering stormwater Phase II discharges in regulated MS4 communities. Cleanup activities could impact these permittees and their compliance requirements.

EPA Response 159: Based on this comment and others, EPA has modified the Water Withdrawals and Uses Section of the Final Permit Modification to require GE to minimize/mitigate impacts during implementation of Corrective Measures to withdrawals and/or uses of water from the Rest of River by any entity, which would cover the water uses referred to in the comment if those uses are within the Rest of River. In addition, see Response 305 below.

Comment 276: The Permit recognizes on page 32 that GE must "[p]ay for all incremental costs associated with and attributable to the presence of PCBs . . ., including, but not limited to, activities related to dam maintenance or removal, flood management activities, road, infrastructure projects, and activities such as installation of canoe and boat launches, docks, etc., with respect to Reaches 5 through 16 in Rest of River, in any area regardless of whether it has been otherwise addressed by remedies prescribed by this Permit." EPA should make it clear that, under this language, all impacts to local infrastructure must be measured and towns fully compensated for any and all infrastructure that has suffered accelerated deterioration as a result of the remedy – e.g., because of truck traffic and heavy equipment associated with the remedy.

GE should attempt to assess beforehand whether cleanup activities necessitate maintenance or improvement of road infrastructure to prevent damage before it occurs.

EPA Response 276: Based on other public comments, EPA has revised the GE requirements regarding the presence of PCBs related to other activities, projects and uses, so that now GE's responsibilities are to conduct response actions to allow Legally Permissible Future Projects or Work to be conducted in a manner that maintains Performance Standards and/or maintains the effectiveness of the Remedial Action. The Final Permit Modification does not include specific requirements regarding compensation for accelerated depreciation of infrastructure. However, as in discussed in Section IX.D of this Response to Comments, this Final Permit Modification does not affect any third parties' rights outside the scope of the Final Permit Modification.

Comment 305: We are concerned that water quality levels may be degraded during cleanup activities, which could impact the function and ability of our municipal and industrial wastewater treatment plants to meet their discharge permit requirements. We request that EPA and DEP work together to set standards that require GE to meet certain water quality standards during cleanup. Should GE be unable to meet these standards, we request that the agencies work cooperatively with municipal and industrial permit holders to help them continue to operate within the confines of broad environmental compliance, recognizing that the impacts of the PCB cleanup are entirely outside of the local operators' control. Similar to the Permit section on Water Withdrawals and Uses (Sec. II.B.10.c.) there should be requirements regarding waste and stormwater discharges and uses. In addition, the Permit should specify that any fines or penalties of any sort levied due to the impact of cleanup activities on such facilities is the financial responsibility of GE, not the impacted municipality or business.

EPA Response 305: The Final Permit Modification provision on Water Withdrawals and Uses has been revised, based in part on this comment, to require GE to minimize/mitigate impacts to withdrawals and uses of water from the Rest of River. See Response 159. Also, EPA anticipates that GE will propose best management practices and engineering controls to minimize the impacts on water quality caused by the remediation. Further, GE is required in the Final Permit Modification to satisfy water quality levels or modified standards in its discharges to the river related to the cleanup. With regard to non-GE entities that withdraw water from the river, and subsequently discharge water back to the river with a permit, compliance with those permits is outside the scope of this Final Permit Modification.

Comment 353: General Electric should be held responsible for incremental costs for PCB handling at concentrations less than 1 ppm in the event that FERC or CTDEEP mandate sediment treatments that are not currently envisioned. In addition the permit should state that no landowner should be required to accept or impose management or use restrictions as a result of residual PCBs.

EPA Response 353: As noted in Responses 462.d, 687, and 688, EPA has modified the requirements regarding Legally Permissible Future Projects, Work, or Future Uses in Connecticut. GE's responsibilities are not to pay incremental costs, but to perform necessary response actions to allow the work to proceed. The Final Permit Modification does not require landowners to accept or impose management or use restrictions as a result of residual PCBs, see Sections II.B.2.l. and II.B.6.c. of the Final Permit Modification. If the 1 mg/kg threshold for

action in Connecticut in the Final Permit Modification is determined by EPA to be unprotective in the future, whether in consultation with FERC, CT DEEP or otherwise, the Decree contains provisions allowing additional work to be required in certain circumstances.

Comment 442: Connecticut supports the inclusion of provisions in the draft RCRA permit to hold GE accountable for the incremental cost which PCBs have on permitted activities within the river. This is an important measure to allow the citizens and corporations within Connecticut to use the Housatonic River and its resources in appropriate ways without assuming additional costs because of the presence of PCBs.

EPA Response 442: As noted in Responses 462.d, 687 and 688, EPA has modified GE's responsibilities in the Final Permit Modification to require GE to perform response actions to allow Legally Permissible Future Projects, Work, or Future Uses to proceed, instead of paying incremental costs. EPA believes that the modified requirements will be at least as effective as the prior requirements in allowing the public to use the Housatonic River and its resources in appropriate ways without assuming additional costs because of the presence of PCBs. However, as noted in Response 462.d, these requirements are applicable in Connecticut only if PCB concentrations exceed 1 mg/kg PCBs.

Comment 537: The requirement that GE negotiate with and/or compensate a third party for incremental costs incurred in using, maintaining, or removing a dam or impoundment due to PCB contamination exceeds EPA's statutory authority.

EPA Response 537: See Responses 687 *et al.*, 689 *et al.*, and 693 below.

Comment 687: GE asserts the following: The Draft Permit would require that, in the future, if anyone implements a project along the river (including dam maintenance or removal, a flood management project, road or bridge work or another infrastructure project, installation of a boat launch or dock, etc.) that would require sampling, handling, or disposition of sediments with PCB concentrations above 1 mg/kg, GE must pay all testing, handling, and disposal costs associated with PCBs (unless GE can show that the PCBs are not attributable to GE). This requirement exceeds EPA's authority in issuing a cleanup remedy, as it is not based on addressing any identified risk to human health or the environment and would usurp the role of the courts.

Comment 688: GE asserts the following: EPA's proposed requirement for GE to pay PCB-related costs incurred by others in conducting river projects is not directed to protecting human health or the environment from asserted risks due to PCB releases, and has nothing to do with the Permit's other remedy selection criteria. Any potential risks from handling and disposing of PCB-containing sediments during such a construction project would be addressed through the array of regulatory requirements and approvals that would apply to such projects (e.g., approval by FERC or the state dam authority for dam projects, a permit under § 404 of the Clean Water Act, water quality certification from the state, review under the state wetlands protection regulations, etc.), which the owner or project proponent would have to meet. The proposed requirement to pay costs does not address such risks; instead, it is a liability-shifting provision that unilaterally declares GE responsible for the economic losses of the owner or project proponent and then directs GE to provide compensation to that party without limitation. That is

not EPA's role under CERCLA or RCRA and is not an appropriate part of a remedial action or corrective measures under those statutes.

Comment 744: GE asserts the following: The proposed remedy would require that, in the event that a third party implements a project along the River that would require handling or disposition of sediments with PCB concentrations greater than 1 mg/kg, or in the event of a dam failure or unpermitted release from behind a non-GE-owned dam, GE must pay the costs associated with PCBs. In addition to other defects, since those requirements are contingent on future events, they have not been evaluated under the Permit criteria, and EPA has not provided for such an evaluation to be conducted in the future before this requirement would apply.

EPA Response 687, 688, 744: EPA, based in part on these GE comments, has modified GE's responsibilities regarding Legally Permissible Future Projects, Work, or Future Uses and is not relying on GE's payment to third parties of incremental costs due to GE's contamination. See Final Permit Modification Sections II.B.2.j., k. and l. and II.B.6.b. and c, and the inclusion of definitions for Legally Permissible Future Projects or Work, and Legally Permissible Future Use. The modified requirements, at Section II.B.2.j., k. and l. and II.B.6.b.and c., are clearly related to the risks posed by PCBs and the objective of controlling sources of releases of PCBs. The Final Permit Modification provisions provide that GE shall conduct response actions to allow such Legally Permissible Future Projects, Work, and Future Uses to be conducted in a manner that maintains Performance Standards and/or maintains the effectiveness of the Rest of River Remedial Action. Thus, these modified and limited provisions are tied to and support the remedy, address risks due to PCB releases, and do not exceed EPA's authority or usurp judicial authority.

EPA notes that responsible party cleanup obligations under CERCLA and RCRA are not invalid merely because they may benefit third-parties. Responsible parties are required to address risks posed by their contamination under these statutes, even if such contamination is located on third-party property and even if such response actions could benefit the third-party owner by addressing contamination on that party's property. Otherwise, a responsible party would never have to address their contamination located on third-party property.

With respect to responsibility for PCBs, Section I.P. of the Permit includes the following provision:

> For purposes of this Permit, [GE] agrees that, for hazardous waste and/or hazardous constituents in the Rest of River area which are also present both at the GE Facility and at the Former Oxbow Areas (as defined in the Consent Decree) and which could have migrated to the Rest of River area from either the GE Facility or the Former Oxbow Areas, [GE] will not contest that such waste and/or constituents did not migrate from the GE Facility.

With respect to GE's arguments that these requirements are a "contingent remedy" not evaluated under the Permit criteria, see EPA's Response 669, Section III.B.1.

Comments 689, 690, 691, 692: GE asserts the following: Contrary to the heading in the Draft Permit, EPA's proposed requirement for GE to pay PCB-related costs incurred by others in

conducting river projects does not constitute an institutional control. EPA guidance defines institutional controls as administrative or legal instruments that "help to minimize the potential for exposure to contamination and/or protect the integrity of a response action" by "limiting land and/or resource use or by providing information that helps to modify or guide human behavior at a site." The requirement to compensate third parties for their costs does not meet any part of this definition.

If a third party incurs costs associated with PCBs in undertaking a project in the river, that party might seek recovery from GE (or others), and there are ample mechanisms available for resolving such claims. However, that is a matter for the parties to resolve or, if necessary, for the courts to decide. It is not within EPA's authority to make a unilateral administrative determination, by inserting a requirement into a cleanup remedy, that GE is liable to the third party and responsible for 100% of that party's PCB-related costs. That would dictate the outcome of the third party's claim, strip GE of potential defenses (e.g., statute of limitations, inconsistency with the NCP or Massachusetts Contingency Plan) by administrative fiat, and ultimately usurp the courts' role.

Even if it were otherwise authorized, EPA's proposed requirement for GE to pay PCB-related costs incurred by others in conducting river projects would conflict with the requirement that EPA must apply the specified remedy selection criteria in selecting a remedy. Since this requirement would apply only in the event of a future contingency (i.e., the incurrence of PCB costs by a third party undertaking a river project), it would constitute a "contingency remedy" under EPA guidance. In such cases, the contingency remedy should be evaluated under the remedy selection criteria, and if that is not done at the time of remedy selection, it would need to be done later to invoke the contingency. Here, the EPA has not evaluated its proposed requirement for GE to pay others' PCB costs under the remedy selection criteria and has not provided for any such evaluation in the future before the requirement would apply. As such, the proposed requirement would constitute an impermissible end run around the requirement to consider these criteria in selecting a remedy. For the reasons discussed in Comments 687 - 691, Section II.B.7.b.(2) of the Draft Permit should be deleted from the final Permit.

EPA Response 689, 690, 691, 692: Based in part on these comments, the Final Permit Modification no longer includes the requirements regarding GE payment of incremental costs incurred by others in conducting river projects. Accordingly, it is unnecessary to respond further to these comments. See Response 687 *et al.* above. With respect to GE's arguments that these requirements are a "contingent remedy" not evaluated under the Permit criteria, see EPA's Response 669, Section III.B.1.

Comment 693: GE asserts the following: Section II.B.7.b.(3) of the Draft Permit would require that, in the event of any dam failure or unpermitted release with respect to a dam on the river in Massachusetts or Connecticut, GE must "pay for the costs associated with PCBs." As it relates to non-GE-owned dams, this requirement is unauthorized for similar reasons to those discussed in Comments 687 – 692 with respect to other river projects. GE is not responsible to prevent failure of any of those dams or unpermitted releases over those dams, nor is it responsible to pay for any costs resulting from such failure or unpermitted release. The dam owners are liable for such events. The proposed requirement that GE must pay the PCB-related costs resulting from such events does not address the impacts of those events and is not directed at protecting human

health or the environment; it just relates to which party must pay the necessary costs of response. While the dam owners who are liable for such an event may have a claim against GE for any incremental costs they incur that are attributable to PCBs, that is a matter for the parties to resolve or, if necessary, for the courts to decide. The EPA Region cannot lawfully attempt to dictate the outcome of such a claim by including in its remedy a requirement that GE must pay these costs. In addition, this requirement would constitute a contingency remedy that was selected without evaluating it under the Permit's remedy selection criteria or providing for such an evaluation before it would apply. It is thus unjustified for that reason as well. Furthermore, the requirement to "pay for the costs associated with PCBs" could include a requirement to pay damages to the natural resource trustees for any asserted NRD resulting from the dam failure or unpermitted release. With respect to any dams other than the GE-owned Woods Pond and Rising Pond Dams, such a requirement would be contrary to the federal and state governments' covenants in the CD that those governments will not seek to recover any additional NRD except in the case of a failure of Woods Pond or Rising Pond Dam.

For these reasons, Section II.B.7.b.(3) of the Draft Permit should be deleted.

EPA Response 693: Based in part on this Comment, the Final Permit Modification has been revised to the current provisions in Section II.B.2.j and l. The revised provisions do not include requirements on GE paying incremental costs so it is unnecessary to respond to comments objecting to the incremental cost payment, including but not limited to potentially regarding NRD. Additionally, with respect to the comment about a contingency remedy, EPA disagrees. Regarding the need for an evaluation against the remedy selection criteria in the Permit, see Response 669, Section III.B.1.

Comment 694: GE asserts the following: The Draft Permit includes, in Section II.B.7.c, a set of proposed requirements, which it also terms "institutional controls," that address future use of floodplain properties. To be consistent with the CD, applicable legal principles, and EPA guidance, several changes are needed in these provisions. All of these proposed requirements apply to floodplain properties with PCB concentrations exceeding the current Massachusetts Contingency Plan (MCP) Method 1 S-1 soil standard for PCBs and the current Connecticut Remediation Standard Regulations (RSR) residential direct exposure criterion for PCBs – both of which are 1 mg/kg. That trigger, however, should be changed to 2 mg/kg to be consistent with the CD Performance Standard for residential properties at this Site, including the Actual/Potential (A/P) Lawns of the Downstream Floodplain Residential Properties. The CD contains a specific risk analysis by EPA demonstrating that a cleanup level of 2 mg/kg is protective for current and future residential use at this Site; and it also includes a specific determination by EPA, MassDEP, and CT DEEP that Removal Actions that achieve that standard "are protective of human health and the environment" at residential properties. Further, in its April 3, 2006 approval letter for GE's revised IMPG Proposal, the EPA Region made clear that 2 mg/kg "constitutes the Performance Standard for residential properties in the Rest of River, including Connecticut."

EPA Response 694: Based in part on this comment, EPA has revised Table 3 of the Final Permit Modification to reflect that for Residential exposure, the Performance Standard for PCBs for Floodplain Soil – Future Use is 2 mg/kg at the 0-1 foot and 1-x foot increments.

Comment 695: GE asserts the following: Subsection c.(1) of the Draft Permit provides that GE must prepare and record EREs for GE-owned properties and State-owned properties (in Massachusetts) that are not subject to Article 97 of the Massachusetts Constitution and must record Notice EREs for State properties that are subject to Article 97. Since the issuance of the Draft Permit, the CD parties have agreed to a modification of the CD providing that Notice EREs may be used to restrict the uses and activities at ***any*** property at the Site owned by the Commonwealth, not just State properties subject to Article 97. Subsection c.(1) of the Draft Permit should be changed to be consistent with that CD Modification.

EPA Response 695: Based on this comment, EPA has revised the provision to address this concern. See Final Permit Modification Section II.B.6.b.(2)(a)(ii).

Comment 696: GE asserts the following: Subsection c.(2) of the draft Permit requires that GE must offer compensation for an ERE (as provided in the CD) to the owners of other non-residential properties that have a "reasonable potential for changes in future use to activities such as residential or agricultural." To be consistent with EPA guidance, the wording of this requirement should be changed to cover properties where a change in future use is "reasonably anticipated." In addition, EPA should make clear, in accordance with EPA's 1995 land use guidance, that this determination must be based on "existing information" and "reasonable assumptions," not speculation or theoretical possibility.

EPA Response 696: GE is misreading EPA's 1995 land use guidance, *Land Use Guidance in the CERCLA Remedy Selection Process*, OSWER Directive No. 9355.7-04 ("Land Use Guidance"). The decision about what is the "reasonably anticipated" future land use of a property for the purpose of selecting cleanup levels is different from deciding when an institutional control is needed to protect against unacceptable future land uses, even if such uses are unexpected or unanticipated. If a remedy requires a restricted land use to be protective, institutional controls are typically used to prevent certain future uses to ensure that the remedy will remain protective. ("In particular, institutional controls will generally have to be included in the alternative to prevent an unanticipated change in land use that could result in unacceptable exposure to residual contamination…" Page 9.) For example, the *Land Use* guidance states that EPA can select a remedy that includes leaving residual soil contamination at concentrations protective for industrial use but not for residential use. But in this case, the guidance states that institutional controls "should be used to ensure that industrial use of the land is maintained and to prevent risks from residential exposures." Page 8. Thus, the "reasonably anticipated" future use may result in a remedy/cleanup based upon limited exposures (for example, a cleanup only to commercial standards), but institutional controls are still needed to ensure that such remedy remains protective and to prevent unacceptable future land use changes. See also, *Institutional Controls: A Site Manager's Guide to Identifying, Evaluating and Selecting Institutional Controls at Superfund and RCRA Corrective Action Cleanups*, September 2000, Page 2 ("Finally, where protectiveness depends on reducing exposure, [institutional controls] are a response action under CERCLA or a corrective action under RCRA.") and Page 5 (If remedial options "leave waste in place that would not result in unrestricted use and unlimited exposure, ICs should be considered to ensure that unacceptable exposure from residual contamination does not occur.") GE's proposed changes could lead to unacceptable exposures due to a change in future land use.

Comment 697: GE asserts the following: Subsection c.(3) of the draft Permit provides that, for any non-residential property covered by subsection c.(2) where the owner declines an ERE, GE must implement a Conditional Solution in which GE agrees to perform additional response actions in the future if the owner commits to change the current use of the property. This requirement does not constitute an institutional control, as defined in EPA guidance, since it would not limit land and/or resource use or provide information that helps to modify or guide human behavior. Rather, it would constitute a contingency remedy, since it would apply only in the event of a future contingency; and EPA is required under the RCRA Permit as well as its guidance to evaluate such a remedy under the relevant remedy selection criteria, either at the time of remedy selection or when the contingency arises. EPA has not conducted an evaluation of this requirement under the Permit criteria, and its proposal does not provide for it to do so in the future if the contingency occurs.

EPA Response 697: First, Conditional Solutions are directly related to Environmental Restrictions and Easements and are appropriately described in the Section titled "Institutional Controls and Related Requirements," Section II.B.6. (Even if they do not fall within EPA's definition of Institution Controls, which EPA does not concede, the Conditional Solution provisions are "Related Requirements" to EREs and are needed to ensure the protectiveness of the remedy and are a necessary part of the remedy.) Second, with respect to Conditional Solutions being "contingency remedies," see EPA's Response 669, Section III.B.1.

Comment 698: GE asserts the following: GE has agreed in Paragraph 34 of the CD to implement Conditional Solutions at certain non-residential properties at this Site. Thus, the Conditional Solution requirement referenced in Comment 697 for such properties would be an acceptable part of the Rest of River remedy ***provided*** that it is consistent with the existing CD provisions and that that requirement is evaluated under the Permit criteria. Specifically, a Conditional Solution requirement would be appropriate here ***only*** under the following conditions:

- The requirements applicable to the owner in order to trigger GE's obligation to conduct further response actions should be same as those to which the parties agreed in Paragraph 34.d of the CD – i.e., the future use must be "legally permissible," the owner must have an approved plan from the appropriate governmental authorities for the future use, and the owned must provide evidence of a commitment to the future use.

- If those requirements are met, the required response actions must be limited to achieving the cleanup standards to which GE and EPA have already agreed in Paragraph 34.d of the CD (i.e., 2 mg/kg for residential properties and the specified CD Performance Standards for recreational and commercial properties). Apart from those previously agreed- to standards, EPA does not have authority in the present circumstances to establish specific Performance Standards for currently unknown future uses, including those specified in Tables 4 and 5. In particular, EPA's specification in Table 5 the draft Permit of a 1 mg/kg standard for residential properties (which is inconsistent with the CD's standard of 2 mg/kg for future residential use under a Conditional Solution scenario) and its establishment in Table 4 of cleanup standards for agricultural consumption uses (for which no standards are specified in the CD) are unauthorized and cannot be specified for application under a Conditional Solution. Rather, as part of the Conditional Solution, GE would propose appropriate cleanup

standards and response actions for EPA review and approval, as provided in CD ¶ 34.d(iii)(B).

- To meet the draft Permit requirements for the Rest of River, EPA would need to make an estimate of the potential implications of this Conditional Solution requirement (e.g., bounding estimates of the potential extent of remediation that could be required) so that it (and others) can consider the costs and impacts of that requirement, and the Region would then need to evaluate that requirement under the Permit criteria.

Comment 745: GE asserts the following: EPA's proposed Conditional Solution requirements and proposed PCB cleanup standards for potential future uses of floodplain properties, including the formula for deriving cleanup standards for changes to agricultural uses (which would not apply to any existing floodplain property), have not been evaluated under the Permit criteria. In particular, EPA has not considered the impacts and costs of the remediation that could be required to meet such standards, as well as any property-specific factors that could affect residual risks; and others could not do so either.

EPA Response 698, 745: Based in part on this comment, EPA has revised in the Final Permit Modification the requirements related to Conditional Solutions. First, with respect to the legal permissibility of the project, work, or future use, as specified in Section II.B.6.b, GE is required to take response actions to be protective of any Legally Permissible Future Project or Work or Legally Permissible Future Use. Definition 17 of the Final Permit Modification requires, in pertinent part, that the party has to have submitted a plan to the appropriate governmental authorities to authorize any project or work (if necessary) and such plan has been approved by the governmental authorities, or provides documentation that the project or work is legal without further governmental authorization, and that the party provide to EPA and GE other documented evidence of a commitment to such project or work. Similarly, see definition 18 of the Final Permit Modification for Legally Permissible Future Use. These modified provisions are consistent with Paragraph 34.d of the Decree.

Second, based in part on this comment, EPA has revised in the Final Permit Modification the requirements related to agricultural uses in floodplain soil and cleanup standards for PCBs in floodplain soil – future use. Specifically, the Final Permit Modification does not include Table 5, and Table 4 has been revised. See, e.g., the note in Table 4: "If this formula results in a *Ct* less than 2 mg/kg total PCBs, the Performance Standard will be 2 mg/kg total PCBs." However, EPA does not agree with GE's assertion that EPA cannot establish Performance Standards for risks associated with agricultural consumption uses. Table 4 presents appropriate risk-based levels for agricultural consumption uses, and uses the 2 mg/kg threshold listed by GE as the standard if risk-based values are less than 2 mg/kg. In addition, Table 5 has been eliminated and replaced/combined with Table 3 in the Final Permit Modification. In part, based on this and other comments, the Residential Performance Standard has been revised to 2 mg/kg as opposed to 1 mg/kg. See Response 694. Contrary to what GE argues, the Decree, in the beginning of Paragraph 34, provides that the Performance Standards for Conditional Solutions include "all requirements…that may be identified as Performance Standards for a Conditional Solution in the Rest of River SOW…" Accordingly, this language expressly provides that EPA may set future Performance Standards for Rest of River Conditional Solutions.

Third, EPA disagrees that with respect to any requirement based on a Conditional Solution, EPA would have to provide the same evaluation of alternatives as provided for key components of the remedy in the Comparative Analysis completed under the Permit. See Response 669, Section III.B.1 for more details.

Comments 699, 701, 702: GE asserts the following: In addition to the provision discussed in Comment 698, subsection c.(3) of the Draft Permit would require that, for owners of these non-residential properties who elect to remove soil from their property for a legally permissible use, GE must pay the incremental costs associated with and attributable to the presence of PCBs (unless GE can show that they are not attributable to GE). That requirement goes beyond EPA's authority for the same reasons discussed in Comments 687 – 692 relating to the requirement to pay future costs for sediment-related projects along the river – i.e., it is not based on addressing risks but simply provides for compensation to the owner for economic loss, it does not constitute an institutional control, it impermissibly attempts to dictate the outcome of the owner's potential claim against GE, and it constitutes a contingency remedy without evaluation of the remedy selection criteria.

As in subsection c.(3) of the draft Permit, subsection c.(4) would require that, for the non-A/P Lawn portions of residential properties, if the owner elects to remove soil from the property for a legally permissible use, GE must pay the incremental costs associated with and attributable to the presence of PCBs (unless GE can show that they are not attributable to GE). For the same reasons discussed in Comments 687 – 692 and 697 – 699, this requirement to pay the owner's future costs exceeds EPA's authority.

Subsection c.(5) of the draft Permit requires that, for non-residential properties where there is not a reasonable potential for a change in future use, if the owner elects to remove soil from the property for a legally permissible use, GE must pay the incremental costs associated with and attributable to the presence of PCBs (unless GE can show that they are not attributable to GE). Again, for the same reasons discussed in Comments 687 – 692 and 697 – 699, this requirement exceeds EPA's authority.

EPA Response 699, 701, 702: As referenced in EPA Response 689 *et al.*, it is unnecessary to respond to this comment because EPA has eliminated the GE payment provision from this section of the Final Permit Modification.

Comment 700: GE asserts the following: Subsection c.(4) of the draft Permit provides that for floodplain portions of residential properties downstream of the Confluence that are not part of the Actual/Potential Lawns, GE must implement a Conditional Solution that would obligate it to perform additional response actions to meet the cleanup standards in Tables 4 and 5 of the draft Permit if the use should change to residential or agricultural. This provision should be changed in several respects. This requirement would apply to all portions of residential properties other than A/P Lawns, even the absence of any reasonable potential for future changes in use of those portions (e.g., due to the topography, wet nature, or location of the area). This would include numerous residential properties for which EPA's own HHRA concluded that there is no reasonable potential for changes in use. To be consistent with that conclusion as well as the EPA guidance discussed above, this provision should be limited to non-A/P Lawn portions of

residential properties for which a change to residential or agricultural use is "reasonably anticipated."

GE also asserts that this Conditional Solution requirement must be limited by the same conditions discussed in Comments 697 – 699. Specifically, the trigger for requiring additional response actions should be the same as specified in CD ¶ 34.d, the cleanup standards applicable to future response actions must be limited to those to which the parties already agreed in CD ¶ 34.d for application under Conditional Solutions (rather than establishing the entirely new standards in Tables 4 and 5), and EPA needs to estimate the potential implications of this requirement and evaluate it under the Permit criteria.

EPA Response 700: With respect to Conditional Solutions, EPA disagrees with GE on the scope of Conditional Solutions, which should not be limited to situations where a change to residential or agricultural use is "reasonably anticipated." (See Response 696 above.) At the same time, based in part on this comment, the Final Permit Modification has been revised so that Conditional Solutions are limited to properties located within Exposure Areas in Reaches 5-8.

Additionally, based in part on this comment, and consistent with Response 698, EPA has revised in the Final Permit Modification the requirements related to agricultural uses in floodplain soil and cleanup standards for PCBs in floodplain soil – future use. Regarding Tables 4 and 5 in the Draft Permit Modification, see Responses 694, 698, 745.

As for the events that trigger a Conditional Solution, see Responses 698 and 745.

Finally, EPA disagrees that with respect to any requirement based on a Conditional Solution, EPA would have to provide the same evaluation of alternatives as provided for key components of the remedy in the Comparative Analysis completed under the Permit. See Response 669, Section III.B.1 for more details.

Comment 703: GE asserts the following: Subsection c.(6) of the draft Permit provides that GE must conduct inspections every five years to determine whether property owners have changed the use of a property "such that a re-evaluation of protectiveness is required," and if so, inform EPA; and EPA will determine if additional response actions are necessary. This provision states further that, if EPA or the State notifies GE of such conditions at any time and EPA determines that that additional response actions are required, GE must conduct such response actions. This requirement is too broad and undermines the covenants that the United States granted to GE in the CD. It is EPA's obligation under CERCLA and the CD to conduct five-year reviews to assess whether any changes in land use have affected the protectiveness of the remedy. While EPA can select additional response actions as part of these reviews (or at any other time that it determines that an existing response action is not protective), EPA does not have authority as part of the present remedy to require GE to conduct any additional response actions that EPA determines are necessary. Under the CD, if EPA determines that there has been a change in land use and that that change has affected the protectiveness of the remedy, EPA could select further response actions. However, in such a case, if the property is not covered by a Conditional Solution, the covenants in the CD preclude EPA from requiring GE to conduct such further response actions unless it finds that the change constitutes new information or conditions that render the selected remedy not protective of health or the environment (CD ¶¶ 46, 161-163). The remedy itself may

not include a requirement that GE must necessarily carry out such further response actions in the absence of an EPA determination of non-protectiveness. Such a requirement would undermine and eviscerate the CD covenants.

EPA Response 703: Based in part on this comment, the Final Permit Modification no longer includes the provision objected to by GE as subsection c.(6). Note, however, that EPA does not necessarily agree with GE's position regarding the applicability of the Decree covenants.

Comment 704: GE asserts the following: Subsection c.(7) of the draft Permit provides that, in the event of any future change in use of a floodplain property, GE must determine the appropriate exposure scenario, determine the exposure point concentration (EPC) for the exposure area, compare that EPC to the applicable cleanup standard from Table 4 of the draft Permit (for agricultural use) or Table 5 (for other uses), and if the EPC exceeds that standard, conduct the necessary sampling and response actions to achieve that standard. Application of these proposed cleanup standards for future uses is unjustified and could lead to extensive and unnecessary remediation, as discussed in Comments 705 – 708.

EPA Response 704: Based in part on this comment, EPA has revised the provisions for floodplain remediation in the Final Permit Modification. See Section II.B.6.b.(2)(b)(ii)(A-D), and II.B.6.c.(2)(b)(i-iv). EPA has retained the four step process for future changes in use of floodplain properties, although to clarify, the fourth step is that if the EPC is exceeded, GE is to submit an evaluation of whether and what additional response actions are necessary, and upon EPA's approval, GE is then to implement the required actions. However, as discussed above in Response 698, EPA has modified Tables 3 and 4 and eliminated Table 5 from the Final Permit Modification to address other comments by GE.

The requirements of this provision help ensure that the remedy remains protective of human health and the environment in the event of a change in use at a property, and thus a change in exposure to PCBs. If there was a subsequent change in use which increased the exposure to PCBs from the estimates in the Final Permit Modification, and there was no recourse for addressing that increased exposure, the remedy may not have satisfactorily protected human health and the environment.

Comment 705: GE asserts the following: EPA's proposed future use cleanup standard of 1 mg/kg for residential properties (draft Permit Table 5) is inconsistent with the residential Performance Standard of 2 mg/kg that EPA established for this Site (including A/P Lawns downstream of the Confluence). The CD contains a specific risk analysis by EPA demonstrating that a cleanup level of 2 mg/kg is protective for current and future residential use at this Site (CD Appendix D, Attachment B), and it includes a determination by EPA, MassDEP, and CT DEEP that Removal Actions that achieve that standard "are protective of human health and the environment" for residential areas at this Site (CD ¶ 8.b(i)). EPA has previously determined, in its April 3, 2006 approval letter for GE's revised IMPG Proposal, that "a numerical Performance Standard for PCBs of 2 mg/kg for residential properties was established in the Consent Decree" and "constitutes the Performance Standard for residential properties in the Rest of River, including Connecticut." Under the CD, EPA is not authorized to modify the agreed-upon Performance Standards without written agreement of all parties, including GE (CD ¶ 217). The Region's proposal would violate that CD provision.

EPA Response 705: See Responses 694 and 698.

Comment 706: GE asserts the following: The formula in draft Permit Table 4 for agricultural uses could lead to extremely low cleanup standards, well below even the standards specified in EPA's proposal for unrestricted use. The basis for this formula is provided in a memorandum in the record (July 20, 2012 memorandum from D. Vorhees entitled "Calculate Performance Standards for Agricultural Product Consumption"), which explains that the formula is derived from the exposure assumptions and risk calculations presented in EPA's HHRA. That memorandum notes that, for many agricultural uses, this formula would produce cleanup levels far below 1 mg/kg – e.g., for properties that are entirely in the floodplain, 0.059 mg/kg for backyard dairy consumption, 0.17 mg/kg for commercial beef consumption, 0.10 for backyard beef consumption, 0.25 mg/kg for commercial poultry meat consumption, 0.27 mg/kg for backyard poultry meat consumption, 0.053 mg/kg for commercial poultry egg consumption, and 0.91 mg/kg for backyard poultry egg consumption. Achieving such standards could require soil removal and replacement throughout most, if not all, of the farm area at such a property, at a cost of millions of dollars, which could well exceed the value of the property; and it would do so without any consideration of the impacts or costs of the requirement or other property-specific conditions that could affect residual risks at the particular property.

EPA Response 706: Based in part on this comment, EPA revised the Final Permit Modification to clarify the Performance Standard for agricultural uses in floodplain soil. The Final Permit Modification now includes a simplified equation based on the more stringent of an excess lifetime cancer risk of 1×10^{-5} and a Hazard Index of 1; while specifying that the Performance Standard cannot be less than 2 mg/kg. 2 mg/kg is also the Performance Standard for residential use. If the formula calculates a soil concentration less than 2 mg/kg, the Performance Standard will be 2 mg/kg. Therefore, the scenarios described above can no longer occur. See the Final Permit Modification, Table 4 - Performance Standards for PCBs for Agricultural Uses in Floodplain Soil.

Comment 707: GE asserts the following: EPA's proposal to establish these cleanup standards for potential future uses goes beyond EPA's authority for the following reasons:

- These future use cleanup standards do not constitute institutional controls.

- The requirement to achieve these standards constitutes a contingency remedy without any evaluation of that requirement under the relevant remedy selection criteria. As such, it constitutes an end run around the Permit requirement to consider those factors in selecting a remedy and is inconsistent with EPA guidance. In addition, it prevents GE, other stakeholders, and the public from evaluating the implications of this requirement under the Permit criteria.

- This requirement also allows an impermissible end run around the CD covenants, because it would require GE to conduct additional response actions beyond those specified in the remedy without an EPA finding that the covenant reopener conditions have been met.

EPA Response 707: As EPA has responded to Comment 669, Section III.B.1, the Final Permit Modification does not have to, and realistically cannot, include every remedy adjustment or

example EPA guidance on such location-specific ARARs states that substantive compliance with the federal Endangered Species Act ("ESA") means:

> that the lead agency must identify whether a threatened or endangered species, or its critical habitat, will be affected by a proposed response action. If so, the agency must avoid the action or take appropriate mitigation measures so that the action does not affect the species or its critical habitat. (EPA's *CERCLA Compliance with Other Laws Manual: Part II, Clean Air Act and Other Environmental Statutes and State Requirements* (August, 1989), p. 4-12.

Indeed, the ESA is an ARAR that has not been disputed by GE, including the obligation to "take mitigation measures so that action does not affect species/habitat." Final Permit Modification, Attachment C - Summary of ARARs table. Thus, it is well settled that the natural resources disturbed by remediation must be restored and mitigated as part of the remedial process in accordance with the substantive requirements of ARARs, such as the ESA, the Massachusetts Endangered Species Act, the Massachusetts Wetlands Protection Act, and the Clean Water Act. Moreover, in other areas of the Site outside the Rest of River, the Clean Water Act and the Massachusetts Wetlands Protection Act constitute ARARs for the Removal Actions Outside the Rest of River and respectively require that River banks will be restored, habitat will be improved, and "disturbed vegetation will be restored." Decree, Appendix E, Table 3 at 2, 4, 5. Similarly, it has not been disputed that the National Historic Preservation Act and the Massachusetts Historical Commission Act are ARARs, including for the Rest of River. *Id.* at 7; Final Permit Modification, Summary of ARARs table.

IV.A.2 Comments on Process for Implementing ARARs

Comment 156: EPA should include the directly affected municipalities, along with the States, in reasonable opportunities for review and comment concerning ARARs and TBCs. Local officials often will have more specific knowledge of the particular area and will be able to add considerable value to EPA's decision-making process.

EPA Response 156: Municipalities and the public were afforded the opportunity to comment on ARARs and TBCs during the 2014 Public Comment period. CERCLA and the Decree each call for EPA to provide a reasonable opportunity for review and comment by the States, but have no analogous provision for the municipalities. That being said, in recognition of the specific interest and knowledge of the municipalities, EPA intends to coordinate significantly with the directly affected municipalities during the design and implementation of the remedy.

Comments 123, 281: Use of any temporary disposal areas or treatment facilities required for the Housatonic site should be strictly and solely limited to contaminated sediment and soils resulting from GE's Rest of River cleanup, barring storage or treatment of hazardous waste from any other sources. Temporary disposal and treatment areas should be subject to the provisions of M.G.L. 21D, which should be added to the list of ARARs and deemed applicable.

EPA Response 123, 281: The Final Permit Modification does not include any disposal facilities at or near the river. The Final Permit Modification does envision that areas will be identified during remedial design for temporary storage of excavated sediments and soils. The Final Permit Modification does not call for storage or treatment of other sources of waste. The Final

Permit Modification does require that the temporary storage facilities used by GE are restored in accordance with Performance Standards and Corrective Measures governing Restoration of Areas Disturbed by Remediation.

The State did not propose MGL c. 21D as an ARAR. EPA concurs that it is not an ARAR; the provisions of 21D do not include substantive standards of control. The State proposed, and EPA included, in the Final Permit Modification as an ARAR, the Massachusetts regulations governing hazardous waste management, including the location standards for hazardous waste management facilities.

Comment 297: To ensure that the ARARs listed in the Permit are protective of human health, commenters request that the EPA consult with the Massachusetts and Connecticut Departments of Health to ensure that all relevant statutes and regulations have been included in the final Permit.

EPA Response 297: EPA consulted with the Commonwealth of Massachusetts and the State of Connecticut, and Massachusetts and Connecticut each responded with their proposed State ARARs. Massachusetts Department of Public Health provided comments on the Draft Permit Modification and did not identify any ARAR issues. EPA did not seek separately to obtain proposed ARARs from the State Departments of Health, as each state's environmental agency has been designated as the lead agency for identification of ARARs through the Superfund program.

IV.B Comments on Specific ARARs

IV.B.1 Clean Water Act, National Recommended Water Quality Criteria for PCBs, Numeric Massachusetts Water Quality Criteria for PCBs, Numeric Connecticut Water Quality Criteria for PCBs

Comment 710: GE asserts the following: EPA proposed to waive the human health criterion of 0.000064 ug/L based on consumption of water and organisms. EPA says the remedy will instead be required to meet the biota Performance Standard and the Downstream Sediment Transport Performance Standard. GE requested EPA to clarify that the Biota and Downstream Transport Performance Standards would not constitute ARARs, because they are not promulgated standards of general applicability.

EPA Response 710: Based on this comment, EPA has revised its description of this ARAR waiver. The Final Permit Modification, Summary of ARARs table makes specifically clear that these alternative criteria are not ARARs.

Comments 711, 712: In the draft Permit, EPA proposed that the remedy is intended to meet the human health criterion of 0.000064 ug/L based on consumption of water and organisms. EPA pointed out that current modeling shows that the remedy will achieve attainment in at least 3 of the 4 Connecticut impoundments. Recognizing that the results from the Connecticut model are very uncertain, EPA stated that it is not possible to predict with certainty attainment or lack of attainment. In addition, EPA acknowledged that the concentration cannot be reliably measured using available analytical techniques. In its Statement of Basis, EPA stated that the criterion is not being waived in Connecticut because it can potentially be met in the future, but that such a waiver may be considered in the future should it become apparent that this criterion cannot be met based on technical impracticability.

these responsibilities. Any future responsibility for parties other than GE is not addressed in, and is beyond the scope of, the Draft or Final Permit Modification.

Comments 446, 451: Connecticut asserts: In Section IIA of the draft Permit, EPA has identified that modification of Performance Standards will be based on EPA's determinations under Paragraphs 162-163 of the Consent Decree or based on agreement under Paragraph 217 of the Consent Decree. This section of the permit needs to be modified to rely solely on paragraph 39a of the Consent Decree. The standard to justify additional work under paragraph 39a is that the modification must be consistent with the scope of the response action. In Section II of the draft permit entitled "Special Conditions" the work in the riverbank in Reaches 5A and 5B is designated as Performance Standards and this section of the permit (Section II A.) specifically limits modifications based only upon EPA's determination under Paragraphs 162-163 of the Consent Decree. Paragraphs 162 and 163 concern EPA's reservations of rights and the standard for modifications of the RCRA permit under these provisions is receipt of information previously unknown to EPA. If in the future the downstream transport or biota performance standards are not met due to further erosion or other transport originating from Reaches 5A and 5B, under the current language in the draft permit EPA will not be able to require GE to perform further work in those riverbanks. EPA must not omit paragraph 39a of the Consent Decree as a basis for modifying Performance Standards or other work authorized by the permit as necessary to achieve other Performance Standards and conditions specified in the permit.

The draft permit should be modified to indicate that an exceedance of the Biota Performance Standard (including the Long-Term Biota Value which should be changed to a Performance Standard) would be addressed with the authority under paragraph 39a of the Consent Decree and CERCLA.

EPA Response 446, 451: EPA agrees with Connecticut that Paragraph 39 of the Decree is an important mechanism for ensuring continued effectiveness of the cleanup including achieving and maintaining the Performance Standards. See Response 157 for more details on Paragraph 39 as well as other avenues to ensure protectiveness of the cleanup. However, Paragraph 39.a. provides that a modification of the Work pursuant to that paragraph "may only be required … to the extent that it … does not modify the Performance Standards (except as provided in Paragraph 217 (Modification) of the Consent Decree)." Paragraph 217 of the Decree requires GE's consent to modify any Performance Standard. As Connecticut correctly notes, Paragraphs 162 and 163 of the Decree are alternative avenues (known as the "reopener provisions") for requiring additional response action. Because the Final Permit Modification and the Decree are clear that the Remedial Action must be implemented pursuant to the Decree, reiteration of the applicability of Paragraph 39.a. in the permit itself is unnecessary. Final Permit Modification at I.A.2.

As for using Paragraph 39.a in response to an exceedance of the Biota Performance Standard, EPA agrees that Paragraph 39.a is one of several avenues EPA can use in appropriate circumstances. At the same time, EPA points out that it has other avenues also for ensuring protectiveness, including its review and approval authority for Rest of River activities, and other Decree mechanisms, including those referenced in Response 157. However, EPA believes that reiteration of the Decree provisions in the Permit is unnecessary because the Final Permit Modification and the Decree are clear that the Remedial Action must be implemented pursuant to the Decree. Final Permit Modification at I.A.2.

VIII. Role of State Agencies, Local Government, and other Stakeholders

VIII.A Lack of Detail in Permit

Comment 2.a: The Proposed Plan does not include information on the specific location of access roads and staging areas. The Plan does not provide a clear plan for the work. The Statement of Basis and Draft Permit do not constitute a comprehensive cleanup plan.

EPA Response 2.a: EPA believes there is the appropriate amount of detail in the Draft and Final Permit Modifications. Section II.J of the Permit specifies that EPA propose in the Draft Permit Modification Performance Standards, and the appropriate Corrective Measures to necessary to meet these Performance Standards. In addition, the Draft Permit Modification shall include a proposed identification of the applicable or relevant and appropriate requirements under state and federal law (ARARs) that must be met by such Corrective Measures, and where appropriate, where EPA proposes to waive any such ARARs, the basis for such waiver under CERCLA and the NCP. EPA's Draft Permit Modification met this requirement and EPA's Final Permit Modification refined the requirements and finalized the ARARs determinations.

The Decree required EPA to base the Draft and Final Permit on information submitted by GE and any other relevant information. This information included, but is not limited to, GE's Revised CMS, which includes a feasibility study of several alternatives. The Revised CMS included assumptions for several items including the location of access roads, staging areas, and methods to implement various response actions. EPA used this information, along with other information, in developing the Draft and Final Permit Modifications, including, without limitation, to estimate project impacts, durations and costs (See EPA's Comparative Analysis and Statement of Basis). However, details such as actual remediation methods, access roads, and staging areas are not finalized in the Final Permit Modification, but will be determined as described in the process outlined below.

Furthermore, CERCLA guidance recognizes that the amount of information that is developed in selecting a remedy need only be set at a level of detail appropriate to the site situation. (NCP Section 300.430(f)(5)(i)). Even the major components of the remedy, including the treatment technologies and/or engineering controls that will be used, as well as any institutional controls, may be presented in "bullet form." (EPA, *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents* (July 1999), 6-41). Bullet form is all that is required because, according to EPA guidance:

> …the ROD is only intended to provide the framework for the transition into the next phase of the remedial process, namely Remedial Design. Remedial Design is the engineering phase during which additional technical information and data identified are incorporated into technical drawings and specifications developed for the subsequent implementation of the remedial action. The specifications in the Remedial Design are based upon the detailed description of the Selected Remedy and the cleanup criteria provided in the ROD.

EPA, *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents* (July 1999), 6-42.

The Decree provides that after the Final Permit Modification is issued and all appeals are resolved, GE shall submit to EPA for review and approval, a Statement of Work, to be followed by the submittal of the necessary Remedial Design and Remedial Action Work Plans to EPA for review and approval. (see Paragraph 22.x and 22.y). Paragraph 22.z. of the Decree further states: "[GE] shall design and implement the Rest of River Remedial Action . . ." Clearly, the Decree intended for GE to perform the detailed design work after the remedy selection process was completed.

Comment 23: The Proposed Plan does not address critically important factors that will determine the effectiveness and integrity of the remediation in the long term.

EPA Response 23: The Proposed and Final Permit Modification do address important factors and include sufficient information for making the remedy decision in this matter. They are based on the criteria and process set forth in the court-ordered Decree, as well as the Permit, and also reflect EPA guidance on performance of investigations and comparison of alternatives. Also, See Response 2.a above.

Comment 89: EPA has additional information on such issues as the location of access roads and staging areas but has not included this information in the Statement of Basis and Draft Permit in an attempt to manipulate the public process. EPA claims to not know where the access roads and staging areas for the remediation will be located, but there are limited areas available, so they must know. Showing the location of these areas to the stakeholders will make public approval of the cleanup plan more difficult.

EPA Response 89: EPA has not made determinations on any specific access roads or staging areas. The location of access roads and staging areas will be determined during the remedial design process following issuance of the Final Permit Modification, and completion of any petitions for review of the Final Permit Modification. GE's Revised CMS, which is in the Administrative Record for the Rest of River, did include estimates of potential access roads and staging areas, but for purposes of comparison of different alternatives and to estimate costs and project durations not for purposes making a definitive determination of where access roads and staging areas will be located. As discussed in Section VIII of this Response to Comments, EPA plans to have significant community and stakeholder involvement during the process of EPA's review of GE remedial design submittals dealing with access roads and staging areas.

Comment 105: The project is acceptable only if all access to and from the site can be via river and rail. If access roads and on-site staging areas are necessary, along with disruption of local traffic and destruction of the floodplain, the benefits are not worth the damage caused.

EPA Response 105: In the Final Permit Modification, EPA has not made final determinations on the location of any access roads and on-site staging areas. In addition, the use of rail and river have not been ruled out of further consideration. In fact, Section II.B.5 of the Final Permit Modification specifies that GE should maximize the transport of materials off-site via rail to the extent practicable. In addition, the Corrective Measures in the Final Permit Modification requires that in Reach 5A the performance of removal and capping generally use engineering methods employed from within the river channel. Final decisions will be made during the remedial design process; EPA plans to have significant community and stakeholder involvement during

the process of EPA's review of GE remedial design submittals dealing with access roads and staging areas.

Comment 289: We believe that the Permit should discuss in more detail how PCB-contaminated sediment and materials will be safely transported and stored.

EPA Response 289: As is typical for a project at this stage of the process (remedy selection), EPA believes that that level of detail on transportation and storage of PCB-contaminated sediment and materials is better provided during the remedial design process and not in the Final Permit Modification. See also Response 2.a above in this Section.

Comment 351: I personally do not believe that there is anything that can be done with the current technologies that won't do more damage than good, but if it has been decided that cleanup must begin, then please make it less catastrophic, and give us the facts we need to live in this area we love so much.

EPA Response 351: See above responses in this Section.

Comment 529: I am concerned that the same access points that were used for the 1-1/2 Mile cleanup, such as Fred Garner Park and rights-of-way adjacent to residences upstream from the Park will be used again for the Rest of River. We endured several years of the prior cleanup and are just now recovering from it.

EPA Response 529: The access points have not been determined. EPA will consider these comments and other input from stakeholders it receives when reviewing GE's Work Plans. See responses above in this section.

VIII.B State and Local Roles

Comments 114, 166, 279, 285, 291, 523: The Permit does not state that EPA, GE and the States will actively engage, consult and consider input from the Rest of River municipalities during the design and/or implementation of cleanup activities. The Berkshire County Rest of River municipal governments should have a more clearly defined role in reviewing and providing input to the EPA throughout the cleanup process, including during the development of the Quality of Life Compliance Plan referenced in Section II.B.11.l.(2) of the Permit, and to accommodate the local desire to plan for increased access to the natural environment along the river, and careful planning of access roads and staging areas could serve as future trails, canoe launches and other recreational amenities.

EPA should require GE to seek the input and approval the Town of Great Barrington before determining the location of any treatment facilities, temporary storage, or site plans, and to work with the Town on an ongoing basis to ensure successful implementation of both the remediation project and the mitigation of its impact on the Town.

EPA Response 114, 166, 279, 285, 291, 523: Under CERCLA and the Decree, EPA has approval authority over GE submittals, and has oversight authority over the response action; and in that role, EPA will provide opportunities for input by municipalities at relevant points. Furthermore, in response to this comment and others, the Final Permit Modification includes

additional requirements related to opportunities for municipalities to have input during the process for designing and implementing the remedy. For example, within the Rest of River SOW submittal:

- EPA requires GE to expedite the submittal of a Work Plan for the siting of Temporary Sediment Processing/Transfer Location(s), including a process to coordinate with affected communities regarding the operation of the temporary location(s). Final Permit Modification, II.H.1.d(3);

- EPA requires GE to submit, as part of its Quality of Life Compliance Plan, provisions for coordination with affected residents or landowners in or near areas impacted by remediation, and a Community Health and Safety submittal. Final Permit Modification, II.H.11.d., and e.

In addition, in part in response to these comments, Section II.H.2 of the Final Permit Modification now includes a requirement that "[i]n addition, the Permittee [GE] shall describe the permittee's project organizational structure, roles, and responsibilities, and lines of communication among the Permittee, EPA, and state and local entities, as appropriate and will include the project organization and a project implementation schedule."

Comment 109b: Our municipal health and safety agencies do not have the training or resources to deal effectively with this issue (trucking of contaminated materials), so such training and resources must be provided by EPA and/or GE.

EPA Response 109b: The Final Permit Modification includes the requirement for GE to submit Supplemental Implementation Plans, including a Health and Safety plan and Operation plan. Final Permit Modification at II.H.8. A component of these plans is a contingency plan that requires coordination with local responders. Also see Response 114 *et al.* above. For issues relate to compensation, see Section IX.D of this Response to Comments.

Comment 134: We believe that "the Site" should be defined, with two Site sub-categories: Primary Site and Secondary Site. The Primary Site would include those areas which contain any contamination above the minimum standard – likely the 10-year floodplain. The Secondary Site would be those areas which are not contaminated but are subject to cleanup operations impacts (e.g., processing, transport, noise, dust, and glare). We believe that the Permit should specifically include defined Primary and Secondary Site approval processes, which would give considerable deference to local permitting processes and involvement in review and comment of operational plans, particularly in Secondary Sites.

EPA Response 134: EPA has not endorsed the two-site concept proposed by the commenter. However, EPA's approach does address the issues raised by the commenter. As noted more specifically in Response 114 *et al.* above, EPA will provide multiple significant opportunities for input by municipalities in the design and implementation of the remedy.

Comment 162: We request that the Overall Strategy and Schedule section of the Permit explicitly direct GE to consider the requirements of local bylaws and regulations during the design and construction phases of the cleanup. Local municipalities should be actively involved in the final plans for of all work areas, including locating access roads, staging areas, dewatering and treatment facility areas, storage sites, etc.

Comment 282: EPA should acknowledge in the RCRA permit two additional, and important, aspects of state and local authority. First, to the extent that any work is conducted off of the "Site," EPA should ensure that GE's scheduling submissions and other documentation take into account the necessity of obtaining all necessary municipal approvals (for example relating to heavy truck traffic beyond the perimeter of the site). Second, even with respect to Work conducted entirely on the Site, the Work must comply with the substance of local permit laws. See, e.g., Town of Fort Edward v. United States, 2008 U.S. App. LEXIS 62, at *5 (2d Cir. 2008): "EPA is required to comply with the substance of state and local permit laws, and is merely exempted from 'the administrative processes' of obtaining the necessary permits that 'could otherwise delay implementation of a response action.'" (quoting 53 Fed. Reg. 51394, 51406).

EPA Response 162, 282: The Final Permit Modification includes requirements for GE to submit proposed schedules for its deliverables in designing and implementing the remedy. Final Permit Modification, Sections II.H. and II.I. EPA has approval authority over such proposed schedules and will ensure that the schedules take into account any necessary approvals for activities. Also, as discussed elsewhere in this Section, EPA intends to solicit the input of local governments and agencies when reviewing GE's deliverables.

In general, EPA will ensure compliance with the substance of state and local bylaws, regulations, and permit requirements for on-site remedial action, except where those requirements conflict with federal law or the terms of the Final Permit Modification. *See Town of Acton v. W.R. Grace & Co. Conn. Tech.*, No. 13-12376-DPW, 2014 WL 7721859 at *9-12 (Sept. 22, 2014) (slip op.) (Discussing conflict preemption under CERCLA.) In addition, see EPA Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, 1988. ("Other federal and State criteria, advisories, and local ordinances should also be considered, as appropriate, in the development of remedial action alternatives."). Under CERCLA, EPA is not required to obtain local or state permits for portions of "any removal or remedial action conducted entirely onsite," where the action is selected and executed in compliance with CERCLA clean-up standards. 42 U.S.C. § 9621; *see also* 40 C.F.R. § 300.400 (defining "onsite" as "the areal extent of contamination and all suitable areas in very close proximity to the contamination necessary for implementation of the response action").

Comment 292: In recent years, EPA has said that the Pittsfield Economic Development Authority (PEDA) is responsible for responding to PCBs discovered in the stormwater system near the original GE Plant Area, even though these PCBs are attributable to an area GE was supposed to have cleaned up. EPA has so far taken no steps (*e.g.*, under the reopener conditions in the CD) to hold GE responsible. The Committee respectfully requests a clarification from EPA as to why GE has not been held responsible for the additional contamination on the PEDA property.

EPA Response 292: The scope of the public comment period was to seek comments on EPA's Draft Permit Modification for the Rest of River remedy. The comment seeks a clarification on actions outside the Rest of River area, and not related to the proposed remedy for Rest of River. The Final Permit Modification is not designed to affect the liability of PEDA or GE regarding the PEDA property. The Rest of River area does not include the PEDA property at the GE Plant Area. As such, the comment is beyond the scope of the public comment period established for the Draft Permit Modification for Rest of River.

Comment 294.b: The results of baseline sampling to be undertaken should be presented to each municipal government and to the Citizens Coordinating Committee. Prior to commencement of cleanup activities within each reach of the river, mitigation plans should be drafted, shared and understood by all parties, including GE, the agencies, municipalities and stakeholder groups, which clearly state what actions will be quickly undertaken to capture PCBs should they become exposed or enter the river system during those cleanup activities.

EPA Response 294.b: The Final Permit Modification includes a baseline assessment of pre-remediation conditions, functions and values of river bottom, bank, Backwater, Floodplain, Impoundment, and Vernal Pool habitat, and the occurrence of State-listed species, as well as baseline monitoring of PCBs. Permit II.B.1.c.(2)(a); II.B.II.4. Those baseline assessments will be made available to the public, including the municipal governments and the CCC. Also the website to be maintained by GE under the Quality of Life Compliance Plan submittal will provide community access to data and information like baseline sampling results. Permit, II.B.11.e.(1). The Final Permit Modification also includes the requirements for restoration of areas impacted by the remediation, including development of a Restoration Corrective Measures Coordination Plan and a Restoration Plan. Permit, II.B.1.c.(2)(c), (d).

Comment 316: EPA should coordinate closely with local health officials to ensure that short-term exposures are controlled and long-term exposures are reduced.

EPA Response 316: As stated in more detail in Response 114 *et al.*, EPA plans to have local officials involved at relevant points as the remedy design and implementation goes forward.

Comment 342: The Mass DEP and the Department of Fish and Wildlife should have been in previous discussion with the Rest of River municipalities. The first time they were in the same room with these municipalities was at the January 2014 meeting. It is unfortunate how the Commonwealth has chosen to work with these municipalities. EPA should find a way to grant the Rest of River municipalities' request to be an active part of the process as the cleanup proceeds. The municipalities need to have their own voice, for to date the Commonwealth has not consulted with, nor represented, them. The municipalities will bring benefit to both EPA and GE during the cleanup, as they have the local knowledge so needed as this cleanup moves forward.

EPA Response 342: During design and implementation of the remedy, EPA will provide significant opportunities for input by local municipalities, as discussed in more detail in Response 114 *et al.* above.

Comment 391: The Pittsfield Board of Health wishes to be actively involved in the next phase of planning and review. We have previous concerns relative to the Silver Lake project about proper reporting of monitoring results and necessary corrective actions. Going forward, it is imperative to have clearly defined monitoring and reporting systems, including corrective actions, in place to ensure protection of public health.

EPA Response 391: EPA will continue to keep the City of Pittsfield, including the Pittsfield Board of Health, involved as remedy design and implementation proceeds. EPA plans to work actively with the Board of Health and other affected municipal entities to ensure protection of

public health as the remedy design and implementation proceeds. The Final Permit Modification does include provisions for monitoring and reporting systems, including corrective actions.

Comment 392.a: The Board of Health request that the results of all air and water monitoring be provided directly to the Board at a minimum in monthly reports, and that that any elevated PCB levels and corrective action be reported immediately.

EPA Response 392.a: As Response 114 *et al.* and 391 above state, EPA will provide significant opportunities for input, including for the Pittsfield Board of Health. As for the results of all air and water monitoring, the City of Pittsfield does receive the monthly Site reports GE is required to submit pursuant to the Decree. In addition, the Final Permit Modification requires GE to submit a Community Health and Safety Plan and Design Work Plans. These plans will include requirements for action levels to be set, corrective action requirements, and notification procedures.

Comment 463: Connecticut requests the ability to review and comment on any work plan which impacts attainment of the Performance Standards/Benchmarks for Downstream Transport and Biota as well as attainment of Connecticut Water Quality Standards, Criteria and Designated Uses.

EPA Response 463: The role of the Commonwealth of Massachusetts and the State of Connecticut in the review of GE submittals for Rest of River is described in Section XV of the Decree. Specifically, the Decree states that EPA will provide the Commonwealth and Connecticut a reasonable opportunity for review and comment prior to EPA approving, approving with conditions, modifying, or disapproving of any of GE's submittals. EPA intends to coordinate closely with the Commonwealth of Massachusetts and the State of Connecticut in implementing the Final Permit Modification/Remedial Action.

VIII.C Other Stakeholder Roles

Comments 2.b, 53: Although the Plan requires that GE provide the detailed information for EPA approval as part of the design process, there will be no formal opportunity for landowners and other interested parties to review and comment on these documents. Such review opportunities should be provided.

EPA Response 2.b, 53: While the Decree does not call for a formal reasonable opportunity for review and comment by landowners and interested parties on remedy design submittals, EPA is committed to involvement by stakeholders as the cleanup design progresses. During remedial design, EPA plans to engage with the communities and stakeholders to ensure that their input is included in the design process.

Comment 61: The process is political and does not properly involve the communities that will be affected by the remediation.

EPA Response 61: EPA is implementing the process pursuant to the Decree and Permit, to address the risks posed by the PCBs in the Rest of River. As part of its obligation, as explained further in Response 2.b, 53 above, EPA plans to provide opportunities for involvement for the communities that will be affected by the remediation.

Comment 284: We note and support the development of a series of plans as part of the overall framework for the cleanup process. We are concerned, however, that the list of requisite plans does not include any details as to what GE or the public should expect to be included in these plans.

EPA Response 284: The Final Permit Modification does include details on what GE or the public should expect to be included in the series of plans to be submitted by GE. For example, one relevant submittal to the local communities is the Quality of Life Compliance Plan, which specifies five separate areas to address in the plan, including noise, air, odor, light; recreational activities; road use and transportation-related impacts; coordination with impacted residents/landowners, and community health and safety. In addition, to the extent that the level of detail provided by GE in its submittal is insufficient, EPA has review and approval authority over each plan submitted by GE.

Comment 507: There is no process in place for the public to review and comment on any of the post-permit information, or to influence EPA's final decisions on the remediation.

EPA Response 507: While the Decree does not call for a formal reasonable opportunity for review and comment by the public and other stakeholders on remedy design submittals, EPA is committed to involvement by stakeholders as the cleanup design progresses. During remedial design, EPA plans to engage with the communities and stakeholders to ensure that their input is included in the design process.

IX. Impacts to the Community and Effects of Remedy

IX.A Quality of Life Issues

Comments 4, 11, 38, 59, 93, 106, 109a: Several commenters expressed concern about the additional truck traffic that would be generated by the remediation. Commenters asked specifically about the type and size of trucks that would be used to carry contaminated material and the specific routes the trucks would use, noting that the additional traffic would disrupt traffic patterns on the roads and potentially in some neighborhoods. Some commenters recommended potential ways to mitigate the impact of the additional truck traffic by using the existing transmission line ROW to access the river or by accessing the work site via water, and some expressed concern about public safety. One commenter noted that even if material is transported via rail there will still be local impacts of increased truck traffic. One commenter expressed concern over traffic in the Reach 5A neighborhoods (off Holmes Road-Shetland, Clydesdale, Pinto and Palomino; off East New Lenox Road –Anita, Eric, Joseph, Quirco and Lucia), Pomeroy Avenue, Holmes Road, and Est New Lenox Road, and that GE's preliminary plans show access roads going through the Reach 5A neighborhoods.

EPA Response 4, 11, 38, 59, 93, 106, 109a: EPA acknowledges that there will be traffic impact on local roads. For example in its Comparative Analysis, EPA estimated that approximately 11,200 dump truck trips per year (or approximately 50 to 60 trucks per day) will be required to remove contaminated material and to bring in clean material. Any potential truck routes (including to a rail facility) identified in documents prepared to evaluate the feasibility of various remediate alternatives are preliminary and non-binding.

To minimize the impacts to the community and to allow for community input, the Final Permit Modification includes revisions from the Draft Permit Modification that require GE to submit a Quality of Life Plan to EPA for approval that includes the following components:

> [A plan for] Road use, including restrictions on transport of waste material through residential areas and methods to minimize or mitigate transportation related impacts to neighborhoods, infrastructure and the general public.

Final Permit Modification at II.H.11.c.

> Coordination with affected residents or land owners at or near areas impacted by remediation.

Final Permit Modification at II.H.11.d.

EPA modified the description of this plan in the Final Permit Modification in response to these comments by adding in the clause "and methods to minimize and/or mitigate transportation related impacts to neighborhoods, infrastructure and the general public" to emphasize the necessity for GE to satisfactorily address the issue of truck traffic.

EPA will solicit input on this plan from local governments, neighbors and other interested stakeholders. The restrictions on transport of waste material though residential neighborhoods is intended to preclude or severely limit transport of contaminated material or clean fill on small residential streets such as Shetland, Clydesdale, Pinto and Palomino; and Anita, Eric, Joseph, Quirco and Lucia. This plan also requires that GE evaluate methods to further reduce the impact on neighborhoods including the use of construction of temporary roads on utility right-of-ways and other locations in the floodplain, and the potential transport of material via other means, such as by river, or in a slurry through pipelines.

The type of trucks to be used for carrying away contaminated material removed from the river will be determined during the Rest of River SOW process and in Remedial Design documents. However, in GE's Revised CMS, GE assumed 10 wheel dump trucks with a capacity of 10 cubic yards or 16 tons for the transport of clean fill and the transport of contaminated material to temporary staging areas. For the transport of contaminated material to off-site disposal facilities, if applicable (i.e., for material not transported by rail), GE estimated tractor trailers that would carry 20 tons of material.

Comments 12, 29, 96, 110, 167, 168, 170.a, 179, 303, 338.a, 339, 392.b: Several commenters expressed concern about community impacts such as noise and air emissions from increased truck traffic and heavy machinery operations and similar quality of life issues during the construction phase of the project. Control of noise, traffic and light pollution were noted as appropriate topics for the Quality of Life Compliance Plan. A number of commenters expressed concern that EPA has not, or will not, work with communities and residents to mitigate these impacts on local communities, and one commenter felt that impact on communities should have been one of the criteria used to select the proposed remedy. Berkshire Regional Planning Commission (BRPC) commented that the Quality of Life Compliance Plan should be consistent with the Transportation Impact Assessments Scope of Work (SOW) provided by BRPC to EPA staff on January 7, 2014; the BRPC SOW should be explicitly referenced in the Permit. A

commenter noted that GE should be required to identify any residential properties that will experience a significant drop in value as a result of cleanup and/or otherwise expressed concerns about the cleanup activities decreasing their property value. One commenter expressed concern that the impacts on properties near Reach 5C and the Backwaters could have impacts of up to 10 years due to the sequencing of the cleanup activities. Commenters also expressed concern over the potential impacts of the remediation on access to the river.

EPA Response 12, 29, 96, 110, 167, 168, 170.a, 179, 303, 338.a, 339, 392.b: EPA acknowledges there will be noise, air pollution, effects on recreational uses of the river and other short-term effects during the implementation of the cleanup. EPA did consider these effects in its analysis of the Permit criteria for selecting a remedy. For example, Section 2.8 of EPA's Comparative Analysis discusses Short-Term Effectiveness considerations for the different alternatives for remediation of the sediment and floodplain, including greenhouse gas emissions, and impacts on local communities and communities along truck transport routes. (Sections 2.8.2, and 2.8.3, respectively).

The short-term effects will generally be limited to the areas in close proximity to the work area. Although the total project duration is estimated to take 13 years, the remedy will occur in phases. Therefore, in many instances, the impact to specific areas will be for a much shorter period of time. For example, remediation of Reach 5A, which covers approximately 5 miles of the River, is expected to be completed in 5 years, but could be divided into approximately 5 segments, with the short-term impacts generally limited to work area adjacent to that segment (e.g., one year of effects for each mile of river remediated). The estimated duration for Reach 5C is 3 years. (See Figure 6 of Final Permit Modification). Similar to Reach 5A, all of the effects of the remediation will not necessarily affect all areas abutting 5C for the 3-year duration. This is similar for work in the Backwaters as well. To the extent that specific areas may be facing more lengthy impacts under the proposed cleanup sequencing, EPA will be soliciting public input during the remedial design process, prior to a determination of the specific details as to segmenting the remedy.

To mitigate these effects on the neighborhood, GE is required to submit to EPA for approval a Quality of Life Compliance Plan. This Plan is required to address:

- Noise, air, odor and light standards
- Provide for the continuance of recreational activities (including access to the river)
- Road use
- Coordination with affected residents; and
- Community Health and Safety Program, which consists of, at a minimum:
  - GE maintaining a web site to provide community access to information such as air monitoring data, technical reports, work progress, and schedules; and
  - GE establishing and maintaining a system to identify and address community complaints and concerns.

EPA did not include the BRPC SOW in the Final Permit Modification. As discussed further in Section VIII of this Response to Comments, EPA will solicit input from local governments, BRPC, neighbors and other interested stakeholders on the Quality of Life Compliance Plan. In addition, EPA intends to continue its robust community involvement program for the site, including neighborhood meetings to discuss plans for construction work, dissemination of information via fact sheets, email, and website updates, and periodic CCC meetings.

It is important to note that several large projects associated with this site have been successfully completed to date and, by virtue of the close working relationship among EPA, GE, local officials, and the community, short-term impacts were successfully managed.

See Section IX.C below for comments related to property values.

Comments 58, 87, 386, 508: Some commenters stated that currently PCBs are not detected in the air above the river and floodplain, but the remediation will release PCBs into the air. Commenters recommended that a Performance Standards or other protocols be established for airborne PCBs.

EPA Response 58, 87, 386, 508: Sampling conducted by GE at Woods Pond and Fred Garner Park in 1995 detected average PCB concentrations in the air of 0.0055 $\mu g/m^3$ and 0.0033 $\mu g/m^3$ respectively (GE's RFI Report). In 2000, EPA collected air samples at the former DeVos Farm property and at October Mountain Road and did not detect the presence of PCBs in air. (2005 HHRA). While the 1 ½ Mile Reach Removal was being conducted, a notification level was set at 0.05 micrograms per cubic meter ($\mu g/m^3$) and an action level was set at 0.1 $\mu g/m^3$ based on 24-hour average for PCB concentrations in air. Monthly air monitoring performed between 2002 and 2006 indicated that there were no exceedances of the action level and one sample that exceeded the notification level. The 1 ½ Mile Reach was in an area with higher average PCB concentrations than Rest of River and therefore, EPA expects similar or lower PCB concentrations in air.

For Rest of River air monitoring, EPA anticipates that GE will be required to use engineering controls and best management practices and to propose an air monitoring plan with health based action levels. While there may be an increase in airborne PCB concentrations in areas close to the remediation for a short period of time, EPA anticipates that GE will be expected to meet action levels for airborne PCBs, and if these levels are exceeded, will be required to initiate additional evaluations and engineering controls.

Comments 170.a, 283: The Permit should require the development of a comprehensive Community Involvement Plan (CIP), outlining a process to ensure meaningful public input and involvement with EPA as it implements the Permit, similar to the CIPs developed for the Hudson River Superfund Site. A process to keep all citizens informed of the status of the cleanup should, at a minimum include more frequent updates to the Citizen Coordinating Committee, municipal boards, periodic updates in local newspapers, access television and social media.

EPA Response 170.a, 283: The Final Permit Modification requires GE, as part of the Quality of Life Compliance Plan, to set up and maintain a web site to keep the community informed of site activities and to maintain a system to address community complaints. See Section VIII of this

Response to Comments for more details. In addition, as discussed in Section VIII of this Response to Comments, EPA will work with GE to ensure that local governments and other stakeholders will be provided updates through the CCC, public meetings and other outreach mechanisms.

Comment 313: Massachusetts DPH anticipates any removal and capping activities associated with the remediation of sediment and floodplain soils could result in potential increased exposure opportunities and risk in the short-term if measures to minimize local impacts are not adequate. Attachment D to the permit describes general conditions that EPA are protective of human health during the remediation, however detailed and site-specific measures are not delineated. Massachusetts DPH recommends EPA and GE carefully coordinate with local officials (including health departments) and conduct outreach to residents to ensure that exposure opportunities (as documented with concurrent air monitoring) or nuisance conditions that may arise will be effectively minimized or eliminated.

EPA Response 313: As discussed above, protection of community health, and coordination with the community and local health officials, will be addressed in the Quality of Life Plan. (Section II.H.11 of the Final Permit Modification). In addition, GE's Remedial Design/Remedial Work Plans and Supplemental Implementation Plans are expected to include engineering control, air monitoring requirements, action levels, and corrective action requirements should action levels be exceeded. Also, see Response 58 *et al.* above in this Section.

IX.B Effects on Infrastructure

Comment 164: The Permit should include a Decommissioning Plan for sites and infrastructure developed to accomplish the cleanup, subject to review and comment by municipal authorities. The value of real and personal property of such facilities should be established for taxation purposes.

EPA Response 164: EPA has not included a requirement for a specific Decommissioning Plan. However, EPA anticipates that a decommission plan, if necessary, will be included in Remedial Design/Remedial Action Work Plans and/or other appropriate submittals.

EPA has not included a requirement for establishing for taxation purposes the value of real and personal property as this is outside the scope of the Final Permit Modification.

Comment 165: The permit should clarify the difference between "on-site" versus "off-site" transportation. We believe that all transportation activities outside of a relatively discrete area of actual removal or replacement and restoration activity have the potential to impact local infrastructure and neighborhoods. Transport of contaminated material or replacement materials will entail a larger area than simply the immediate restoration site, and municipal review and input will be key in these areas. The municipalities request that EPA define each cleanup site to include all local road infrastructure that will likely be damaged from cleanup-related truck traffic. The BRPC has provided EPA project staff with a transportation impact assessment methodology (Attachment C), and we request that it be utilized as specific cleanup plans are developed in each reach to help determine and assess costs for bringing an infrastructure component up to specification prior to its use and/or repairing damage done by increased and heavier truck traffic.

EPA should clarify that the costs of preparing infrastructure to withstand future cleanup operations is to be determined by EPA in consultation with the affected municipality, and these costs are to be paid by GE.

EPA Response 165: Under the Decree, the term "Site" is a defined term (see Decree, Paragraph 4). The Final Permit Modification at Section II.H.10 requires that GE submit an Off-site Transportation Plan. In addition, the Final Permit Modification at Section II.H. includes several other requirements, including the Quality of Life Compliance Plan, to ensure that the cleanup plans take into account the quality of life, such as road use, transportation related impacts to neighborhoods, infrastructure and the general public, as well as coordination with affected residents and landowners at or near areas impacted by remediation. See Permit II.H.11.c and d. Moreover, with respect to the Work Plan for Siting of Temporary Centralized Contaminated Materials Processing/Transfer Location(s) (Section II.H.1.d.), EPA, based in part on this comment, moved this provision to the Expedited Deliverables portion of the Rest of River SOW to allow for more time for discussion of this important facet. (Compare to Section II.B.11.a of the 2014 Draft Permit Modification).

In addition, affected municipalities will have the opportunity to provide input throughout the design and implementation of cleanup measures, in Section VIII of this Response to Comments. With respect to the transportation impacts, GE in the first instance will be submitting the remedial design related documents. EPA will ensure that GE knows about the BRPC transportation impact assessment methodology for its consideration during remedy design.

To the extent that any infrastructure-related impacts are not addressed during the remedial design process, and EPA does not require them elsewhere in the Final Permit Modification, SOW or Work Plans, the Decree does not alter third parties' existing rights. Paragraph 189 of the Decree provides:

> Nothing in this Consent Decree shall be construed to create any rights in, or grant any cause of action to, any person not a Party to this Consent Decree. The preceding sentence shall not be construed to waive or nullify any rights that any person not a signatory to this Decree may have under applicable law.

Comment 169: It is imperative that the impacted municipalities not be left to pay for infrastructure damage caused by cleanup activities. Damage caused to discrete sections of road caused by the stress of heavy trucks and equipment may not be immediately apparent, but instead may manifest itself a few years after construction activities are complete. An escrow account should be established with the Berkshire County Rest of River municipalities, using GE funds, in the event that such funds are needed in the future by any of the Rest of River municipalities to cover the cost of repairing infrastructure damaged by transportation linked to PCB cleanup activities. We request that an escrow account be established with the Berkshire County Rest of River municipalities, using GE funds, in the event that such funds are needed in the future by any of the Rest of River municipalities to cover the cost of repairing infrastructure damaged by transportation linked to PCB cleanup activities.

EPA Response 169: Given the focus of the Final Permit Modification, EPA has not required to GE set up an escrow account for funds to cover the costs of repairing infrastructure damaged by

transportation linked to PCB cleanup activities. As mentioned above in this Section IX, EPA's Final Permit Modification requirements do require GE to address transportation related impacts to neighborhoods, infrastructure, and the general public. Additionally, as stated in Response 165 above, the Final Permit Modification does not affect the rights of nonparties to the Decree. In addition, as discussed in Section VII (EPA Response 124, 187) of this Response to Comments, the Decree requires GE to provide an assurance of its ability to pay for all required response actions.

Comment 299: We specifically request that the "Road use…" section of the Quality of Life Compliance Plan (Sec. II.B.11.l.(3)) be expanded to state that GE must identify the truck routes and require a road, bridge and culvert assessment of all possible routes to determine pre-construction conditions. A baseline study of the current condition of transportation infrastructure for routes used during the cleanup must be conducted by GE. Any damage done to the infrastructure due to heavy truck traffic must be restored, at a minimum, to pre-construction condition. The assessment should be conducted in close coordination with each municipality. Also as part of this section, GE should be required to include a traffic management plan in the SOW, which should (like the rest of the SOW) be subject to a reasonable opportunity for review and comment by the affected municipality(ies) which maintains necessary access. GE should be required to adhere to the municipality(ies) requirement to maintain traffic and to promptly correct immediate deficiencies in traffic operations or roadway conditions as the municipal officials find necessary. The municipalities should have the ability to restrict use of roads during portions of the year when they are most susceptible to damage, particularly the "spring thaw" period.

EPA Response 299: In response to public comments, EPA has modified the language of the Road Use provision of the Quality of Life Compliance Plan to provide more detail, although not the precise detail requested in this comment. See Response 4 *et al.* above. EPA anticipates that municipalities will be involved in any issues in designing the cleanup that affect the transportation routes and transportation infrastructure. EPA believes that the provisions of the Quality of Life Compliance Plan allow for traffic management to be considered in the Rest of River SOW process.

As for ensuring restoration to pre-construction condition any damage done to the infrastructure due to heavy truck traffic, the Final Permit Modification does not have an explicit provision for that. These issues are typically addressed in GE's Remedial Design/Remedial Action Work Plans. In addition, consistent with all other response actions conducted pursuant to the Decree, EPA anticipates that assessment and restoration of infrastructure will be coordinated with EPA, GE and the affected municipality or agency. Furthermore, the Final Permit Modification does not affect existing rights of municipalities and others and does not preclude EPA, municipalities and GE from further discussions on this issue as the cleanup design and implementation progresses.

Comment 300: We request the Permit to include language requiring GE to establish a written procedure for infrastructure review and remediation of any damaged infrastructure within a timely manner, consistent with state or local mandated engineering and construction standards, no longer than one to two construction seasons. We also request than in no circumstances should the infrastructure remediation be done to a standard lower than the infrastructure's previous surface or condition.

EPA Response 300: EPA has not included the specific language requested by the commenter in the Final Permit Modification. As explained in Responses 165 and 299 above, the Final Permit Modification includes requirements for GE to address project impacts on infrastructure as part of the Rest of River SOW submittals. EPA will coordinate with municipalities affected by the remediation during the review and approval process for these submittals, including soliciting input from the municipalities. Specific details regarding infrastructure will be addressed at that stage. EPA expects that, consistent with other cleanups performed by GE under the Decree, GE will restore any infrastructure to its pre-remediation condition, to the extent practicable, unless GE and the appropriate government entity reach an agreement on other mitigation measures.

IX.C Property Values, Economic Impacts, and Tourism

Comments 13, 36, 39, 97, 274.a, 275, 390: Many commenters expressed concern about the potential negative effect of the remediation on local property values, particularly during the construction period. One commenter noted that fears of loss of property value are unfounded because once the contamination is cleaned up properties near the river and floodplain will be worth more than they are now. One commenter noted the Skeo Report that shows that there will likely be a loss of real estate tax revenue because of the "temporary" loss of value of the homes near the river. Considering the extent of the proposed remediation, including the work in the floodplains, we expect there to be a loss of value of most of the homes in the neighborhoods adjoining Reach 5A, and even the announcement of the proposed remedy will make selling homes in the Reach 5A neighborhoods more difficult. One commenter felt that such concerns are unwarranted because properties near the river will be worth more after the cleanup is completed. One commenter suggested that the permitting agencies and GE should work with local governments to identify beneficial opportunities to mitigate these direct and substantial impacts to municipalities, residents and businesses.

EPA Response 13, 36, 39, 97, 274.a, 275, 390: Consistent with EPA practice in evaluating remedies, EPA did not study the impacts on property values as part of the remedy selection process under the Permit. That being the case, EPA cannot assess whether the consequences will be negative or whether once the contamination is cleaned up properties near the river and floodplain will increase in value. Nonetheless**,** within the context of the selected remedy, the Final Permit Modification does include provisions to address minimizing impacts of the remediation. In response to public comment, EPA added to the Quality of Life Compliance Plan additional detail for GE to evaluate the impacts of road use on neighborhoods, infrastructure and the general public (specifically restrictions on transport of waste material through residential areas and methods to minimize and/or mitigate transportation related impacts to neighborhoods, infrastructure and the general public) (II.H.11.c and d.). See Response 4 *et al.* above. Moreover, EPA is requiring GE to expedite its plan for coordination with affected communities on the operation of temporary contaminated materials handling facilities (II.H.1.d.(3)). In addition, GE is required, in the Rest of River SOW, to develop plans for addressing impacts on aspects such as community health and safety (II.H.11.e), noise, air odor, light standards (II.H.11.a), and recreational activities (II.H.11.b).

As one commenter mentioned, EPA, separate from the remedy selection process, provided funding for a study requested by local municipalities titled *Cleanup of the Housatonic "Rest of River" Socioeconomic Impact Study* by Skeo Solutions (September 2012).

Skeo concluded the following:

> The Rest of River cleanup is estimated to have a long-term positive effect of $0-795 million on property values in the study area, with nearly all of the effect coming from residential properties. The positive effect on property tax revenues could range from $0 to $11 million annual, based on current tax rates. Conversely, on-site disposal could have a negative effect on property values near the potential landfill locations of about $20 - $40 million per landfill. It is possible that property values may decline temporarily during the cleanup project; this potential temporary decline is estimated to range from $0 to $397 million, which would lead to a decline of $0 to $5.6 million in annual property taxes during the cleanup operation.

Skeo report, page 2.

The text of Skeo report is included for clarification purposes only. EPA is not commenting on the accuracy of the Skeo report.

In response to the comment suggesting that the permitting agencies and GE should work with local governments to identify beneficial opportunities to mitigate these direct and substantial impacts to municipalities, residents and businesses, EPA intends to solicit input from local governments and coordinate input, as appropriate, with GE. In addition, see Section VIII of this Response to Comments.

Comments 356, 389: The cleanup will not damage tourism. On the contrary, a cleaner river and floodplain in which to fish, canoe and hike will enhance tourism.

Some of the cleanup costs will represent an economic benefit and new jobs for the area. The cleanup of the first two miles was an economic engine that pumped money into the local economy.

EPA Response 356, 389: EPA acknowledges the commenters' viewpoints. Given the scope of the decision for addressing the risks posed by PCBs in the Rest of River, EPA has not performed an analysis of future tourism impacts, so EPA cannot assess the likelihood of the predictions.

Comment 343: I have grave concerns regarding the future economic impacts this weakened cleanup will have on the Rest of River municipalities.

EPA Response 343: As discussed above in this section, EPA has not performed an analysis on the economic impact of any remediation alternative.

IX.D Compensation

Comments 113, 161, 170.b, 277, 283.a, 296, 518: Several commenters expressed support for EPA's requirement that GE compensate landowners for any Environmental Restrictions and Easements that may be placed on private property as part of the remediation. However, this compensation is related mostly for changes in use and does not address Massachusetts Audubon's current and ongoing use of its property for conservation and educational services.

Commenters also recommended that property owners receive financial compensation for loss of use of and access to their properties during construction, loss of trees removed as part of remediation, and reduced quality of life.

One commenter felt that the language of this provision should be modified and recommended an additional provision for compensation for any property taken by Eminent Domain.

Several commenters requested that EPA require GE to fund experts in various technical areas, such as, but not limited to, public health professionals, ecological experts, and environmental remediation experts to consult with local municipalities, or technical support for the local boards of health and volunteer fire/ambulance companies that may be required to respond to site conditions and potential health risks generated from cleanup activities.

A commenter requested that the Quality of Life Compliance Plan require GE to identify any local businesses that will be negatively affected by cleanup activities, with a qualitative evaluation of the extent of the impact and of alternatives to the activity causing the impact. The Plan should also specify a process by which such businesses shall receive compensation for economic losses from GE, through capitalization of a compensation fund administered by an independent third party, preferably locally based.

EPA Response 113, 161, 170.b, 277, 283.a, 296, 518: The Final Permit Modification includes the Performance Standards, and the appropriate Corrective Measures necessary to meet the Performance Standards, to address PCBs and any other hazardous waste and/or hazardous constituents that have migrated from the GE Facility to the surface waters, sediments, and floodplain soils in the Rest of River area. Given the purpose and scope of the Final Permit Modification on addressing the risks posed by PCB contamination, EPA, other than specific compensation to be provided by GE as part of the remedy (for example, with respect to an Environmental Restriction and Easement or ERE), did not include in the Final Permit Modification requirements for GE to provide compensation for financial losses, for impacts of current contamination (other than the remediation requirements in the Final Permit Modification), for impacts on quality of life, or to provide for public health coordinators or technical support for local boards of health or volunteer fire/ambulance companies. Note that safety plans will be developed as part of the RD/RA process. With respect to removal of trees during the cleanup, the Final Permit Modification addresses that. Under Section II.B.1.c, Restoration of Areas Disturbed by Remediation Activities, GE is required to restore areas affected by the Corrective Measures, and return such areas to their pre-remediation conditions to the extent feasible and consistent with the remediation requirements.

With respect to EREs, the Final Permit Modification clarifies that there is a requirement for GE to offer compensation in return for an ERE for properties within defined "Exposure Areas" that are not remediated to residential standards. If a property owner declines the offer of compensation for an ERE, then the Final Permit Modification requires GE to implement a Conditional Solution that is protective of current uses, future uses (changes in use), and project or work. See Section III.G of this Response to Comments.

With respect to GE accessing private property and eminent domain, GE is required to use best efforts to obtain voluntary access from property owners for the implementation of remediation

activities. If GE fails to secure access, the United States can either issue an Order for Access pursuant to CERCLA (which may not include compensation) or use eminent domain. If eminent domain is used, just compensation is required.

Otherwise, the Final Permit Modification does not affect the rights of third parties to proceed with claims for damages independent of the Final Permit Modification requirements. The Decree provides, at Paragraph 189:

> Nothing in this Consent Decree shall be construed to create any rights in, or grant any cause of action to, any person not a Party to this Consent Decree. The preceding sentence shall not be construed to waive or nullify any rights that any person not a signatory to this Decree may have under applicable law.

Moreover, Section I.B.2 of the Final Permit Modification provides that the issuance of the Final Permit Modification does not convey any property rights or exclusive privilege to GE, and that the issuance of the Final Permit Modification does not authorize any injury to persons or property or invasion of other private rights.

Additionally, on the specific comment regarding the compensation for impacts to Quality of Life, note that the Final Permit Modification has a Quality of Life Compliance Plan with requirements for GE during the remedial process.

Comment 115: The Permit should require GE to post several financial guarantees/sureties to ensure compensation to municipal governments, property owners and others who may face financial losses due to cleanup or post-cleanup activities. Such sureties should be overseen by an independent third party.

EPA Response 115: GE's financial assurance requirements are addressed in Section VII of this Response to Comments. With regard to compensation for potential financial losses, see Response 113 *et al.* above in this Section IX.D.

Comment 158: We request that the EPA add language to require GE to reimburse entities which experience financial losses due to a degradation in water quality or quantity due to corrective measures and/or construction within Reaches 5-16." This is to protect Rest of River businesses who rely on the river's flow, particularly the Onyx Mill in Lee and the Glendale Hydro-Electric facility in Stockbridge. This should apply to any future water withdrawal users as well. Proposed actions should be coordinated with the users and the permitting agencies and they should be provided a reasonable opportunity to review and comment on proposed actions which may affect their operations. We suggest that this language or similar language be added to Section II.B.10.c. "(4) Permittee shall reimburse entities which experience financial losses due to a degradation to water quality or quantity due to corrective measures and/or construction within Reaches 5-16."

EPA Response 158: While there are no provisions in the Final Permit Modification for monetary compensation for such financial losses, the Final Permit Modification and Decree include multiple protections related to water users. The Permit requires GE to submit a Rest of River SOW for implementation of the Corrective Measures. The Rest of River SOW will include several plans directly relevant to the commenter's concern, including the Water Withdrawal and Uses Plan (Section II.H.21), the Dam Operation, Inspection, Monitoring and

Maintenance Plan (Section II.H.20), and the requirements within the Quality of Life Compliance Plan for coordination with affected residents or landowners at or near areas impacted by remediation (Section II.H.11.d).

The Quality of Life Compliance Plan also includes, more generally, Community Health and Safety requirements, that require GE to establish and maintain a system to identify and address community complaints and concerns during construction activities.

The commenter also asked that proposed actions be coordinated with the users and the permitting agencies and they be provided a reasonable opportunity to review and comment on proposed actions which may affect their operations. The States are provided a reasonable opportunity to review and comment on remedial design plans. Moreover, EPA plans to solicit public input from other affected stakeholders at each significant step of cleanup design and implementation, as discussed in Section VIII of this Response to Comments.

Comment 160: The Permit should contain language which makes it clear that any water quality violations pertaining to PCBs shall be presumed to be the result of GE's actions and that GE is responsible for correcting those violations and paying any fines or penalties, unless GE can demonstrate that the PCBs are not attributable to GE.

EPA Response 160: Given EPA's focus on the remedy selection, EPA has not included that presumption in the Final Permit Modification. Any water quality violations alleged outside the scope of the Rest of River are not affected by this Final Permit Modification.

Comment 161: EPA should require GE to fund the hiring of consultants to serve local boards in reviewing and commenting on plans, statements of work and other submittals during the cleanup, and to aid said boards in reviewing air and water quality monitoring and other data that are generated during cleanup activities.

EPA Response 161: Given the Final Permit Modification's scope and purpose, it does not explicitly require GE to pay for hiring of consultants to municipalities. However, the Final Permit Modification does not preclude additional funding mechanisms outside of it, and the Final Permit Modification and Decree do not affect rights of non-parties to the Decree. In addition, as detailed more fully in in Section VIII of this Response to Comments, EPA will be soliciting the input of stakeholders including the towns as part of EPA's review/approval process during remedial design.

Comment 172: Section II.B.11.v. of the Permit (Operation and Maintenance Plan) should discuss the requirements for the O&M Plan in more detail. This plan will be critical in containing remaining PCB contamination left behind after the completion of the cleanup. As part of the Plan, GE should be required to fund in perpetuity an environmental monitoring consultant whose work will be overseen by, and who will report directly to, EPA.

EPA Response 172: Consistent with the comment, EPA has modified the O&M Plan discussion to provide additional detail in the Final Permit Modification of the requirements of the O&M Plan. See Section II.C. Additionally, EPA anticipates coordinating with affected municipalities during development of cleanup plans such as the O&M Plan, and encourages that topic be raised at that juncture. Regarding funding of consultants, EPA has employed, and expects to continue

to employ, technical consultants to assist in the review and comment on GE's work plans and technical submittals. Per the Decree, GE is responsible for payment, with certain limitations, of EPA's costs in overseeing GE remedial design and remedial action activities for Rest of River, including the costs of technical consultants. EPA bills, and recovers costs from, GE annually for costs incurred, including those for technical staff. Otherwise, see Response 161 above.

Comment 186: We are concerned about, and seeking guarantees, that Sheffield taxpayers will not be responsible for any cleanup related expenses, activity or any PCB contamination left in the river as a result of the Permit.

EPA Response 186: The Final Permit Modification contains EPA's selected approach for addressing the PCB contamination in a manner to address risks to human health and the environment. It does not require payments by the Sheffield taxpayers for the Rest of River cleanup. However, of any actions that are determined to be beyond the scope of the Final Permit Modification, EPA cannot speculate on the outcome.

Comment 298: EPA should direct GE to identify the types of fires, accidents and other emergencies that may occur during cleanup activities and to provide an independent evaluation of the capabilities of the local fire and ambulance companies to respond effectively to such emergencies. EPA should require GE to provide any additional equipment or training that may be needed to meet all potential emergency situations described in the evaluation.

EPA Response 298: As part of the SOW process and Work Plan submittals, GE will be required to develop a Health and Safety Plan, which typically includes an emergency response plan. This will require coordination with local agencies. With regard to requiring GE to provide direct funding or compensation to local agencies, see Response 161 above.

Comment 287: We request that the EPA require GE to fund in perpetuity an environmental monitoring consultant whose work will be overseen by, and who will report directly to, the EPA.

EPA Response 287: EPA has environmental professionals who have been working on this action for many years. The Decree includes provisions requiring GE, with certain limitations, to reimburse EPA's costs incurred at the Site, including personnel costs for EPA's professional staff and consultants. EPA bills, and recovers costs from, GE annually for costs incurred, including those for technical staff. Also, see Response 172.

Comment 288: Massachusetts General Laws enable local governments to hire consultants to aid them in reviewing and conditioning projects within their jurisdictions, with the cost of the consultants borne by the applicants. These laws were designed to provide technical assistance to local boards faced with complex projects that could have long-term effects within their communities, while also reducing municipal financial hardship. Because the Rest of River cleanup has extensive environmental and human health implications and spans across several municipal jurisdictions, we believe that the most comprehensive and efficient means to meet the intent of these Home Rule provisions would be to encourage GE to fund the hiring of consultants to serve local boards in reviewing and commenting on plans, statements of work and other submittals during the cleanup, and to aid such boards in reviewing air and water quality monitoring and other data that is generated during construction.

EPA Response 288: EPA acknowledges that it may be efficient for local governments and boards to coordinate their reviewing and commenting on plans, statements of work and other submittals during the cleanup. See Section VIII of this Response to Comments regarding the role of local governments in providing input on plans during the remedial design and implementation process. However, federal laws under which the Final Permit Modification is being issued do not have "home rule" provisions like those mentioned by the commenter. See also Response 172 above in this Section.

Comment 400: Based on the conceptual plans presented to date, it remains unclear exactly what work will be proposed on Mass Audubon's property and how that work will be conducted. Mass Audubon needs to be involved in the development and approval of the work on its property including but not limited to:

- Detailed plans for work on Mass Audubon property including any access or staging points, methods, timeline, restoration methods and performance standards, public communication plans, etc.

- Provisions to minimize disruption to Mass Audubon's use of its lands and associated costs and lost revenue, including compensation for revenue lost due to closings or inability to conduct educational programs on its property during or after remedial activity.

- Provisions for reimbursement to Mass Audubon for interpretive signage appropriate to its property and consistent with Mass Audubon's design standards and the uses allowed on the property.

- Procedures for how to deal with any future need by Mass Audubon to move or dig in PCB contaminated soils on Mass Audubon properties, including provisions ensuring timely response by the agencies and GE.

- Protection of Mass Audubon from costs and liability associated with potential human exposures to PCBs on our property or claims by downstream landowners if a flood or other event causes PCBs to move from Mass Audubon property to others.

- Provisions to indemnify and hold harmless Mass Audubon from other damages, injuries or deaths of GE staff, contractors, and/or agents that may arise from the GE restoration and related work on Mass Audubon properties.

- Emergency response and contingency provisions and procedures e.g. in the event of a flood.

EPA Response 400: In accordance with the Decree and Final Permit Modification, GE will submit these details in work plans to EPA for review and approval. EPA will solicit input from Mass Audubon during its review process. In the Work Plan review and approval process, EPA can include provisions, to the extent practicable, to minimize disruptions to the Mass Audubon's use of its land. Compensation issues are outside the scope of the Permit. Mass Audubon can raise these issues with GE during discussions over access to the property.

Regarding detailed plans for work on Mass Audubon property including any access or staging points, methods, timeline, restoration methods and Performance Standards, public

communication plans, etc., in accordance with the Decree and Final Permit Modification, GE will submit these details in work plans to EPA for review and approval. EPA will solicit input from Mass Audubon during its review process.

As discussed in Section III.G of this Response to Comments, the Final Permit Modification includes requirements for GE to address these issues either with a compensated deeded use restriction or with a "Conditional Solution." Generally, if a party accepts compensation for granting a use restriction (ERE), then that party assumes costs of future soil handling requirements. If parties such as Mass Audubon elect not to accept the offer for an ERE, GE is obligated to implement a Conditional Solution on such property. A Conditional Solution obligates GE to take response actions, including but not limited to, ensuring the proper excavation, management, and off-site disposal sediment and soil for any Legally Permissible Future Project or Work or Legally Permissible Future Use of the property. The Final Permit Modification requires GE to submit a work plan to EPA within 30 days of the date that EPA notifies GE that the criteria for a Legally Permissible Future Use or Legally Permissible Future Project or Work has been met.

Regarding protection of Mass Audubon from costs and liability associated with potential human exposures to PCBs on its property or claims by downstream landowners if a flood or other event causes PCBs to move from Mass Audubon property to others, and provisions to indemnify and hold harmless Mass Audubon from other damages, injuries or deaths of GE staff, contractors, and/or agents that may arise from the GE restoration and related work on Mass Audubon properties, these issues are not covered by the Final Permit Modification. However, as a condition of access, Mass Audubon can request GE include such provisions, such as providing insurance certificates and naming Mass Audubon as an "additional insured" party.

Regarding emergency response and contingency provisions and procedures, e.g., in the event of a flood, to the extent that this comment is related to work conducted on Mass Audubon's property or other remediation work conducted by GE, GE's work plans will be required to include an emergency response and contingency plan.

Comment 401: The Decree provides for GE to compensate EPA and state agencies for their work related to the cleanup. GE's environmental contamination directly affects numerous landowners as well as the general public in many municipalities. It is GE's duty to provide EPA and the state agencies with funding for sufficient staff and consulting resources to properly oversee this massive cleanup project. We specifically urge that at least one full time position be funded under DFW to provide independent ecological expertise throughout the remediation process. We also urge that agency staffing or consultants be provided who can assist other affected parties with technical support. In addition, Mass Audubon requests that GE directly compensate Mass Audubon for its staff and/or consulting time required for our involvement as directly impacted landowners. This should be in addition to any direct compensation for loss of use or access to our properties.

EPA Response 401: Regarding EPA/State staffing, GE has not provided specific staff for EPA or the States to oversee the GE cleanups to date. However, under the Decree, GE is required to reimburse, with certain limitations, EPA and State costs incurred in overseeing the Rest of River cleanup. For example, see Decree, Para. 98.b for U.S. Rest of River oversight costs and 98.e for

Massachusetts oversight costs. To date, government costs of overseeing GE's cleanups have been reimbursed in part, consistent with the Decree limitations.

As for an additional staff person hired at DFW funded by GE, that provision has not been added to the Final Permit Modification in light of the existing cost recovery provisions in the Decree. As discussed above, there are provisions in the Decree to address Massachusetts's rest of River oversight costs.

As for agency staffing or consultants who can assist other parties with technical support, EPA for many years has implemented a Technical Assistance Grant for the GE-Pittsfield/Housatonic River site. The TAG is designed to provide funding for stakeholders to obtain technical support. Housatonic River Initiative is the TAG grant recipient, and HRI has been obtaining technical support from Environmental Stewardship Concepts, Inc. EPA encourages the commenter to coordinate with HRI in this regard.

As for Mass Audubon requesting that GE directly compensate them for time required, EPA has not included such compensation in the Final Permit Modification, given the focus of the EPA decision. At the same time, the Decree and Final Permit Modification do not affect the rights of non-parties to the Decree. See also Response 172 above in this Section.

IX.E Greenhouse Gases and Carbon Footprint

Comment 7: What is the "carbon footprint" of this project.

EPA Response 7: EPA presented estimates of greenhouse gas (GHG) emissions (i.e., carbon footprint) for eight floodplain and sediment response actions, including the response actions included in the proposed plan, in the Comparative Analysis. These were based on estimates developed by GE in its Revised CMS. Table 17 in the Comparative Analysis provides estimates of GHG emissions anticipated to occur through sediment removal/capping, floodplain soil and tree removal, and related ancillary activities during the implementation of the remedial alternatives under evaluation. Estimates presented in Table 17 of the Comparative Analysis include a breakdown of direct, indirect, and off-site emission sources.

The carbon footprint associated with the remediation component (i.e., exclusive of treatment/disposition of materials) of EPA's Proposed Remedial Alternative, including a breakdown of direct, indirect, and off-site emission sources, is presented below.

Direct Emissions	70,000 tonnes
Indirect Emissions	3,400 tonnes
Off-Site Emissions	98,000 tonnes
Total GHG Emissions	171,000 tonnes

To provide context regarding these emissions, 171,000 tonnes is the equivalent quantity of CO_2-eq[38] in 1 year as would be emitted by 32,200 passenger vehicles. The remediation

[38] GHG emissions are reported as metric tonnes of carbon dioxide equivalents (CO_2-eq).

component in the Final Permit Modification did not change significantly from the component referred to as SED 9/FP4 MOD in the Comparative Analysis, so the estimate of GHG emissions cited above is still accurate.

The Comparative Analysis also provided ranges of estimated total GHG emissions for the treatment/disposition alternatives, based on the potential volumes of sediment and soil that would require disposal or treatment. For TD 1 (off-site disposal to a licensed facility by truck) the GHG emission estimates ranged from 19,000 to 290,000 tonnes. GHG estimates for TD 1 RR (off-site disposal to a licensed facility by rail) were not presented in the Comparative Analysis.

Based on the anticipated soil and sediment removal volume,[39] GE's comments on EPA's Draft Permit Modification and Statement of Basis estimate GHG emissions for TD 1 and TD 1 RR as follows:

Total GHG Emissions for TD 1: 164,800 tonnes
Total GHG Emissions for TD 1 RR: 70,000 tonnes

GE's estimate for TD 1 is within the ranges estimated by EPA in its Comparative Analysis. The number of passenger vehicles that would emit an equivalent quantity of CO_2-eq in 1 year for TD 1 and TD 1 RR are 34,700 and 14,700, respectively (GE 2014, Table 3). These GHG estimates are calculated by multiplying estimated roundtrip miles from the site to the off-site disposal facilities by vehicle emission rates, fuel economy values, and other factors.

EPA notes that estimates of GHG emissions can vary significantly based on the assumptions used in the calculations.

IX.F Accidents and Injuries

Comment 6: Has an assessment been made of the number of anticipated motor vehicle accidents, injuries, and/or deaths attributable to the increased truck traffic resulting from the remediation?

EPA Response 6: EPA presented estimates of injuries and fatalities due to increased truck traffic and risk to remediation workers in the Comparative Analysis Tables 19 and 20, for floodplain and sediment response alternatives, including the proposed remedy, SED 9/FP 4 MOD. These estimates exclude risks related to disposition of the material. The remedy in the Final Permit Modification did not change significantly from the proposed remedy, and, therefore, the estimates in Tables 19 and 20 in the Comparative Analysis are still reasonable.

In addition, Tables 25 and 26 in the Comparative Analysis present estimates of accident-related injuries and fatalities due to implementation of various treatment/disposition alternatives, excluding off-site disposal by rail. These estimates were based on analyses conducted by GE in

[39] In Table 13 of its 2014 comments, GE estimates that 519,000 tons of TSCA material and 1,135,400 tons of non-TSCA material would be transported off-site to facilities for SED 9/FP 4 MOD.

National Remedy Review Board (NRRB). Major decisions that depart from Agency practice, policy and recommendations of the NRRB need have rationale carefully explained, and the decision substantiated with a record of data analysis, none of which is present in this case.

EPA Response 197: EPA disagrees on the sufficiency of the

rationale provided for the Draft and Final Permit Modification. A description of the remedy selection criteria and documentation to support the remedy selection, including the Statement of Basis, the Comparative Analysis, and the extensive Administrative Record, is discussed in Section II.B of this Response to Comments.

EPA also disagrees that the remedy varies from EPA practice, policy and recommendations from the NRRB. One of the primary purposes of the review conducted by the NRRB (and the Contaminated Sediment Technical Advisory Group (CSTAG)) in 2011 was to determine consistency with agency policy and guidance as per EPA OSWER Directive 9200.0-21, *National Consistency in Superfund Remedy Selection*. Specifically, the NRRB/CSTAG recommendations were documented in an October 20, 2011 letter to EPA Region I. EPA provided a detailed response to these recommendations on August 3, 2012. This included, among other items, a memo from EPA Region I to the NRRB/CSTAG directly addressing each recommendation, a revised comparative analysis, and supporting information. In addition, the EPA Region I case team met with CSTAG in 2002, 2004, and 2009. After each meeting, CSTAG provided recommendations to the Region and the Region replied back to CSTAG. All of this documentation is the Rest of River Administrative Record. Clearly, EPA Region I went to great lengths to coordinate with the NRRB and CSTAG to ensure consistency with EPA guidance, policy and procedures.

Comment 224: The off-site disposal of contaminated sediment and soil described on p. 10 of the Statement of Basis should be a major consideration with the potential for increased dispersion of contaminants, even with the maximizing of rail transport.

EPA Response 224: In its Comparative Analysis, EPA considered (under Short-Term Effectiveness) the potential for accidental release of PCB-contaminated material during transport. This included both solid material (for TD1 – offsite disposal) and solid material and leachate (for TD3 – onsite disposal).

Comment 233: The discussion of Interim Media Protection Goals and Performance Standards on page 18 is confusing. What is the relationship between these criteria and what is the purpose of IMPGs when Performance Standards exist?

EPA Response 233: Interim Media Protection Goals, or "IMPGs", are defined in the Permit as media-specific protection goals for the Rest of River area. Under the Permit, the IMPGs were used in the Corrective Measures Study as one of the Selection Decision Factors considered in the evaluation of remedial alternatives (see Section II.G.2. of the Permit). Performance Standards are defined in the Permit as cleanup standards, design standards and other measures and requirements necessary to protect human health and the environment. Performance Standards in the Final Permit Modification are binding requirements for the Rest of River remediation.

As discussed above, the actual methods and equipment to be used will be determined during remedial design, and these methods may vary from what was assumed in the Revised CMS. The methods selected at that time will reflect the best available technologies for the circumstances being addressed. As discussed in Section VIII of this Response to Comments, the States and communities will each have roles in providing EPA with input during the remedial design and implementation process.

Comment 34: Anchored silt screens should be placed around the dredge during work and at the outlets of Woods Pond and Rising Pond to minimize transport of sediment downstream.

EPA Response 34: In its Corrective Measures Study Proposal and Revised CMS, GE assumed that engineering controls (e.g., silt curtains) would be used to reduce sediment resuspension for mechanical and hydraulic dredging performed in the wet. The specific equipment and engineering controls that will be used during remediation will be determined during remedial design.

Comment 91.a: Although it may be possible to pump excavated material as a slurry to a downriver processing area, it will still be necessary to transport clean fill material over access roads.

EPA Response 91.a: In Section 4.2.4 of the Corrective Measures Study Proposal and the Revised CMS, sediment removed via hydraulic dredging was assumed by GE to be transported via a slurry pipeline, while sediment removed via mechanical dredging/excavation was assumed to be transported by barges and/or trucks depending on location. It was also assumed that dewatering would be required to varying degrees for all sediment removed.

As discussed above, the actual methods and equipment to be used will be determined during remedial design, and these methods may vary from what was assumed in the Revised CMS. The methods selected at that time will reflect the best available technologies for the circumstances being addressed.

Comment 195: New remediation methods with up-to-date equipment can provide more efficient remediation with a lesser impact and footprint than presented in the Draft Permit and Statement of Basis. The options for remediation are much broader than what is being considered.

EPA Response 195: EPA agrees that the best available equipment and technologies will need to be considered during remedial design of each phase of the project, and that adaptive management principles be employed to make improvements to the process where possible during the life of the project. However, EPA believes that regardless of the specific equipment selected, the general approaches to remediation will remain the same as those evaluated in the Revised CMS – mechanical excavation in the wet/dry and hydraulic excavation.

Comment 525: EPA should require that access to Rising Pond necessary for the remediation be from the west side of the Pond, not from Route 183 on the east side.

EPA Response 525: GE will propose the road access necessary to conduct the remediation in future design documents and it will be evaluated by EPA pursuant to the document review process set forth in the Decree. The public will have an opportunity for input on the remedial

ATTACHMENT A
SUMMARY OF THE CHANGES MADE FROM THE DRAFT TO THE FINAL PERMIT MODIFICATION (EXCLUDING CHANGES TO ATTACHMENT C – SUMMARY OF ARARS)

Attachment A
Changes from Draft Permit Modification to Final Permit Modification (excluding changes to Attachment C – Summary of ARARs)
Response to Comments Housatonic River "Rest of River"

Change(s)	**Reason for Change(s)**
Modified header to include the phrase "And Selection of CERCLA Remedial Action And Operation & Maintenance for Rest of River "	To provide consistency with language in the Decree.
Deleted last paragraph on cover sheet regarding the Effective Date.	The process outlined in the Decree (including the regulations in 40 C.F.R. § 270 and Part 124), will determine the Effective Date of the Final Permit Modification.
List of Tables: Merged former Table 3 – "Cleanup Standards for Unrestricted Use – Floodplain and Riverbank Soil" and Table 5 – "Cleanup Standards for PCBs for Floodplain Soil – Future Use" and combined into one table, Table 3, and Table 3 was renamed "Performance Standards for PCBs in Floodplain Soil – Future Use."	See Former Tables 3 and 5 on page A-15 of this attachment.
Revised definition of Backwaters to insert the phrase "a preliminary identification of which" prior to ". . . is generally depicted on Figures 3-17 of GE's October 2010 Revised Corrective Measures Study."	In response to public comments, the definition was revised to clarify that the Figure 3-17 in the definition is only a preliminary depiction of Backwaters, and that any area that meets the definition fits within this definition. See Section III.C.2 of the Response to Comments (RTC), Response 132, 302.
Added definition of Effective Date.	To provide more clarity on the Effective Date of the Final Permit and associated requirements.
Deleted from the definition of Floodplain "out to the 1 ppm isopleth…"	To clarify that GE is responsible for all PCBs released from its Facility into Rest of River.
Deleted definition of Groundwater	There are no references to groundwater in the Draft or Final Permit Modification.

Attachment A
Changes from Draft Permit Modification to Final Permit Modification (excluding changes to Attachment C – Summary of ARARs)
Response to Comments Housatonic River "Rest of River"

Change(s)	**Reason for Change(s)**
Added definition of Legally Permissible Future Project or Work.	These terms were added in response to GE comments objecting to requirement for monetary compensation to third parties for incremental costs associated with the presence of PCBs. The Final Permit Modification was revised to require GE to perform necessary response actions in lieu of mandatory payments. See Section III.G. of the RTC, including Responses 462.d and 687 *et al*.
Added definition of Legally Permissible Future Use.	These terms were added in response to GE comments objecting to requirement for monetary compensation to third parties for incremental costs associated with the presence of PCBs. The Final Permit Modification was revised to require GE to perform necessary response actions in lieu of mandatory payments. See Section III.G of the RTC, including Response 687 *et al*.
Revised definition of PCBs to include the word "total."	In response to public comments, to include the word "total" so that regardless of the analytical method used, the amount of PCBs should be the sum of the detected PCB aroclors, congeners, or homologues. See Section III.E of the RTC, Response 464.
Added a definition for Corrective Measures. Revised definition of Performance Standards as follows: ""Performance Standards" mean cleanup standards, design standards, and other measures and requirements necessary to protect human health and the environment. Such Performance Standards that must be achieved and maintained are identified in the Consent Decree, this Modification of the Reissued RCRA Permit, and/or will subsequently be identified in the Rest of River Statement of Work ("Rest of River SOW" or "SOW"), and/or amendments thereto ~~that must be met~~."	In response to public comments, to assist in clarifying the difference between Corrective Measures and Performance Standards, a definition of Corrective Measures was added and the definition for Performance Standards was revised. See Section III.A of the RTC, Comment 445.

Attachment A
Changes from Draft Permit Modification to Final Permit Modification (excluding changes to Attachment C – Summary of ARARs)
Response to Comments Housatonic River "Rest of River"

Change(s)	**Reason for Change(s)**
Added definition of "Rest of River" or "Rest of River area."	In response to public comments that requested clarification on the scope of the permit Modification. See Section VII of the RTC, Response 301.
Changed "Restoration" to Restoration of Areas Disturbed by Remediation" and revised definition to include "disturbed by remediation activities under this Permit" and to the extent feasible and consistent with the remediation requirements.	In response to GE's comments that the definition of Restoration was overly broad and could be in conflict with the Natural Resource Damage covenants in the Decree. See Section III.B.2 of the RTC, including Response 677 *et al*.
Added Background section (I.A) including 1. Overview of Permit and Consent Decree; 2. Final Permit Modification Pursuant to Process Set Forth in Consent Decree; 3. Performance of Severable Work during Remedy Challenges.	To add more specific detail on the process provided for in the Decree. Also, changed in part in response to public comments. See Section VI of the RTC, Response 135.
Deleted Section I.A. Duty to Comply	The Duty to Comply provisions are addressed in new Section I.A.
Deleted Section I.C Permit Actions	The Permit Actions provisions are addressed in new Section I.A.
Added reference to the Field Sampling Plan and the Quality Assurance Project Plan into the Section on Monitoring and Records.	To make clear those documents are part of the Project Operations Plan.
Added a reference to the Notice of Anticipated Noncompliance Section to require notice be given to the States as well as EPA.	In response to public comments, to make clear that GE is to submit these notices and reports to both States. See Section VI of the RTC, Response 443.

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Response to Comments Housatonic River "Rest of River"

Change(s)	**Reason for Change(s)**
Changed the language on Section II.A Introduction as follows: -added in reference to the Rest of River Remedial Action and Operation and Maintenance; -changed "attain" to "achieve and maintain"; -changed Permit reference from "modified" to "finalize, or finalized portions thereof"; -defined the term "approval" used in the Final Permit Modification.	Changes were to track more precisely the terms and process of the Decree and Permit. Also, changed in part in response to public comments. See Section III.E Response 150 and Section VI of the RTC, Response 135.
Section II.B. Description of Performance Standards was revised throughout to separate Performance Standards from Corrective Measures.	In response to a public comment with concern about confusion between Performance Standards and Corrective Measures, Section II.B provides additional detail clarifying what is a Performance Standard and what is a Corrective Measure under the Decree and the Final Permit Modification. For each of the components of the remedy in II.B, EPA has identified and distinguished between the Performance Standards and Corrective Measures. The added detail is to minimize confusion on the Performance Standards to be achieved and maintained, and on the Corrective Measures to be implemented to achieve and maintain those Performance Standards. See Section III.A, Response 445 and Section III.E, Response 150 of the RTC.
Changed description of actions required in the event of exceedances of the Downstream Transport Performance Standard, including modifying GE requirements to identify <u>potential</u> causes of the exceedance. Added detail to the Corrective Measures describing how to measure compliance with the Performance Standard.	One set of public comments expressed concern about the uncertainties in the requirements related to the Downstream Transport Performance Standards. Other sets of public comments expressed concern about the remedy controlling downstream transport of PCBs, and having enforceable Performance Standards. In response, the changes are to provide greater detail on when an exceedance occurs under the Final Permit Modification and actions required in the event of exceedances of the Downstream Transport Performance Standard. The Corrective Measures provide more detail on requirements for measuring and achieving and maintaining the Performance Standards. See Section III.B.1 of the RTC, including Responses 318, 403, 428, 482, 665, and 666.

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Response to Comments Housatonic River "Rest of River"

Change(s)	**Reason for Change(s)**
Changed description of actions required in the event of exceedances of the Short-Term Biota Performance Standard, including modifying GE requirements to identify potential causes of the exceedance.	In response to public comment, to provide clarity on EPA's measurement of exceedances and description of actions required in the event of exceedances of the Performance Standards. See Section III.B.2 of the RTC, Response 674, 675.
Changed the title Long-Term Biota Benchmarks to Long-Term Biota Monitoring Performance Standards, and changing the description of the requirements related to that Performance Standard.	In response to public comments, to make clear that the requirement is a Performance Standard and that the primary focus of the Performance Standard is monitoring. See Section III.B.2 of the RTC, including Responses 172, 193; 228, 262, 407; 440, 449, and 674, 675.
Added Corrective Measures for the Short-Term Biota Performance Standards and the Long-Term Biota Monitoring Performance Standards (collectively, the "Biota Performance Standards").	In response to public comments on the requirements related to the Biota Performance Standards, to explain the Corrective Measures associated with the Biota Performance Standards. In addition, as noted above, the permit was revised to segregate Performance Standards from Correction Measures. See Section III.A of the RTC, Response 445.
Changed title from "Restoration of Impacted Areas" to "Restoration of Areas Disturbed by Remediation Activities." Clarified the difference between Performance Standards and Corrective measures and clarified that the areas are to be returned to pre-remediation conditions "to the extent feasible and consistent with the remediation requirements."	In response to public comments, to provide more clarity on the scope of restoration responsibilities and more detail on the corrective measures to be undertaken. See Section III.B.2 of the RTC, including Response 677 *et al*. In addition, as noted above, the permit was revised to segregate Performance Standards from Correction Measures. See Section III.A of the RTC, Response 445.

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Response to Comments Housatonic River "Rest of River"

Change(s)	Reason for Change(s)
For Reach 5A and Reach 5C, clarified description of extent of reach addressed by Performance Standard by including the phrase "throughout Reach 5A [5C] on the Performance Standard.	In response to public comments, to eliminate any confusion on the extent of remediation for the sediment in these Reaches, the Performance Standard in the Final Permit Modification was revised. See Section III.C.1 of the RTC, Responses 55 *et al*. and 125a.
For Reach 5A, 5C, Backwaters, Woods Pond, Reach 7 Impoundments, and Rising Pond, added a specific Performance Standard that implementation of remediation shall not result in loss of Flood Storage Capacity or increase in water surface elevation.	EPA included these revisions to clarify that implementation of remediation shall not result in loss of Flood Storage Capacity or increase in water surface elevation in any of the Reaches.
For Reach 5B, deleted the need for a Pilot Study to determine the most effective approach for the placement of a sediment amendment.	Given the advances in the use of sediment amendments, EPA did not want to presume that a pilot study was a necessity.
For the Reach 7 Impoundments, deleted requirements for GE to make good faith efforts to reach agreement with entities planning to use, maintain or remove any Reach 7 dam or impoundment regarding PCB-contaminated sediments. Added requirements II.B.2.f.(1)(a)-(e) to give GE options to implement either Removal and Engineered Capping (II.B.2.f.(1)(a)-(c)), excavation to 1 ppm (II.B.2.f.(1)(d)) or proposal for GE to coordinate with any entity planning to remove a Reach 7 dam.	In response to public comment questioning EPA's authority to require GE to enter into negotiations with third parties and to reimburse third parties for costs associated with sediment handling, EPA deleted such requirements. In lieu of those requirements, EPA included in the Final Permit Modification requirements for GE to perform sediment removal and Engineered Capping or sediment removal to 1 mg/kg, unless, in lieu of implementing these options, GE proposed to EPA for review and approval that GE coordinate with any entity the response actions necessary to address the PCB contamination behind the impoundments. See Section III.C.4 of the RTC, Response 624. In addition, the Permit clarified that GE is also required to conduct response actions necessary for third parties to conduct legally permissible work at impoundments, such as dam removal. See Section III.G of the RTC, numerous responses.

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Response to Comments Housatonic River "Rest of River"

Change(s)	**Reason for Change(s)**
For Woods Pond and Rising Pond, added requirement to perform updated bathymetric surveys before sediment removal and before and after sediment capping, and for Rising Pond, to potentially remove accumulated sediment after Engineered Capping has been implemented.	In response to public comment requesting the monitoring and potential removal, if necessary, of accumulated sediments above the cap, EPA has added these requirements. See Section III.C.5 of the RTC, Response 458, Section III.E of the RTC, Response 396 and Section XI.C of the RTC, Response 31.
Changed title from "Flowing Subreaches in Reach 7 and Reaches 9-16 to "Flowing Subreaches in Reach 7 and <u>Throughout</u> Reaches 9-16, <u>including Impoundments</u>" to clarify that the subject area included Impoundments in Reaches 9-16.	In response to public comment expressing concern that the prior title ("Flowing Subreaches in Reach 7 and Reaches 9 Through 16") was not clear that it applied to all areas in Reaches 9-16, not just flowing Subreaches. See Section III.C.6 of the RTC, Response 461.
For Engineered Capping, A. Changed the design flow event for the erosion protection layer from a 100-year return interval event, to an "applicable return event" (for example, 100-year or 500-year flow event), which shall be calculated using up-to-date flow data; also B. Modified to address climate change.	A. In response to public comment expressing concern that the cap be able to withstand physical forces under extreme conditions, and considering the newly established Executive Order 13690, which is a TBC and which seeks greater consideration of potential climate impacts. See Section III.C.7 of the RTC, Response 217, 329 Section IX.D of the RTC, Responses 120 and 145, 171. B. In response to public comments, to ensure addressing climate change. See Section IX.D, Response 120.

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Response to Comments Housatonic River "Rest of River"

Change(s)	Reason for Change(s)
In River Sediment and Banks section, added new subsections (subsections j, k and l) that includes the following requirements: - Inspecting, monitoring and maintaining dams and impoundments, and operating Woods Pond Dam and Rising Pond Dam; -Catastrophic failure of dams; -Conducting response actions protective of Legally Permissible Future Project or Work; -Included schedule and timing requirements for implementing such work -Deleted the 1 mg/kg trigger requirement in Reaches 5-9. In the event GE used best efforts and could not secure an agreement with a dam owner for maintenance, allow for GE to submit to EPA for review and approval a plan that includes, without limitation, the reasons why GE could not reach agreement with dam owners and, any proposed actions GE will take to remediate the PCB contamination behind the dams, any further actions to be taken to obtain agreement from the dam owner, and whether the Engineered Caps will maintain effectiveness without Permittee having fulfilled its obligations regarding dam inspection, monitoring and maintenance.	One set of public comments expressed concern about EPA's ability to require payment of money by GE to third parties in the Final Permit Modification. Another set of public comments expressed concern that GE be held accountable for third party costs attributable to PCBs on legally permissible activities within the river. In response to these comments, instead of monetary payment, the added sections to the Final Permit Modification are to ensure performance of additional response actions, including, ensuring inspections, monitoring and maintenance of dams, where appropriate, related to dams and impoundments in Reaches 5-9 (subsection j). In addition, provisions were included for Legally Permissible Projects or Work in reaches 5 through 9 (subsection k) and in Connecticut Reaches 10-16 (subsection l) In response to public comments, to ensure that without monetary payment by GE, that the performance of additional response actions occurs to ensure protectiveness. In addition, the requirement for GE to take action regarding catastrophic failure of a dam is a similar clarification in response to GE expressed concern about EPA's ability to require payment of money by GE. In response to concerns about potentially mandating discussing with dam owners and requiring payments to third parties, as discussed in GE's Statement of Position on the Intended Final Decision, mandating an agreement with dam owners for dam maintenance, the Final Permit Modification includes provisions for GE to submit an alternate plan to EPA for review and approval. See Section III.G. of the RTC, including but not limited to Response 462c for the 1 mg/kg trigger requirement; Responses 143, 382, 225, 352, 442, 465,687 *et al*., and 693; and Section III.C.4 of the RTC, Comment 636.

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Change(s)	**Reason for Change(s)**
For Floodplain Soil, A. Clarified that upon removal, the excavated areas will be backfilled to original grade. B. Clarified that GE shall avoid excavation in Core Area 1 habitat (other than in Frequently Used Subareas) and shall minimize impacts in Core Areas 2 and 3.	A. To ensure Performance Standards are met. B. In response to public comments requesting more details on requirements in Core Areas. See Section II.B.2, Response 90.
A. For Vernal Pools, modified requirements to eliminate the process where EPA would choose 8-10 Vernal Pools for remediation by traditional means, an additional set of pools for remediation via Activated Carbon, and a third set of pools for testing by a third remediation method to be proposed by GE. In its place is a requirement that GE place an amendment such as activated carbon in Vernal Pools, and if that method is not successful in achieving the Performance Standard, then GE will remediate the Vernal Pools through excavation and backfill, except in Core Area 1. B. Clarified that the 3.3 mg/kg Performance Standard is a spatially-weighted average concentration (SWAC).	A. Changes are in response to public comment that expressed concern about the open-ended, unknown nature of the third remediation method, and public comments that expressed concern about the ability to restore Vernal Pools after excavation. While EPA does not necessarily agree with the concerns in the comments, EPA revised the approach to ensure both remediation methods are known, have been evaluated, and will be protective. See Section III.B.2 of the RTC, Response 601 *et al*., and Section III.D.2 of the RTC, including Responses 540 *et al*, 658, 659, and 660. B. In response to public comments to make this clarification. See Section III.D.2 of the RTC, Response 656.

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Change(s)	**Reason for Change(s)**
For inspection, monitoring and maintenance, added a provision to monitor sediment accumulation above the Caps at Woods Pond and Rising Pond to determine if subsequent removal of accumulated sediment is required.	In response to public comments about the need to ensure adequate monitoring of sediment accumulation. See Section III.C.3 of the RTC, Response 457.
For inspection, monitoring and maintenance, deleting the statement that monitoring shall continue until long-term biota benchmarks are achieved.	In response to public comments to clarify that the need to achieve and *maintain* Performance Standards is not tied to achievement of Long-Term Biota Monitoring Performance Standard. See Section III.E of the RTC, Response 150, Section III.G, Response 225.
For off-site Disposal of Contaminated Sediment and Soil, included language that GE may propose for EPA approval the use of innovative treatment technologies as part of adaptive management.	In response to public comments requesting EPA continue to evaluate innovative technologies for the destruction of PCBs. See Section III.F.3 of the RTC, Response 60 *et al*., subsection iii.
Merged former Section II.B.5 titled "Sequencing Implementation of Corrective II.I. Schedule of the Final permit Modification. Relocated Section II.B.10.c, Coordination of Corrective Measures to Section II.G.	To simplify the Final Permit Modification and to eliminate any potential conflicting language.

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Change(s)	**Reason for Change(s)**
Significantly revised and modified Institutional Controls and Related Requirements as follows:	
1. Created new sections for dams, sediment in impoundments (Subsections II.B.2.j, k and l).	1. See page A-8, River Sediment and Banks, Subsections j, k and l.
2. Biota Consumption Advisories: Changed to clarify that GE is not actually maintaining the biota consumption advisories but is cooperating with the governments on the advisories, and to clarify the responsibilities with regard to the advisories.	2. In response to public comments on the appropriate roles and implementation of biota consumption advisories. See Section III.G of the RTC, Response 462a.
3. Revised Floodplain requirements into two separate categories: Floodplain Soil in Exposure Areas in Reaches 5-8 and Floodplain Soils outside Exposure Areas in Reaches 5-16. Significant revisions include deleting requirements for monetary payments to third parties and replacing with the requirement for GE to implement response actions necessary to be protective of Legally Permissible Future Projects, Work or Use and requiring formal Conditional Solutions Floodplain Exposure Areas.	3. In response to public comments on eliminating mandatory monetary payments; and opposing comments requesting EPA hold GE responsible for third party costs associated with PCBs. Clarified requirements where GE has to offer compensation for EREs and where they need to implement formal Conditional Solutions and where similar, but not formal Conditional Solution requirements apply. See Section III.G of the RTC, numerous Responses, including Responses 465, 695, 687 *et al.*, 698, 745; 700; and 704 and Section IX.D of the RTC, Response 113 *et al*.

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Change(s)	**Reason for Change(s)**
Revised Water Withdrawals and Uses Section to include the following Performance Standard: "The Permittee shall minimize/mitigate impacts during implementation of the Corrective Measures to withdrawals and/or uses of water from rest of river by any entity."	In response to public comment that GE should be responsible for impacts to third party users of water legally withdrawn from the Housatonic River for municipal or industrial uses. See Section III.G of the RTC, Responses 159 and 305.
Added a new Section II.C titled: "Operation and Maintenance" and provided detailed requirements of the O&M Plan to be submitted. This clarified that there are both inspection, monitoring and maintenance requirements to be conducted during the Remedial Action and O&M requirements to be conducted upon completion of the Remedial Action.	In response to public comments on GE being liable in perpetuity, to ensure that GE maintains compliance with Performance Standards, and to clarify that per the Decree, O&M is a defined term in the Decree and is to be included in the Final Permit Modification along with the Remedial Action requirements. See Section III.E of the RTC, including Responses 133, 152 and Section IX.D of the RTC, Response 172.
Revised ARARs Section to include statement that EPA may waive ARARs during implementation of the remedy.	To clarify that EPA has the authority to waive ARARs during implementation of the remedy.
Revised Adaptive Management Section to 1. Add detail to explanation of the discussion of adaptive management in GE deliverables; and 2. Add a statement that any requirements identified by EPA cannot be inconsistent with the Decree.	1. In response to public comments that implementation of adaptive management is appropriate to take advantage of lessons learned and changes in technology, and to require GE to use the principles of adaptive management in implementing all components of the Remedial Action. See Section V of the RTC, Response, 22 *et al.* 2. In response to public comments that Adaptive Management cannot be used in a manner inconsistent with the Decree. See Section V of the RTC, Response 543, 709.

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Change(s)	Reason for Change(s)
Revised the requirements for the Rest of River Statement of Work Section (Section II.H) as follows:	
1. Changed the introduction of this section.	1. To eliminate unnecessary language and clarify GE's submittal requirements.
2. Changed the Expedited Deliverables section (II.H.1). Changed the name of the Temporary Sediment Processing/Transfer Location(s) to the Centralized Contaminated Materials Processing/Transfer Location(s) and added "including potential dewatering facility and/or rail transfer facility" to a description of the facility.	2. In response to public comments, clarified scope of Baseline Monitoring Plan. See Section III.E of the RTC, Response 452. In response to comments on how the rail transfer facility will be sited, changed the name of facility and the description to include a specific reference to a rail transfer station and added detail on the submittal of a Work Plan for siting of Centralized Contaminated Materials Processing/Transfer Location(s). See Section III.F.2 of the RTC, Response 547 and Section VIII.B of the RTC, Response 114 *et al*.
3. Changed overall Strategy section (II.H.2): A. Added explanation of the expectations for submittal of that part of the Rest of River SOW. B. Added reference to discussion of project management structure. C. Deleted reference to a topic which is now being addressed as significant element within the Quality of Life Compliance Plan (minimizing impact to neighborhoods and general public and road use).	3. A, B, and C. To have a clearer, more complete Overall Strategy for the SOW and in response to public comments on coordination with state and local entities. See Section VIII.B of the RTC, Response 114 *et al*.
D. Inserted "banks" into subsection on coordination of response action.	3. D. In response to public comments, see Section VI of the RTC, Response 163.

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Change(s)	**Reason for Change(s)**
4. Changed other components of the ROR SOW, including: A. Provided more detail in the Quality of Life Compliance Plan.	4. A. In response to numerous public comments expressing concerns about the remedy implementation's impacts on quality of life, EPA included more specific information required as part of the Quality of Life Compliance Plan. See Section IX.A of the RTC, Response 4 *et al*.
B. Modified the Sustainability Plan to a Sustainability and Climate Adaptation Plan.	B. In response to public comments expressing concern about how the remedy would be designed and implemented to take into account climate changes, EPA made clear the Sustainability Plan includes Climate Adaptation. See Section XI.D of the RTC, Response 145, 171.
C. Moved the O&M plan out of the Rest of River SOW submittals to Section II.C.	C. In response to public comments and to recognize that the timing of the O&M Plan per the Decree will be considerably later than the timing of the Rest of River SOW (O&M Plan as a component of the Final Remedial Action Completion Report). See Section III.E of the RTC, including Response 133, 152.
D. Provided detail on the Inspection, Monitoring and Maintenance Plan (II.H.18.b).	D. In response to public comments, including requiring a plan to remove accumulated sediment from Woods Pond and Rising Pond. See Section III.C.3. of the RTC, Comment 457, Section III.C.5 of the RTC, Response 458, and Section III.E of the RTC, Responses 150 and 452.
Revised Section II.I Schedule to require that GE submit a SOW or relevant portions thereof no later than 120 days from the Effective Date of the permit, or relevant portions thereof.	In response to public comments on the SOW submittal date. See Section VI of the RTC, Response 174.

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Change(s)	**Reason for Change(s)**
Revised Section II.K., Sampling Requirements, by adding that data and supporting information are to be provided in electronic format with locational information for all samples collected.	In response to public comments to allow for easier use and analysis of data. See Section III.6.C of the RTC, Response 504, 505.
Tables 1 through 4 (and elsewhere in permit): Modified title to change "Cleanup Standards" to Performance Standards."	To be consistent with the term Performance Standards.
Former Tables 3 and 5: Replaced with a new Table 3 and modified performance Standard for Unrestricted /Residential to 2 mg/kg at the 0-1 and the 1-X depth increments as compared to 1 mg/kg for Connecticut.	In response to public comments on the inconsistency for residential cleanup standards. See Section IV of the RTC, Response 714 and Section III.G, Responses 694, and 698, 745.
Modified Table 4 to provide the specific Performance Standards for each Agricultural Scenario (e.g., Commercial Family Farm, Dairy Consumption) and limit the Performance Standard to no lower than 2 mg/kg PCB for agricultural scenarios.	In response to public comments, including on the inconsistency for residential cleanup standards. See Section III.G of the RTC, including Responses 694; 698, 745; and 706.
Attachment C. Summary of ARARs table.	See Attachment B to this RTC.

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Change(s)	Reason for Change(s)
Attachment D. -Inserted "and as supported by the Administrative Record for this matter" into the second paragraph.	To clarify that the risk-based determination was based on information in the Administrative Record.
-Revised the language for temporary stockpiles as follows: Changed "Runoff shall be collected and disposed of, as appropriate, in accordance with § 761.60, or 761.79(b)(1), or as otherwise approved by EPA." to "Runoff shall be collected and disposed of, as appropriate, in accordance with § 761.60, or 761.79(b)(1), or as otherwise approved by EPA pursuant to the process outlined in this Permit."	In response to public comment, Attachment D was modified to clarify how the design of temporary stockpiles will be reviewed and approved. See Section VI of this RTC, Response 290.

ATTACHMENT C
PUBLIC COMMENT INVENTORY TO 2014 DRAFT PERMIT MODIFICATION AND STATEMENT OF BASIS

Attachment C
Public Comment Inventory to EPA's June 2014 Draft Permit Modification and Statement of Basis
Response to Comments Housatonic River "Rest of River"

Commenter	Affilation	Date of Comments	Comment Number
Alsop	Private Citizen	27-Oct-14	19, 63, 481, 482, 483
Andersen	Private Citizen	26-Oct-14	19, 54, 56, 124, 127, 354, 355, 356
Andersen (Transcript of Public Hearing)	Private Citizen	23-Sep-14	19, 54
Baillargeon	Private Citizen	14-Oct-14	1, 2a, 2b, 3
Barzottini (Transcript of Public Hearing)	Private Citizen	23-Sep-14	25, 75
Berkel (Transcript of Public Hearing)	Private Citizen	23-Sep-14	4
Brielman	Private Citizen	25-Oct-14	1, 528
Brotman	Private Citizen	23-Oct-14	124, 195, 310
Bubriski	Private Citizen	6-Jul-14	4, 5, 5a, 6,
Bubriski	Private Citizen	6-Jul-14	4, 5, 5a ,6, 7
Bubriski	Private Citizen	27-Oct-14	1, 2a, 2b, 349, 350
Burke and Krol	Private Citizen	26-Oct-14	1, 2a, 2b, 3
Cook	Private Citizen	8-Oct-14	2a, 2b, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 91a, 92, 93, 94, 95, 96, 97
Cook (Transcript of Public Hearing)	Private Citizen	23-Sep-14	2a, 2b, 57, 58, 59, 60, 61
Cracolici	Private Citizen	21-Oct-14	75, 180
Craighead	Private Citizen	6-Oct-14	1, 2a, 2b, 3
Cuddihy	Private Citizen	27-Oct-14	1, 2a, 2b, 79, 351
DeBartolo, G.	Private Citizen	27-Oct-14	1, 2a, 2b, 9, 147, 358, 359, 360, 361, 362, 363a, 363b, 364, 365, 366, 367, 368
DeBartolo, M.	Private Citizen	27-Oct-14	1, 9, 79, 99, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521
DeFarlo	Private Citizen	27-Oct-14	1, 2a, 2b, 3
DeLeo	Private Citizen	9-Oct-14	1, 2a, 2b, 3
Demary	Private Citizen	12-Oct-14	1, 2a, 2b, 3
Douillet	Private Citizen	20-Oct-14	2a, 2b, 14, 79
Durant	Private Citizen	26-Oct-14	1, 2a, 2b, 3
Durfee	Private Citizen	12-Oct-14	100
Eisley	Private Citizen	22-Oct-14	2a, 2b, 529
Esoldi	Private Citizen	24-Oct-14	1, 179
Federer (Transcript of Public Hearing)	Private Citizen	23-Sep-14	62
Forsley	Private Citizen	10-Oct-14	1, 2a, 2b, 3
Fox	Private Citizen	8-Oct-14	1, 2a, 2b, 3
Galt, A.	Private Citizen	17-Oct-14	58, 81, 104, 108, 109a, 109b, 110
Galt, J.	Private Citizen	14-Oct-14	1, 79, 104
Gibson	Private Citizen	23-Oct-14	19, 25, 56, 109a, 109b, 117, 142 , 164, 279, 281, 307, 308, 309
Gillman	Private Citizen	24-Oct-14	1, 2a, 2b, 3, 13, 110, 179
Goclowski, B.	Private Citizen	30-Jul-14	8, 9
Goclowski, B.	Private Citizen	27-Oct-14	522
Goclowski, L. and B.	Private Citizen	8-Oct-14	1, 2a, 2b, 3, 86, 98, 99

Attachment C
Public Comment Inventory to EPA's June 2014 Draft Permit Modification and Statement of Basis
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Commenter	Affilation	Date of Comments	Comment Number
Goodchild	Private Citizen	23-Oct-14	2a, 2b
Halstead	Private Citizen	24-Oct-14	2a, 2b, 117, 217, 317, 318, 319, 320, 321, 322, 323
Hamel	Private Citizen	13-Oct-14	1, 2a, 2b, 3, 102, 103
Hanlon	Private Citizen	16-Oct-14	2a, 2b
Haraden	Private Citizen	27-Oct-14	1, 2a, 2b, 3, 13, 179, 369
Harry	Private Citizen	22-Oct-14	1, 2a, 2b, 3
Hughes	Private Citizen	2-Oct-14	1, 2a, 2b, 3
Jerome	Private Citizen	17-Oct-14	1, 2a, 2b, 3, 13, 39, 110
Karlquist	Private Citizen	23-Oct-14	2a, 2b, 12, 13, 58, 179, 190
Kellogg	Private Citizen	10-Oct-14	1, 2a, 2b, 3
Kelly	Private Citizen	27-Oct-14	2a, 2b, 19, 25, 56, 357
Kirchner	Private Citizen	17-Oct-14	1, 2a, 2b, 3
Kittler	Private Citizen	23-Oct-14	1, 2a, 2b, 3, 87
Kronberg	Private Citizen	23-Sep-14	16, 17, 18, 19, 20, 357
Kronberg (Transcript of Public Hearing)	Private Citizen	23-Sep-14	17, 18, 19, 71
Lampiasi	Private Citizen	16-Oct-14	1, 2a, 2b, 3
Laughnane	Private Citizen	24-Oct-14	179
Lee, E.	Private Citizen	10-Oct-14	1, 39, 101
Lee, R.	Private Citizen	10-Oct-14	1, 39, 101
Lobovits	Private Citizen	24-Oct-14	1, 334, 335
Loeb	Private Citizen	24-Oct-14	324, 429, 430, 431
Loehr, T. and L.	Private Citizen	27-Oct-14	1, 2a, 2b, 3
Lotto and Walsh	Private Citizen	16-Oct-14	105, 106
Lovejoy	Private Citizen	14-Oct-14	1, 2a, 2b, 3
MacGillis	Private Citizen	14-Oct-14	2a, 2b, 14, 101
MacLeod	Private Citizen	27-Oct-14	527
May, C.	Private Citizen	12-Oct-14	1, 2a, 2b, 3
May, N.	Private Citizen	12-Oct-14	1, 2a, 2b, 3
McClenachan	Private Citizen	21-Oct-14	177, 178
McLeod	Private Citizen	7-Oct-14	58, 78
Melle	Private Citizen	24-Aug-14	25, 26, 124, 133, 152, 187
Melle	Private Citizen	26-Aug-14	25
Minella	Private Citizen	10-Oct-14	1, 2a, 2b, 3
Moncy	Private Citizen	21-Oct-14	1, 2a, 2b, 3
Morse	Private Citizen	27-Oct-14	1, 2a, 2b, 3, 110
Naseman	Private Citizen	27-Oct-14	2a, 2b, 19, 25, 206, 241, 249, 260, 375, 402, 405, 405a, 406, 407, 408, 409, 410, 411, 412
Nelson	Private Citizen	1-Oct-14	25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38
Nolan	Private Citizen	27-Oct-14	1, 2a, 2b, 3

Attachment C
Public Comment Inventory to EPA's June 2014 Draft Permit Modification and Statement of Basis
Response to Comments Housatonic River "Rest of River"

Commenter	Affilation	Date of Comments	Comment Number
Pastie	Private Citizen	27-Oct-14	1, 2a, 2b, 3
Pfeifer	Private Citizen	25-Oct-14	336
Pompi	Private Citizen	24-Oct-14	1, 2a, 2b
Poutasse	Private Citizen	9-Oct-14	1, 2a, 2b, 3
Rabinowitz and Borak	Private Citizen	15-Oct-14	1, 2a, 2b, 3
Ruggeri	Private Citizen	25-Oct-14	1, 3
Sigall	Private Citizen	8-Oct-14	1, 2a, 2b, 3
Smith	Private Citizen	7-Oct-14	2a, 2b, 77
Stevens	Private Citizen	16-Sep-14	11, 12, 13, 14
Treible	Private Citizen	9-Oct-14	1, 2a, 2b
Tuggey	Private Citizen	16-Oct-14	1, 2a, 2b, 3, 107
Tulgan	Private Citizen	15-Oct-14	1, 2a, 2b, 3,
Utz, D.	Private Citizen	14-Oct-14	1, 2a, 2b, 3, 39
Utz, D. and L.	Private Citizen	2-Oct-14	1, 2a, 2b, 3, 39
Valli	Private Citizen	21-Oct-14	2a, 2b, 179
Walchenbach	Private Citizen	21-Oct-14	1, 2a, 2b, 3, 181
Wallingford	Private Citizen	26-Oct-14	1, 14, 45, 83
Wentworth	Private Citizen	27-Oct-14	2a, 2b, 506
Wesley	Private Citizen	13-Oct-14	1, 2a, 2b, 3
Whalen	Private Citizen	26-Oct-14	1, 2a, 2b, 3, 13, 95, 341
Wheeler	Private Citizen	26-Oct-14	13, 25, 337, 338, 338a, 339, 340
Williams, H. and C.	Private Citizen	7-Oct-14	1, 2a, 2b, 3
Williams, R. and E.	Private Citizen	22-Oct-14	1, 2a, 2b, 3, 58, 179, 188, 189, 190
Wilson	Private Citizen	10-Oct-14	1, 2a, 2b, 3
Wilson. T. and M.	Private Citizen	27-Oct-14	1, 2a, 2b, 3, 13
Wood	Private Citizen	26-Oct-14	19, 24, 54, 56, 61, 119, 124, 127, 152, 342, 343, 344, 345, 353
Zatorski	Private Citizen	27-Oct-14	1, 2a, 2b, 3
First Light Power Resources Services	Industry	24-Oct-14	352
Mashantucket Pequot Tribal Nation	Tribe	20-Jun-14	15
Berkshire Bike Path Council	Non-Governmental Organization	18-Aug-14	10
Berkshire Environmental Action Team	Non-Governmental Organization	27-Oct-14	25
Cianfarini, B./Citizens for PCB Removal (Transcript of Public Hearing)	Non-Governmental Organization	23-Sep-14	19, 25, 54, 56, 63
Cianfarini, C./Citizens for PCB Removal (Transcript of Public Hearing)	Non-Governmental Organization	23-Sep-14	19, 69, 70
Citizens for PCB Removal	Non-Governmental Organization	27-Oct-14	19, 25, 54, 58, 70, 142, 209, 229, 293, 354, 371 to 390
Cushing/Mass Audubon (Transcript of Public Hearing)	Non-Governmental Organization	23-Sep-14	2a, 2b, 40, 45, 46, 51, 52, 53
deFur/Housatonic River Initiative (Transcript of Public Hearing)	Non-Governmental Organization	23-Sep-14	19, 31, 37, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 72, 73, 74

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Commenter	Affilation	Date of Comments	Comment Number
Environmental Stewardship Concepts, LLC on behalf of Housatonic River Initiative	Non-Governmental Organization	23-Oct-14	17, 19, 25, 63, 70, 90a, 117, 178, 260a, 191 to 274
Friedman/Housatonic River Initiative (Transcript of Public Hearing)	Non-Governmental Organization	23-Sep-14	19
Gray/Housatonic River Initiative (Transcript of Public Hearing)	Non-Governmental Organization	23-Sep-14	19, 63, 64, 65, 66, 67, 68
Green Berkshires, Inc	Non-Governmental Organization	27-Oct-14	2a, 2b, 113, 133, 154, 309, 320, 507, 508, 509, 510
Housatonic Environmental Action League	Non-Governmental Organization	25-Oct-14	502, 503, 504, 505
Housatonic Valley Association	Non-Governmental Organization	24-Oct-14	19, 56, 325 to 333
Mass Audubon	Non-Governmental Organization	27-Oct-14	2a, 2b, 19, 25, 26, 56, 113, 124, 288, 304, 329, 382, 393, 394, 395, 396, 397, 398, 399, 400, 401, 403, 404
Mass Audubon (written comments from Public Hearing)	Non-Governmental Organization	23-Sep-14	2a, 2b 20, 22, 23, 24
Miller/Toxics Action Center (Transcript of Public Hearing)	Non-Governmental Organization	23-Sep-14	19
Regan/Housatonic Valley Association (Transcript of Public Hearing)	Non-Governmental Organization	23-Sep-14	19, 25, 40, 54, 55, 56
Berkshire Regional Planning Commission	Municipal Government	9-Oct-14	19, 20, 25 , 56, 111 to 124, 125a, 125b, 125c, 126 to 161, 162, 163 to 169, 170a, 170b, 171, 172, 173, 174, 175, 176, 176a, 287
City of Pittsfield, Community Development Board	Municipal Government	25-Sep-14	2a, 2b, 114, 156, 162
City of Pittsfield, Office of the Mayor	Municipal Government	27-Oct-14	2a, 2b, 120, 121, 124, 127, 152, 153, 161, 279, 280, 285, 288, 291, 293, 301, 370
Housatonic Rest of River Municipal Committee	Municipal Government	8-Oct-14	19, 26, 56, 113, 120, 123, 124, 127, 129, 132, 143, 151, 152, 154, 158, 165, 169, 173, 176, 176a, 274a, 275, 276, 277, 278, 279, 280, 281, 282, 283, 283a, 285a, 294a, 294b, 284 to 306
Pittsfield Board of Health	Municipal Government	24-Oct-14	391, 392a, 392b
Select Board, Town of Great Barrington	Municipal Government	27-Oct-14	17, 19, 56, 112, 120, 121, 143, 149, 153, 162, 165, 169, 173, 184, 185, 276, 294, 294a, 299, 301, 304, 382, 455, 523 to 526, 528
Town of Lee, Board of Selectmen	Municipal Government	21-Oct-14	56, 143, 158, 162, 165, 276, 278, 281, 285, 288, 302, 301, 305, 307
Town of Sheffield, Board of Selectmen	Municipal Government	20-Oct-14	149, 182, 183, 184, 185, 294, 294a, 294b
Town of Stockbridge Board of Selectmen	Municipal Government	15-Oct-14	186, 187
Ward 4 Councilor for City of Pittsfield	Municipal Government	26-Oct-14	2a, 2b, 346, 347, 348
Connecticut Department of Energy and Environmental Protection	State Government	27-Oct-14	428, 439 to 480, 487a
Larson/Massachusetts Fisheries and Wildlfie Board (Transcript of Public Hearing)	State Government	23-Sep-14	50

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Commenter	Affilation	Date of Comments	Comment Number
MA Executive Office of Energy and Environmental Affairs	State Government	27-Oct-14	56, 279, 285, 291, 342, 484 to 501
Mass Fisheries and Wildlife Board	State Government	23-Sep-14	21
Massachusetts Bureau of Environmental Health	State Government	23-Oct-14	311, 312, 313, 314, 315, 316
USDOI, Fish and Wildlife Service	U.S. Government	24-Oct-14	19, 25, 46, 90a, 127, 173, 185, 206, 223, 394, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427
General Electric Company	Permittee	27-Oct-14	530 to 761, and Attachments A through J

ATTACHMENT D
CROSS-REFERENCE RESPONSE MATRIX FOR PUBLIC COMMENTS ON THE 2014 DRAFT PERMIT MODIFICATION AND STATEMENT OF BASIS

Attachment D
Cross-Reference Response Matrix for Public Comments on the 2014 Draft Permit Modification and Statement of Basis
Response to Comments Housatonic River "Rest of River"

Comment Number	Commenter	Response to Comment Section	
1	Baillargeon, Brielman, Bubriski, Burke and Krol, Craighead, Cuddihy, DeBartolo, G., DeBartolo, M., DeFarlo, DeLeo, Demary, Durant, Esoldi, Forsley, Fox, Galt, J., Gillman, Goclowski, L. and B., Hamel, Haraden, Harry, Hughes, Jerome, Kellogg, Kirchner, Kittler, Lampiasi, Lee, E., Lee, R., Lobovits, Loehr, Lovejoy, May, C., May, N., Minella, Moncy, Morse, Nolan, Pastie, Pompi, Poutasse, Rabinowitz and Borak, Ruggeri, Sigall, Treible, Tuggey, Tulgan, Utz, D. and L., Utz, D., Walchenbach, Wallingford, R. and S., Wesley, Whalen, Williams, H. and C., Williams, R. and E., Wilson, G., Wilson, T. and M., Zatorski	II.E	The Proposed Remedy is too Extensive and the River/Floodplain will be Destroyed
2.a	Baillargeon, Bubriski, Burke and Krol, City of Pittsfield, Community Development Board, City of Pittsfield, Office of the Mayor, Cook, Cook (Transcript of Public Hearing), Craighead, Cuddihy, Cushing/Mass Audubon (Transcript of Public Hearing), DeBartolo, G., DeFarlo, DeLeo, Demary, Douillet, Durant, Eisley, Forsley, Fox, Gillman, Goclowski, L. and B., Goodchild, Green Berkshires, Inc., Halstead, Hamel, Hanlon, Haraden, Harry, Hughes, Jerome, Karlquist, Kellogg, Kelly, Kirchner, Kittler, Lampiasi, Loehr, Lovejoy, MacGillis, Mass Audubon, May, C., May, N., Minella, Moncy, Morse, Naseman, Nolan, Pastie, Pompi, Poutasse, Rabinowitz and Borak, Sigall, Smith, Treible, Tuggey, Tulgan, Utz, D. and L., Utz, D., Valli, Walchenbach, Ward 4 Councilor for City of Pittsfield, Wentworth, Wesley, Whalen, Williams, H. and C., Williams, R. and E., Wilson, G., Wilson, T. and M., Zatorski	VIII.A	Lack of Detail in Permit
2.b	Baillargeon, Bubriski, Burke and Krol, City of Pittsfield, Community Development Board, City of Pittsfield, Office of the Mayor, Cook, Cook (Transcript of Public Hearing), Craighead, Cuddihy, Cushing/Mass Audubon (Transcript of Public Hearing), DeBartolo G., DeFarlo, DeLeo, Demary, Douillet, Durant, Eisley, Forsley, Fox, Gillman, Goclowski, Goodchild, Green Berkshires, Inc., Halstead, Hamel, Hanlon, Haraden, Harry, Hughes, Jerome, Karlquist, Kellogg, Kelly, Kirchner, Kittler, Lampiasi, Loehr, Lovejoy, MacGillis, Mass Audubon, May, C., May, N., Minella, Moncy, Morse, Naseman, Nolan, Pastie, Pompi, Poutasse, Rabinowitz and Borak, Sigall, Smith, Treible, Tuggey, Tulgan, Utz, D. and L., Utz, D., Valli, Walchenbach, Ward 4 Councilor for City of Pittsfield, Wentworth, Wesley, Whalen, Williams, H. and C., Williams, R. and E., Wilson, G., Wilson, T. and M., Zatorski	VIII.C	Other Stakeholders Roles
3	Baillargeon, Burke and Krol, Craighead, DeFarlo, DeLeo, Demary, Durant, Forsley, Fox, Gillman, Goclowski, L. and B., Hamel, Haraden, Harry, Hughes, Jerome, Kellogg, Kirchner, Kittler, Lampiasi, Loehr, Lovejoy, May, C., May, N., Minella, Moncy, Morse, Nolan, Pastie, Poutasse, Rabinowitz and Borak, Ruggeri, Sigall, Tuggey, Tulgan, Utz, D. and L., Utz, D., Walchenbach, Wesley, Whalen, Williams, H. and C., Williams, R. and E., Wilson, G., Wilson, T. and M., Zatorski	II.E	The Proposed Remedy is too Extensive and the River/Floodplain will be Destroyed

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Cross-Reference Response Matrix for Public Comments on the 2014 Draft Permit Modification and Statement of Basis

Response to Comments Housatonic River "Rest of River"

Comment Number	Commenter	Response to Comment Section	
4	Berkel (Transcript of Public Hearing), Bubriski	IX.A	Quality of Life Issues
5	Bubriski	XI.C	Operational Details and Engineering Controls
5.a	Bubriski	XI.C	Operational Details and Engineering Controls
6	Bubriski	IX.F	Accidents and Injuries
7	Bubriski	IX.E	Greenhouse Gases and Carbon Footprint
8	Goclowski, B.	XI.F	Other Miscellaneous Comments
9	DeBartolo, G., DeBartolo, M., Goclowski, B.	XI.E	Non-PCB Compounds
10	Berkshire Bike Path Council	III.D.1	Floodplains
11	Stevens	IX.A	Quality of Life Issues
12	Karlquist, Stevens	IX.A	Quality of Life Issues
13	Gillman, Haraden, Jerome, Karlquist, Stevens, Whalen, Wheeler, Wilson, T. and M.	IX.C	Property Values, Economic Impacts, and Tourism
14	Douillet, MacGillis, Stevens, Wallingford, R. and S.	II.E	The Proposed Remedy is too Extensive and the River/Floodplain will be Destroyed
15	Mashantucket Pequot Tribal Nation	XI.A	Archeology
16	Kronberg	XI.E	Non-PCB Compounds
17	Environmental Stewardship Concepts, LLC on behalf of HRI, Kronberg, Kronberg (Transcript of Public Hearing), Select Board, Town of Great Barrington	III.B.2	Restoration Performance Standards
18	Kronberg, Kronberg (Transcript of Public Hearing)	XI.D	Climate Change
19	Alsop, Andersen, Andersen (Transcript of Public Hearing), Berkshire Regional Planning Commission, Cianfarini, B./Citizens for PCB Removal (Transcript of Public Hearing), Cianfarini, C./Citizens for PCB Removal (Transcript of Public Hearing), Citizens for PCB Removal, deFur/Housatonic River Initiative (Transcript of Public Hearing), Environmental Stewardship Concepts, LLC on behalf of HRI, Friedman/Housatonic River Initiative (Transcript of Public Hearing), Gibson, Gray/Housatonic River Initiative (Transcript of Public Hearing), Housatonic Rest of River Municipal Committee, Housatonic Valley Association, Kelly, Kronberg, Kronberg (Transcript of Public Hearing), Mass Audubon, Miller/Toxics Action Center (Transcript of Public Hearing), Naseman, Regan/Housatonic Valley Association (Transcript of Public Hearing), Select Board, Town of Great Barrington, USDOI, Fish and Wildlife Service, Wood	II.D	The Proposed Remediation is Insufficient
20	Berkshire Regional Planning Commission, Kronberg, Mass Audubon	II.D	The Proposed Remediation is Insufficient
21	Mass Fisheries and Wildlife Board	II.C.1	Supporting Comments from State Government
21.a	Mass Fisheries and Wildlife Board	III.B.2	Restoration Performance Standards
22	Mass Audubon	V.	Adaptive Management
23	Mass Audubon	VIII.A	Lack of Detail in Permit
24	Mass Audubon, Wood	XI.B	Future Storm Events

Attachment D
Cross-Reference Response Matrix for Public Comments on the 2014 Draft Permit Modification and Statement of Basis
Response to Comments Housatonic River "Rest of River"

Comment Number	Commenter	Response to Comment Section	
25	Barzottini (Transcript of Public Hearing), Berkshire Environmental Action Team, Berkshire Regional Planning Commission, Cianfarini, B./Citizens for PCB Removal (Transcript of Public Hearing), Citizens for PCB Removal, Environmental Stewardship Concepts, LLC on behalf of HRI, Gibson, Kelly, Mass Audubon, Melle, Melle, Naseman, Nelson, Regan/Housatonic Valley Association (Transcript of Public Hearing), USDOI, Fish and Wildlife Service, Wheeler	III.C.7	Engineered Capping
26	Housatonic Rest of River Municipal Committee, Mass Audubon, Melle, Nelson	III.C.7	Engineered Capping
27	Nelson	III.C.3	Woods Pond
28	Nelson	III.C.3	Woods Pond
29	Nelson	IX.A	Quality of Life Issues
30	Nelson	XI.C	Operational Details and Engineering Controls
31	deFur/Housatonic River Initiative (Transcript of Public Hearing), Nelson	XI.C	Operational Details and Engineering Controls
32	Nelson	XI.F	Other Miscellaneous Comments
33	Nelson	XI.C	Operational Details and Engineering Controls
34	Nelson	XI.C	Operational Details and Engineering Controls
35	Nelson	XI.C	Operational Details and Engineering Controls
36	Nelson	IX.C	Property Values, Economic Impacts, and Tourism
37	deFur/Housatonic River Initiative (Transcript of Public Hearing), Nelson	XI.C	Operational Details and Engineering Controls
38	Nelson	IX.A	Quality of Life Issues
39	Jerome, Lee, E., Utz, D. and L., Utz, D.	IX.C	Property Values, Economic Impacts, and Tourism
40	Cushing/Mass Audubon (Transcript of Public Hearing), deFur/Housatonic River Initiative (Transcript of Public Hearing), Regan/Housatonic Valley Association (Transcript of Public Hearing)	II.D	The Proposed Remediation is Insufficient
41	deFur/Housatonic River Initiative (Transcript of Public Hearing)	II.D	The Proposed Remediation is Insufficient
42	deFur/Housatonic River Initiative (Transcript of Public Hearing)	II.F	PCB Toxicity and Risk Assessments
43	deFur/Housatonic River Initiative (Transcript of Public Hearing)	II.F	PCB Toxicity and Risk Assessments
44	deFur/Housatonic River Initiative (Transcript of Public Hearing)	II.F	PCB Toxicity and Risk Assessments
45	Cushing/Mass Audubon (Transcript of Public Hearing), deFur/Housatonic River Initiative (Transcript of Public Hearing), Regan/Housatonic Valley Association (Transcript of Public Hearing), Wallingford, R. and S.	III.C.1	Reaches 5A, 5B, and 5C
46	Cushing/Mass Audubon (Transcript of Public Hearing), deFur/Housatonic River Initiative (Transcript of Public Hearing), USDOI, Fish and Wildlife Service	III.B.2	Restoration Performance Standards
47	deFur/Housatonic River Initiative (Transcript of Public Hearing)	III.F.3	New and Innovative Technology
48	deFur/Housatonic River Initiative (Transcript of Public Hearing)	III.B.2	Restoration Performance Standards
49	deFur/Housatonic River Initiative (Transcript of Public Hearing)	II.D	The Proposed Remediation is Insufficient
50	Larson/MA Fisheries and Wildlife Board (Transcript of Public Hearing)	II.C.1	Supporting Comments from State Government
51	Cushing/Mass Audubon (Transcript of Public Hearing)	V.	Adaptive Management
52	Cushing/Mass Audubon (Transcript of Public Hearing)	XI.B	Future Storm Events
53	Cushing/Mass Audubon (Transcript of Public Hearing)	VIII.C	Other Stakeholders Roles

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Cross-Reference Response Matrix for Public Comments on the 2014 Draft Permit Modification and Statement of Basis
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Comment Number	Commenter	Response to Comment Section
54	Andersen, Andersen (Transcript of Public Hearing), Cianfarini, B./Citizens for PCB Removal (Transcript of Public Hearing), Citizens for PCB Removal, Regan/Housatonic Valley Association (Transcript of Public Hearing), Wood	III.D.1 Floodplains
55	Regan/Housatonic Valley Association (Transcript of Public Hearing)	III.C.1 Reaches 5A, 5B, and 5C
55	Regan/Housatonic Valley Association (Transcript of Public Hearing)	III.C.2 Backwaters adjacent to Reaches 5, 6, and 7
56	Andersen, Berkshire Regional Planning Commission, Cianfarini, B./Citizens for PCB Removal (Transcript of Public Hearing), Town of Lee, Board of Selectmen, Gibson, Housatonic Rest of River Municipal Committee, Housatonic Valley Association, Kelly, MA Executive Office of Energy and Environmental Affairs, Mass Audubon, Regan/Housatonic Valley Association (Transcript of Public Hearing), Select Board, Town of Great Barrington, Wood	V. Adaptive Management
56	Andersen, Berkshire Regional Planning Commission, Cianfarini, B./Citizens for PCB Removal (Transcript of Public Hearing), Town of Lee, Board of Selectmen, Gibson, Housatonic Rest of River Municipal Committee, Housatonic Valley Association, Kelly, MA Executive Office of Energy and Environmental Affairs, Mass Audubon, Regan/Housatonic Valley Association (Transcript of Public Hearing), Select Board, Town of Great Barrington, Wood	II.C.2 Supporting Comments from Local Governments, Citizens, and Non-Governmental Organizations
56	Andersen, Berkshire Regional Planning Commission, Town of Lee, Board of Selectmen, Cianfarini, B./Citizens for PCB Removal (Transcript of Public Hearing), Gibson, Housatonic Rest of River Municipal Committee, Housatonic Valley Association, Kelly, MA Executive Office of Energy and Environmental Affairs, Mass Audubon, Regan/Housatonic Valley Association (Transcript of Public Hearing), Select Board, Town of Great Barrington, Wood	III.F.1 General Comments on Treatment/Disposition
56	Andersen, Berkshire Regional Planning Commission, Cianfarini, B./Citizens for PCB Removal (Transcript of Public Hearing), Town of Lee, Board of Selectmen, Gibson, Housatonic Rest of River Municipal Committee, Housatonic Valley Association, Kelly, MA Executive Office of Energy and Environmental Affairs, Mass Audubon, Regan/Housatonic Valley Association (Transcript of Public Hearing), Select Board, Town of Great Barrington, Wood	IV. Applicable or Relevant and Appropriate Requirements (ARARs)
57	Cook (Transcript of Public Hearing)	III.C.1 Reaches 5A, 5B, and 5C
58	Citizens for PCB Removal, Cook (Transcript of Public Hearing), Galt, A., Karlquist, McLeod, Williams, R. and E.	IX.A Quality of Life Issues
59	Cook (Transcript of Public Hearing)	IX.A Quality of Life Issues
60	Cook (Transcript of Public Hearing)	III.F.3 New and Innovative Technology
61	Cook (Transcript of Public Hearing), Wood	V. Adaptive Management
61	Cook (Transcript of Public Hearing), Wood	VIII.C Other Stakeholders Roles
62	Federer (Transcript of Public Hearing)	II.F PCB Toxicity and Risk Assessments

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Comment Number	Commenter	Response to Comment Section
63	Alsop, Cianfarini, B./Citizens for PCB Removal (Transcript of Public Hearing), Environmental Stewardship Concepts, LLC on behalf of HRI, Gray/Housatonic River Initiative (Transcript of Public Hearing)	V. Adaptive Management
64	Gray/Housatonic River Initiative (Transcript of Public Hearing)	II.F PCB Toxicity and Risk Assessments
65	Gray/Housatonic River Initiative (Transcript of Public Hearing)	II.D The Proposed Remediation is Insufficient
66	Gray/Housatonic River Initiative (Transcript of Public Hearing)	III.C.7 Engineered Capping
67	Gray/Housatonic River Initiative (Transcript of Public Hearing)	III.F.2 Comparative Analysis for Treatment/Disposition Remedy
68	Gray/Housatonic River Initiative (Transcript of Public Hearing)	II.F PCB Toxicity and Risk Assessments
69	Cianfarini, C./Citizens for PCB Removal (Transcript of Public Hearing)	II.D The Proposed Remediation is Insufficient
70	Cianfarini, C./Citizens for PCB Removal (Transcript of Public Hearing), Citizens for PCB Removal, Environmental Stewardship Concepts, LLC on behalf of HRI	XI.F Other Miscellaneous Comments
71	Kronberg (Transcript of Public Hearing)	XI.E Non-PCB Compounds
72	deFur/Housatonic River Initiative (Transcript of Public Hearing)	III.B.1 Downstream Transport and Biota Performance Standards
73	deFur/Housatonic River Initiative (Transcript of Public Hearing)	III.C.6 Monitored Natural Recovery (MNR) for Flowing Subreaches in Reach 7 and Throughout Reaches 9 – 16, Including Impoundments
74	deFur/Housatonic River Initiative (Transcript of Public Hearing)	II.D The Proposed Remediation is Insufficient
75	Barzottini (Transcript of Public Hearing), Cracolici	III.F.3 New and Innovative Technology
77	Smith	II.E The Proposed Remedy is too Extensive and the River/Floodplain will be Destroyed
78	McLeod	III.C.1 Reaches 5A, 5B, and 5C
79	Cook, Cuddihy, DeBartolo, M., Douillet, Galt, A.	III.C.1 Reaches 5A, 5B, and 5C
80	Cook	II.E The Proposed Remedy is too Extensive and the River/Floodplain will be Destroyed
81	Cook, Galt, A.	II.E The Proposed Remedy is too Extensive and the River/Floodplain will be Destroyed
82	Cook	II.F PCB Toxicity and Risk Assessments
83	Cook, Wallingford, R. and S.	II.E The Proposed Remedy is too Extensive and the River/Floodplain will be Destroyed
84	Cook	II.F PCB Toxicity and Risk Assessments
85	Cook	II.F PCB Toxicity and Risk Assessments
86	Cook, Goclowski, L. and B.	II.F PCB Toxicity and Risk Assessments
87	Cook, Kittler	IX.A Quality of Life Issues
88	Cook	II.F PCB Toxicity and Risk Assessments
89	Cook	VIII.A Lack of Detail in Permit
90	Cook	III.B.2 Restoration Performance Standards
90.a	Environmental Stewardship Concepts, LLC on behalf of HRI, USDOI, Fish and Wildlife Service	III.B.2 Restoration Performance Standards
91	Cook	II.E The Proposed Remedy is too Extensive and the River/Floodplain will be Destroyed
91.a	Cook	XI.C Operational Details and Engineering Controls
92	Cook	III.F.1 General Comments on Treatment/Disposition

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Comment Number	Commenter	Response to Comment Section	
93	Cook	IX.A	Quality of Life Issues
94	Cook	III.B.2	Restoration Performance Standards
95	Cook, Whalen	III.C.1	Reaches 5A, 5B, and 5C
96	Cook	IX.A	Quality of Life Issues
97	Cook	IX.C	Property Values, Economic Impacts, and Tourism
98	Goclowski, L. and B.	II.E	The Proposed Remedy is too Extensive and the River/Floodplain will be Destroyed
99	DeBartolo, M., Goclowski, L. and B.	XI.E	Non-PCB Compounds
100	Durfee	III.F.3	New and Innovative Technology
101	Lee, E., Lee, R., MacGillis	II.E	The Proposed Remedy is too Extensive and the River/Floodplain will be Destroyed
102	Hamel	II.E	The Proposed Remedy is too Extensive and the River/Floodplain will be Destroyed
103	Hamel	II.E	The Proposed Remedy is too Extensive and the River/Floodplain will be Destroyed
104	Galt, A., Galt, J.	II.F	PCB Toxicity and Risk Assessments
105	Lotto and Walsh	VIII.A	Lack of Detail in Permit
106	Lotto and Walsh	IX.A	Quality of Life Issues
107	Tuggey	II.E	The Proposed Remedy is too Extensive and the River/Floodplain will be Destroyed
108	Galt, A	XI.F	Other Miscellaneous Comments
109.a	Galt, A., Gibson	IX.A	Quality of Life Issues
109.b	Galt, A., Gibson	VIII.B	State and Local Roles
110	Galt, A., Gillman, Jerome, Morse	IX.A	Quality of Life Issues
111	Berkshire Regional Planning Commission	III.E	Inspection, Monitoring and Maintenance/Operation and Maintenance
112	Berkshire Regional Planning Commission, Select Board, Town of Great Barrington	III.C.4	Reach 7 Impoundments
113	Berkshire Regional Planning Commission, Green Berkshires, Inc., Housatonic Rest of River Municipal Committee, Mass Audubon	IX.D	Compensation
114	Berkshire Regional Planning Commission, City of Pittsfield, Community Development Board	VIII.B	State and Local Roles
115	Berkshire Regional Planning Commission	IX.D	Compensation
116	Berkshire Regional Planning Commission	III.C.1	Reaches 5A, 5B, and 5C
117	Berkshire Regional Planning Commission, Environmental Stewardship Concepts, LLC on behalf of HRI, Gibson, Halstead	III.C.1	Reaches 5A, 5B, and 5C
117	Berkshire Regional Planning Commission, Environmental Stewardship Concepts, LLC on behalf of HRI, Gibson, Halstead	X.	Comments on the Statement of Basis
118	Berkshire Regional Planning Commission	XI.F	Other Miscellaneous Comments
119	Berkshire Regional Planning Commission, Wood	III.D.1	Floodplains
120	Berkshire Regional Planning Commission, City of Pittsfield, Office of the Mayor, Housatonic Rest of River Municipal Committee, Select Board, Town of Great Barrington	XI.D	Climate Change

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121	Berkshire Regional Planning Commission, City of Pittsfield, Office of the Mayor, Select Board, Town of Great Barrington	III.E Inspection, Monitoring and Maintenance/Operation and Maintenance
122	Berkshire Regional Planning Commission	III.C.7 Engineered Capping
123	Berkshire Regional Planning Commission, Housatonic Rest of River Municipal Committee	IV. Applicable or Relevant and Appropriate Requirements (ARARs)
124	Andersen, Berkshire Regional Planning Commission, Brotman, City of Pittsfield, Office of the Mayor, Housatonic Rest of River Municipal Committee, Mass Audubon, Melle, Wood	VII. Financial Assurance and GE's Responsibility to Address Contamination in Perpetuity
125.a	Berkshire Regional Planning Commission	III.C.1 Reaches 5A, 5B, and 5C
125.b	Berkshire Regional Planning Commission	III.C.1 Reaches 5A, 5B, and 5C
125.c	Berkshire Regional Planning Commission	III.C.1 Reaches 5A, 5B, and 5C
126	Berkshire Regional Planning Commission	III.C.7 Engineered Capping
127	Andersen, Berkshire Regional Planning Commission, City of Pittsfield, Office of the Mayor, Housatonic Rest of River Municipal Committee, USDOI, Fish and Wildlife Service, Wood	III.D.2 Vernal Pools
128	Berkshire Regional Planning Commission	III.D.1 Floodplains
129	Berkshire Regional Planning Commission, Housatonic Rest of River Municipal Committee	III.B.2 Restoration Performance Standards
130	Berkshire Regional Planning Commission	III.B.2 Restoration Performance Standards
131	Berkshire Regional Planning Commission	II.C.2 Supporting Comments from Local Governments, Citizens, and Non-Governmental Organizations
132	Berkshire Regional Planning Commission, Housatonic Rest of River Municipal Committee	III.C.2 Backwaters adjacent to Reaches 5, 6, and 7
133	Berkshire Regional Planning Commission, Green Berkshires, Inc., Melle	III.E Inspection, Monitoring and Maintenance/Operation and Maintenance
134	Berkshire Regional Planning Commission	VIII.B State and Local Roles
135	Berkshire Regional Planning Commission	VI. Other Permit-Specific Language Comments
136	Berkshire Regional Planning Commission	VI. Other Permit-Specific Language Comments
137	Berkshire Regional Planning Commission	IV. Applicable or Relevant and Appropriate Requirements (ARARs)
138	Berkshire Regional Planning Commission	III.C.7 Engineered Capping
139	Berkshire Regional Planning Commission	XI.B Future Storm Events
140	Berkshire Regional Planning Commission	III.C.1 Reaches 5A, 5B, and 5C
140	Berkshire Regional Planning Commission	III.C.2 Backwaters adjacent to Reaches 5, 6, and 7
141	Berkshire Regional Planning Commission	III.C.2 Backwaters adjacent to Reaches 5, 6, and 7
142	Berkshire Regional Planning Commission, Citizens for PCB Removal, Gibson	III.C.3 Woods Pond
143	Berkshire Regional Planning Commission, Town of Lee, Board of Selectmen, Housatonic Rest of River Municipal Committee, Select Board, Town of Great Barrington	III.G Institutional Controls and Related Requirements
144	Berkshire Regional Planning Commission	III.C.5 Rising Pond
145	Berkshire Regional Planning Commission	XI.D Climate Change
146	Berkshire Regional Planning Commission	III.D.1 Floodplains
147	Berkshire Regional Planning Commission, DeBartolo, G.	III.B.2 Restoration Performance Standards

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148	Berkshire Regional Planning Commission	III.B.2 Restoration Performance Standards
149	Berkshire Regional Planning Commission, Select Board, Town of Great Barrington, Town of Sheffield, Board of Selectmen	III.E Inspection, Monitoring and Maintenance/Operation and Maintenance
150	Berkshire Regional Planning Commission	III.E Inspection, Monitoring and Maintenance/Operation and Maintenance
151	Berkshire Regional Planning Commission, Housatonic Rest of River Municipal Committee	III.E Inspection, Monitoring and Maintenance/Operation and Maintenance
152	Berkshire Regional Planning Commission, City of Pittsfield, Office of the Mayor, Housatonic Rest of River Municipal Committee, Melle, Wood	III.E Inspection, Monitoring and Maintenance/Operation and Maintenance
152	Berkshire Regional Planning Commission, City of Pittsfield, Office of the Mayor, Housatonic Rest of River Municipal Committee, Melle, Wood	VII. Financial Assurance and GE's Responsibility to Address Contamination in Perpetuity
153	Berkshire Regional Planning Commission, City of Pittsfield, Office of the Mayor, Select Board, Town of Great Barrington	III.C.1 Reaches 5A, 5B, and 5C
154	Berkshire Regional Planning Commission, Green Berkshires, Inc.., Housatonic Rest of River Municipal Committee, Green Berkshires, Inc.	III.C.3 Woods Pond
155	Berkshire Regional Planning Commission	III.F.3 New and Innovative Technology
156	Berkshire Regional Planning Commission, City of Pittsfield, Community Development Board	IV. Applicable or Relevant and Appropriate Requirements (ARARs)
157	Berkshire Regional Planning Commission	VII. Financial Assurance and GE's Responsibility to Address Contamination in Perpetuity
158	Berkshire Regional Planning Commission, Town of Lee, Board of Selectmen, Housatonic Rest of River Municipal Committee	IX.D Compensation
159	Berkshire Regional Planning Commission	III.G Institutional Controls and Related Requirements
160	Berkshire Regional Planning Commission	IX.D Compensation
161	Berkshire Regional Planning Commission, City of Pittsfield, Office of the Mayor	IX.D Compensation
162	Berkshire Regional Planning Commission, City of Pittsfield, Community Development Board, Town of Lee, Board of Selectmen, Select Board, Town of Great Barrington	VIII.B State and Local Roles
163	Berkshire Regional Planning Commission	VI. Other Permit-Specific Language Comments
164	Berkshire Regional Planning Commission, Gibson	IX.B Effects on Infrastructures
165	Berkshire Regional Planning Commission, Town of Lee, Board of Selectmen, Housatonic Rest of River Municipal Committee, Select Board, Town of Great Barrington	IX.B Effects on Infrastructures
166	Berkshire Regional Planning Commission	VIII.B State and Local Roles
167	Berkshire Regional Planning Commission	IX.A Quality of Life Issues
168	Berkshire Regional Planning Commission	IX.A Quality of Life Issues
169	Berkshire Regional Planning Commission, Housatonic Rest of River Municipal Committee, Select Board, Town of Great Barrington	IX.B Effects on Infrastructures
170.a	Berkshire Regional Planning Commission	IX.A Quality of Life Issues
170.b	Berkshire Regional Planning Commission	IX.D Compensation
171	Berkshire Regional Planning Commission	XI.D Climate Change
172	Berkshire Regional Planning Commission	IX.D Compensation

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173	Berkshire Regional Planning Commission, Housatonic Rest of River Municipal Committee, Select Board, Town of Great Barrington, USDOI, Fish and Wildlife Service	III.B.2 Restoration Performance Standards
174	Berkshire Regional Planning Commission	VI. Other Permit-Specific Language Comments
175	Berkshire Regional Planning Commission	II.F PCB Toxicity and Risk Assessments
176	Berkshire Regional Planning Commission, Housatonic Rest of River Municipal Committee	III.C.3 Woods Pond
176.a	Berkshire Regional Planning Commission, Housatonic Rest of River Municipal Committee	XI.F Other Miscellaneous Comments
177	McClenachan	II.E The Proposed Remedy is too Extensive and the River/Floodplain will be Destroyed
178	Environmental Stewardship Concepts, LLC on behalf of HRI, McClenachan	III.C.3 Woods Pond
179	Esoldi, Gillman, Haraden, Karlquist, Laughnane, Valli, Williams, R. and E.	IX.A Quality of Life Issues
180	Cracolici	II.E The Proposed Remedy is too Extensive and the River/Floodplain will be Destroyed
181	Walchenbach	II.F PCB Toxicity and Risk Assessments
182	Town of Sheffield, Board of Selectmen	III.E Inspection, Monitoring and Maintenance/Operation and Maintenance
183	Town of Sheffield, Board of Selectmen	III.E Inspection, Monitoring and Maintenance/Operation and Maintenance
184	Select Board, Town of Great Barrington, Town of Sheffield, Board of Selectmen	III.E Inspection, Monitoring and Maintenance/Operation and Maintenance
185	Select Board, Town of Great Barrington, USDOI, Fish and Wildlife Service	III.B.2 Restoration Performance Standards
186	Town of Stockbridge Board of Selectmen	IX.D Compensation
187	Melle, Town of Stockbridge Board of Selectmen	VII. Financial Assurance and GE's Responsibility to Address Contamination in Perpetuity
188	Williams, R. and E.	II.D The Proposed Remediation is Insufficient
189	Williams, R. and E.	II.D The Proposed Remediation is Insufficient
190	Karlquist, Williams, R. and E.	II.E The Proposed Remedy is too Extensive and the River/Floodplain will be Destroyed
191	Environmental Stewardship Concepts, LLC on behalf of HRI	III.C.6 Monitored Natural Recovery (MNR) for Flowing Subreaches in Reach 7 and Throughout Reaches 9 – 16, Including Impoundments
192	Environmental Stewardship Concepts, LLC on behalf of HRI	III.D.1 Floodplains
193	Environmental Stewardship Concepts, LLC on behalf of HRI	III.B.1 Downstream Transport and Biota Performance Standards
194	Environmental Stewardship Concepts, LLC on behalf of HRI	II.D The Proposed Remediation is Insufficient
195	Brotman, Environmental Stewardship Concepts, LLC on behalf of HRI	XI.C Operational Details and Engineering Controls
196	Environmental Stewardship Concepts, LLC on behalf of HRI	III.C.6 Monitored Natural Recovery (MNR) for Flowing Subreaches in Reach 7 and Throughout Reaches 9 – 16, Including Impoundments
196	Environmental Stewardship Concepts, LLC on behalf of HRI	II.D The Proposed Remediation is Insufficient
197	Environmental Stewardship Concepts, LLC on behalf of HRI	X. Comments on the Statement of Basis
198	Environmental Stewardship Concepts, LLC on behalf of HRI	II.D The Proposed Remediation is Insufficient
199	Environmental Stewardship Concepts, LLC on behalf of HRI	III.C.6 Monitored Natural Recovery (MNR) for Flowing Subreaches in Reach 7 and Throughout Reaches 9 – 16, Including Impoundments

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200	Environmental Stewardship Concepts, LLC on behalf of HRI	III.F.3 New and Innovative Technology
201	Environmental Stewardship Concepts, LLC on behalf of HRI	III.F.3 New and Innovative Technology
202	Environmental Stewardship Concepts, LLC on behalf of HRI	III.F.3 New and Innovative Technology
203	Environmental Stewardship Concepts, LLC on behalf of HRI	III.F.3 New and Innovative Technology
204	Environmental Stewardship Concepts, LLC on behalf of HRI	III.F.3 New and Innovative Technology
205	Environmental Stewardship Concepts, LLC on behalf of HRI	III.C.7 Engineered Capping
206	Environmental Stewardship Concepts, LLC on behalf of HRI, Naseman, USDOI, Fish and Wildlife Service	III.B.2 Restoration Performance Standards
207	Environmental Stewardship Concepts, LLC on behalf of HRI	III.C.1 Reaches 5A, 5B, and 5C
208	Environmental Stewardship Concepts, LLC on behalf of HRI	III.C.1 Reaches 5A, 5B, and 5C
209	Citizens for PCB Removal, Environmental Stewardship Concepts, LLC on behalf of HRI	III.C.1 Reaches 5A, 5B, and 5C
210	Environmental Stewardship Concepts, LLC on behalf of HRI	III.F.3 New and Innovative Technology
211	Environmental Stewardship Concepts, LLC on behalf of HRI	III.D.1 Floodplains
212	Environmental Stewardship Concepts, LLC on behalf of HRI	III.C.1 Reaches 5A, 5B, and 5C
213	Environmental Stewardship Concepts, LLC on behalf of HRI	III.D.1 Floodplains
214	Environmental Stewardship Concepts, LLC on behalf of HRI	III.F.3 New and Innovative Technology
215	Environmental Stewardship Concepts, LLC on behalf of HRI	III.C.5 Rising Pond
216	Environmental Stewardship Concepts, LLC on behalf of HRI	III.C.6 Monitored Natural Recovery (MNR) for Flowing Subreaches in Reach 7 and Throughout Reaches 9 – 16, Including Impoundments
217	Environmental Stewardship Concepts, LLC on behalf of HRI, Halstead	III.C.7 Engineered Capping
218	Environmental Stewardship Concepts, LLC on behalf of HRI	III.D.1 Floodplains
219	Environmental Stewardship Concepts, LLC on behalf of HRI	III.D.2 Vernal Pools
220	Environmental Stewardship Concepts, LLC on behalf of HRI	III.D.1 Floodplains
221	Environmental Stewardship Concepts, LLC on behalf of HRI	III.D.2 Vernal Pools
222	Environmental Stewardship Concepts, LLC on behalf of HRI	III.F.3 New and Innovative Technology
223	Environmental Stewardship Concepts, LLC on behalf of HRI, USDOI, Fish and Wildlife Service	III.B.2 Restoration Performance Standards
224	Environmental Stewardship Concepts, LLC on behalf of HRI	X. Comments on the Statement of Basis
225	Environmental Stewardship Concepts, LLC on behalf of HRI	III.G Institutional Controls and Related Requirements
226	Environmental Stewardship Concepts, LLC on behalf of HRI	III.C.6 Monitored Natural Recovery (MNR) for Flowing Subreaches in Reach 7 and Throughout Reaches 9 – 16, Including Impoundments
227	Environmental Stewardship Concepts, LLC on behalf of HRI	III.C.1 Reaches 5A, 5B, and 5C
228	Environmental Stewardship Concepts, LLC on behalf of HRI	III.B.1 Downstream Transport and Biota Performance Standards
229	Citizens for PCB Removal, Environmental Stewardship Concepts, LLC on behalf of HRI	III.C.1 Reaches 5A, 5B, and 5C
230	Environmental Stewardship Concepts, LLC on behalf of HRI	II.D The Proposed Remediation is Insufficient
231	Environmental Stewardship Concepts, LLC on behalf of HRI	II.F PCB Toxicity and Risk Assessments
232	Environmental Stewardship Concepts, LLC on behalf of HRI	II.F PCB Toxicity and Risk Assessments
233	Environmental Stewardship Concepts, LLC on behalf of HRI	X. Comments on the Statement of Basis
234	Environmental Stewardship Concepts, LLC on behalf of HRI	III.C.6 Monitored Natural Recovery (MNR) for Flowing Subreaches in Reach 7 and Throughout Reaches 9 – 16, Including Impoundments

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235	Environmental Stewardship Concepts, LLC on behalf of HRI	III.D.1 Floodplains
236	Environmental Stewardship Concepts, LLC on behalf of HRI	X. Comments on the Statement of Basis
237	Environmental Stewardship Concepts, LLC on behalf of HRI	III.F.1 General Comments on Treatment/Disposition
238	Environmental Stewardship Concepts, LLC on behalf of HRI	III.F.1 General Comments on Treatment/Disposition
239	Environmental Stewardship Concepts, LLC on behalf of HRI	X. Comments on the Statement of Basis
240	Environmental Stewardship Concepts, LLC on behalf of HRI	X. Comments on the Statement of Basis
241	Environmental Stewardship Concepts, LLC on behalf of HRI, Naseman	X. Comments on the Statement of Basis
242	Environmental Stewardship Concepts, LLC on behalf of HRI	XI.F Other Miscellaneous Comments
243	Environmental Stewardship Concepts, LLC on behalf of HRI	III.D.1 Floodplains
244	Environmental Stewardship Concepts, LLC on behalf of HRI	XI.F Other Miscellaneous Comments
245	Environmental Stewardship Concepts, LLC on behalf of HRI	III.C.3 Woods Pond
246	Environmental Stewardship Concepts, LLC on behalf of HRI	III.C.3 Woods Pond
247	Environmental Stewardship Concepts, LLC on behalf of HRI	X. Comments on the Statement of Basis
248	Environmental Stewardship Concepts, LLC on behalf of HRI	X. Comments on the Statement of Basis
249	Environmental Stewardship Concepts, LLC on behalf of HRI, Naseman	IV. Applicable or Relevant and Appropriate Requirements (ARARs)
250	Environmental Stewardship Concepts, LLC on behalf of HRI	X. Comments on the Statement of Basis
251	Environmental Stewardship Concepts, LLC on behalf of HRI	III.B.2 Restoration Performance Standards
252	Environmental Stewardship Concepts, LLC on behalf of HRI	X. Comments on the Statement of Basis
253	Environmental Stewardship Concepts, LLC on behalf of HRI	III.D.1 Floodplains
254	Environmental Stewardship Concepts, LLC on behalf of HRI	X. Comments on the Statement of Basis
255	Environmental Stewardship Concepts, LLC on behalf of HRI	X. Comments on the Statement of Basis
256	Environmental Stewardship Concepts, LLC on behalf of HRI	X. Comments on the Statement of Basis
257	Environmental Stewardship Concepts, LLC on behalf of HRI	III.F.3 New and Innovative Technology
258	Environmental Stewardship Concepts, LLC on behalf of HRI	X. Comments on the Statement of Basis
259	Environmental Stewardship Concepts, LLC on behalf of HRI	X. Comments on the Statement of Basis
260	Environmental Stewardship Concepts, LLC on behalf of HRI, Naseman	XI.F Other Miscellaneous Comments
260.a	Environmental Stewardship Concepts, LLC on behalf of HRI	III.F.3 New and Innovative Technology
260.a	Environmental Stewardship Concepts, LLC on behalf of HRI	V. Adaptive Management
261	Environmental Stewardship Concepts, LLC on behalf of HRI	III.C.6 Monitored Natural Recovery (MNR) for Flowing Subreaches in Reach 7 and Throughout Reaches 9 – 16, Including Impoundments
262	Environmental Stewardship Concepts, LLC on behalf of HRI	III.B.1 Downstream Transport and Biota Performance Standards
263	Environmental Stewardship Concepts, LLC on behalf of HRI	III.G Institutional Controls and Related Requirements
264	Environmental Stewardship Concepts, LLC on behalf of HRI	III.F.3 New and Innovative Technology
265	Environmental Stewardship Concepts, LLC on behalf of HRI	X. Comments on the Statement of Basis
265.a	Environmental Stewardship Concepts, LLC on behalf of HRI	III.F.2 Comparative Analysis for Treatment/Disposition Remedy
266	Environmental Stewardship Concepts, LLC on behalf of HRI	III.F.1 General Comments on Treatment/Disposition
267	Environmental Stewardship Concepts, LLC on behalf of HRI	III.F.1 General Comments on Treatment/Disposition
267	Environmental Stewardship Concepts, LLC on behalf of HRI	III.F.3 New and Innovative Technology
268	Environmental Stewardship Concepts, LLC on behalf of HRI	III.F.2 Comparative Analysis for Treatment/Disposition Remedy
269	Environmental Stewardship Concepts, LLC on behalf of HRI	III.F.2 Comparative Analysis for Treatment/Disposition Remedy
270	Environmental Stewardship Concepts, LLC on behalf of HRI	X. Comments on the Statement of Basis
271	Environmental Stewardship Concepts, LLC on behalf of HRI	III.F.3 New and Innovative Technology

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272	Environmental Stewardship Concepts, LLC on behalf of HRI	X. Comments on the Statement of Basis
273	Environmental Stewardship Concepts, LLC on behalf of HRI	III.B.2 Restoration Performance Standards
274	Environmental Stewardship Concepts, LLC on behalf of HRI	IV. Applicable or Relevant and Appropriate Requirements (ARARs)
274.a	Housatonic Rest of River Municipal Committee	IX.C Property Values, Economic Impacts, and Tourism
275	Housatonic Rest of River Municipal Committee	IX.C Property Values, Economic Impacts, and Tourism
276	Town of Lee, Board of Selectmen, Housatonic Rest of River Municipal Committee, Select Board, Town of Great Barrington	III.G Institutional Controls and Related Requirements
277	Housatonic Rest of River Municipal Committee	IX.D Compensation
278	Town of Lee, Board of Selectmen, Housatonic Rest of River Municipal Committee	IX.G Use of Local Labor
279	City of Pittsfield, Office of the Mayor, Gibson, Housatonic Rest of River Municipal Committee, MA Executive Office of Energy and Environmental Affairs	VIII.B State and Local Roles
280	City of Pittsfield, Office of the Mayor, Housatonic Rest of River Municipal Committee	III.D.1 Floodplains
281	Town of Lee, Board of Selectmen, Gibson, Housatonic Rest of River Municipal Committee	IV. Applicable or Relevant and Appropriate Requirements (ARARs)
282	Housatonic Rest of River Municipal Committee	VIII.B State and Local Roles
283	Housatonic Rest of River Municipal Committee	IX.A Quality of Life Issues
283	Housatonic Rest of River Municipal Committee	VIII.C Other Stakeholders Roles
283.a	Housatonic Rest of River Municipal Committee	IX.D Compensation
284	Housatonic Rest of River Municipal Committee	VIII.C Other Stakeholders Roles
285	City of Pittsfield, Office of the Mayor, Town of Lee, Board of Selectmen, Housatonic Rest of River Municipal Committee, MA Executive Office of Energy and Environmental Affairs	VIII.B State and Local Roles
285.a	Housatonic Rest of River Municipal Committee	IX.H Environmental Education
286	Housatonic Rest of River Municipal Committee	III.E Inspection, Monitoring and Maintenance/Operation and Maintenance
287	Berkshire Regional Planning Commission, Housatonic Rest of River Municipal Committee	IX.D Compensation
288	City of Pittsfield, Office of the Mayor, Town of Lee, Board of Selectmen, Housatonic Rest of River Municipal Committee, Mass Audubon	IX.D Compensation
289	Housatonic Rest of River Municipal Committee	VIII.A Lack of Detail in Permit
290	Housatonic Rest of River Municipal Committee	VI. Other Permit-Specific Language Comments
291	City of Pittsfield, Office of the Mayor, Housatonic Rest of River Municipal Committee, MA Executive Office of Energy and Environmental Affairs	VIII.B State and Local Roles
292	Housatonic Rest of River Municipal Committee	VIII.B State and Local Roles
292	Housatonic Rest of River Municipal Committee	VII. Financial Assurance and GE's Responsibility to Address Contamination in Perpetuity
293	Citizens for PCB Removal, City of Pittsfield, Office of the Mayor, Housatonic Rest of River Municipal Committee	III.C.1 Reaches 5A, 5B, and 5C
294	Housatonic Rest of River Municipal Committee, Select Board, Town of Great Barrington, Town of Sheffield, Board of Selectmen	III.E Inspection, Monitoring and Maintenance/Operation and Maintenance

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294.a	Housatonic Rest of River Municipal Committee, Select Board, Town of Great Barrington, Town of Sheffield, Board of Selectmen	III.E Inspection, Monitoring and Maintenance/Operation and Maintenance
294.b	Housatonic Rest of River Municipal Committee, Town of Sheffield, Board of Selectmen	VIII.B State and Local Roles
295	Housatonic Rest of River Municipal Committee	VI. Other Permit-Specific Language Comments
296	Housatonic Rest of River Municipal Committee	IX.D Compensation
297	Housatonic Rest of River Municipal Committee	IV. Applicable or Relevant and Appropriate Requirements (ARARs)
298	Housatonic Rest of River Municipal Committee	IX.D Compensation
299	Housatonic Rest of River Municipal Committee, Select Board, Town of Great Barrington	IX.B Effects on Infrastructures
300	Housatonic Rest of River Municipal Committee	IX.B Effects on Infrastructures
301	City of Pittsfield, Office of the Mayor, Town of Lee, Board of Selectmen, Housatonic Rest of River Municipal Committee, Select Board, Town of Great Barrington,	VII. Financial Assurance and GE's Responsibility to Address Contamination in Perpetuity
302	Town of Lee, Board of Selectmen, Housatonic Rest of River Municipal Committee	III.C.2 Backwaters adjacent to Reaches 5, 6, and 7
303	Housatonic Rest of River Municipal Committee	IX.A Quality of Life Issues
304	Housatonic Rest of River Municipal Committee, Mass Audubon, Select Board, Town of Great Barrington	V. Adaptive Management
305	Town of Lee, Board of Selectmen, Housatonic Rest of River Municipal Committee	III.G Institutional Controls and Related Requirements
306	Housatonic Rest of River Municipal Committee	XI.A Archeology
307	Town of Lee, Board of Selectmen, Gibson	III.F.1 General Comments on Treatment/Disposition
308	Gibson	VII. Financial Assurance and GE's Responsibility to Address Contamination in Perpetuity
309	Gibson, Green Berkshires, Inc.	XI.F Other Miscellaneous Comments
310	Brotman	II.B Comparative Analysis for Sediment and Floodplain Remedy
311	Massachusetts Bureau of Environmental Health	III.E Inspection, Monitoring and Maintenance/Operation and Maintenance
312	Massachusetts Bureau of Environmental Health	III.G Institutional Controls and Related Requirements
313	Massachusetts Bureau of Environmental Health	IX.A Quality of Life Issues
314	Massachusetts Bureau of Environmental Health	III.D.1 Floodplains
315	Massachusetts Bureau of Environmental Health	II.C.1 Supporting Comments from State Government
316	Massachusetts Bureau of Environmental Health	VIII.B State and Local Roles
317	Halstead	VI. Other Permit-Specific Language Comments
318	Halstead	III.B.1 Downstream Transport and Biota Performance Standards
319	Halstead	III.C.3 Woods Pond
320	Green Berkshires, Inc., Halstead	III.C.1 Reaches 5A, 5B, and 5C
321	Halstead	III.C.2 Backwaters adjacent to Reaches 5, 6, and 7
322	Halstead	III.D.1 Floodplains
323	Halstead	III.D.1 Floodplains
324	Loeb	III.C.3 Woods Pond
325	Housatonic Valley Association	III.C.1 Reaches 5A, 5B, and 5C

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Comment Number	Commenter	Response to Comment Section
326	Housatonic Valley Association	II.D The Proposed Remediation is Insufficient
327	Housatonic Valley Association	III.D.1 Floodplains
327.a	Housatonic Valley Association	III.D.1 Floodplains
328	Housatonic Valley Association	II.D The Proposed Remediation is Insufficient
329	Housatonic Valley Association, Mass Audubon	III.C.7 Engineered Capping
330	Housatonic Valley Association	III.C.7 Engineered Capping
331	Housatonic Valley Association	XI.B Future Storm Events
332	Housatonic Valley Association	VII. Financial Assurance and GE's Responsibility to Address Contamination in Perpetuity
333	Housatonic Valley Association	III.G Institutional Controls and Related Requirements
334	Lobovits	II.E The Proposed Remedy is too Extensive and the River/Floodplain will be Destroyed
335	Lobovits	XI.F Other Miscellaneous Comments
336	Pfeifer	II.D The Proposed Remediation is Insufficient
337	Wheeler	III.C.7 Engineered Capping
338	Wheeler	II.E The Proposed Remedy is too Extensive and the River/Floodplain will be Destroyed
338.a	Wheeler	IX.A Quality of Life Issues
339	Wheeler	IX.A Quality of Life Issues
340	Wheeler	II.E The Proposed Remedy is too Extensive and the River/Floodplain will be Destroyed
341	Whalen	II.B Comparative Analysis for Sediment and Floodplain Remedy
342	MA Executive Office of Energy and Environmental Affairs, Wood	VIII.B State and Local Roles
343	Wood	IX.C Property Values, Economic Impacts, and Tourism
344	Wood	II.D The Proposed Remediation is Insufficient
345	Wood	II.C.2 Supporting Comments from Local Governments, Citizens, and Non-Governmental Organizations
346	Ward 4 Councilor for City of Pittsfield	II.E The Proposed Remedy is too Extensive and the River/Floodplain will be Destroyed
347	Ward 4 Councilor for City of Pittsfield	II.E The Proposed Remedy is too Extensive and the River/Floodplain will be Destroyed
348	Ward 4 Councilor for City of Pittsfield	II.E The Proposed Remedy is too Extensive and the River/Floodplain will be Destroyed
349	Bubriski	II.D The Proposed Remediation is Insufficient
350	Bubriski	II.E The Proposed Remedy is too Extensive and the River/Floodplain will be Destroyed
351	Cuddihy	VIII.A Lack of Detail in Permit
352	First Light Power Resources Services	III.G Institutional Controls and Related Requirements
353	Wood	III.G Institutional Controls and Related Requirements
354	Andersen, Citizens for PCB Removal	III.D.1 Floodplains
355	Andersen	III.D.1 Floodplains
356	Andersen	IX.C Property Values, Economic Impacts, and Tourism

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Comment Number	Commenter	Response to Comment Section
357	Kelly, Kronberg	II.C.2 Supporting Comments from Local Governments, Citizens, and Non-Governmental Organizations
358	DeBartolo, G.	III.C.1 Reaches 5A, 5B, and 5C
359	DeBartolo, G.	II.F PCB Toxicity and Risk Assessments
360	DeBartolo, G.	II.E The Proposed Remedy is too Extensive and the River/Floodplain will be Destroyed
361	DeBartolo, G.	XI.B Future Storm Events
362	DeBartolo, G.	III.F.3 New and Innovative Technology
363.a	DeBartolo, G.	III.B.2 Restoration Performance Standards
363.b	DeBartolo, G.	III.B.2 Restoration Performance Standards
364	DeBartolo, G.	II.E The Proposed Remedy is too Extensive and the River/Floodplain will be Destroyed
365	DeBartolo, G.	IV. Applicable or Relevant and Appropriate Requirements (ARARs)
366	DeBartolo, G.	II.E The Proposed Remedy is too Extensive and the River/Floodplain will be Destroyed
367	DeBartolo, G.	II.E The Proposed Remedy is too Extensive and the River/Floodplain will be Destroyed
368	DeBartolo, G.	II.E The Proposed Remedy is too Extensive and the River/Floodplain will be Destroyed
369	Haraden	II.E The Proposed Remedy is too Extensive and the River/Floodplain will be Destroyed
370	City of Pittsfield, Office of the Mayor	V. Adaptive Management
371	Citizens for PCB Removal	III.C.6 Monitored Natural Recovery (MNR) for Flowing Subreaches in Reach 7 and Throughout Reaches 9 – 16, Including Impoundments
372	Citizens for PCB Removal	II.D The Proposed Remediation is Insufficient
373	Citizens for PCB Removal	III.F.1 General Comments on Treatment/Disposition
374	Citizens for PCB Removal	III.C.6 Monitored Natural Recovery (MNR) for Flowing Subreaches in Reach 7 and Throughout Reaches 9 – 16, Including Impoundments
375	Citizens for PCB Removal, Naseman	II.D The Proposed Remediation is Insufficient
376	Citizens for PCB Removal	II.D The Proposed Remediation is Insufficient
377	Citizens for PCB Removal	III.C.7 Engineered Capping
378	Citizens for PCB Removal	II.D The Proposed Remediation is Insufficient
379	Citizens for PCB Removal	II.D The Proposed Remediation is Insufficient
380	Citizens for PCB Removal	III.D.2 Vernal Pools
380	Citizens for PCB Removal	III.C.2 Backwaters adjacent to Reaches 5, 6, and 7
381	Citizens for PCB Removal	III.G Institutional Controls and Related Requirements
382	Citizens for PCB Removal, Mass Audubon, Select Board, Town of Great Barrington	III.G Institutional Controls and Related Requirements
383	Citizens for PCB Removal	III.F.3 New and Innovative Technology
384	Citizens for PCB Removal	III.C.7 Engineered Capping
385	Citizens for PCB Removal	III.F.3 New and Innovative Technology
386	Citizens for PCB Removal	IX.A Quality of Life Issues

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Comment Number	Commenter	Response to Comment Section
387	Citizens for PCB Removal	III.G Institutional Controls and Related Requirements
388	Citizens for PCB Removal	II.D The Proposed Remediation is Insufficient
389	Citizens for PCB Removal	IX.C Property Values, Economic Impacts, and Tourism
390	Citizens for PCB Removal	IX.C Property Values, Economic Impacts, and Tourism
391	Pittsfield Board of Health	VIII.B State and Local Roles
392.a	Pittsfield Board of Health	VIII.B State and Local Roles
392.b	Pittsfield Board of Health	IX.A Quality of Life Issues
393	Mass Audubon	V. Adaptive Management
394	Mass Audubon, USDOI, Fish and Wildlife Service	III.D.1 Floodplains
395	Mass Audubon	III.C.1 Reaches 5A, 5B, and 5C
396	Mass Audubon	III.E Inspection, Monitoring and Maintenance/Operation and Maintenance
397	Mass Audubon	III.D.1 Floodplains
398	Mass Audubon	V. Adaptive Management
399	Mass Audubon	III.B.2 Restoration Performance Standards
400	Mass Audubon	IX.D Compensation
401	Mass Audubon	IX.D Compensation
402	Naseman	II.D The Proposed Remediation is Insufficient
403	Mass Audubon	III.B.1 Downstream Transport and Biota Performance Standards
404	Mass Audubon	XI.F Other Miscellaneous Comments
405	Naseman	XI.F Other Miscellaneous Comments
405.a	Naseman	IV. Applicable or Relevant and Appropriate Requirements (ARARs)
406	Naseman	IV. Applicable or Relevant and Appropriate Requirements (ARARs)
407	Naseman	III.B.1 Downstream Transport and Biota Performance Standards
408	Naseman	IV. Applicable or Relevant and Appropriate Requirements (ARARs)
409	Naseman	IV. Applicable or Relevant and Appropriate Requirements (ARARs)
410	Naseman	IV. Applicable or Relevant and Appropriate Requirements (ARARs)
411	Naseman	VII. Financial Assurance and GE's Responsibility to Address Contamination in Perpetuity
412	Naseman	II.D The Proposed Remediation is Insufficient
413	USDOI, Fish and Wildlife Service	II.D The Proposed Remediation is Insufficient
414	USDOI, Fish and Wildlife Service	III.F.3 New and Innovative Technology
415	USDOI, Fish and Wildlife Service	III.D.1 Floodplains
416	USDOI, Fish and Wildlife Service	XI.F Other Miscellaneous Comments
417	USDOI, Fish and Wildlife Service	III.C.1 Reaches 5A, 5B, and 5C
418	USDOI, Fish and Wildlife Service	III.C.1 Reaches 5A, 5B, and 5C
419	USDOI, Fish and Wildlife Service	III.C.1 Reaches 5A, 5B, and 5C
420	USDOI, Fish and Wildlife Service	III.C.1 Reaches 5A, 5B, and 5C
421	USDOI, Fish and Wildlife Service	III.C.1 Reaches 5A, 5B, and 5C
422	USDOI, Fish and Wildlife Service	III.C.1 Reaches 5A, 5B, and 5C
423	USDOI, Fish and Wildlife Service	III.C.2 Backwaters adjacent to Reaches 5, 6, and 7
424	USDOI, Fish and Wildlife Service	III.D.1 Floodplains
425	USDOI, Fish and Wildlife Service	III.C.7 Engineered Capping

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Comment Number	Commenter	Response to Comment Section
426	USDOI, Fish and Wildlife Service	III.D.2 Vernal Pools
427	USDOI, Fish and Wildlife Service	II.D The Proposed Remediation is Insufficient
428	Connecticut Department of Energy and Environmental Protection	III.B.1 Downstream Transport and Biota Performance Standards
429	Loeb	III.C.3 Woods Pond
430	Loeb	III.F.1 General Comments on Treatment/Disposition
431	Loeb	III.F.3 New and Innovative Technology
432 to 438	Unassigned	Unassigned
439	Connecticut Department of Energy and Environmental Protection	III.B.1 Downstream Transport and Biota Performance Standards
439	Connecticut Department of Energy and Environmental Protection	V. Adaptive Management
440	Connecticut Department of Energy and Environmental Protection	III.B.1 Downstream Transport and Biota Performance Standards
441	Connecticut Department of Energy and Environmental Protection	III.E Inspection, Monitoring and Maintenance/Operation and Maintenance
442	Connecticut Department of Energy and Environmental Protection	III.G Institutional Controls and Related Requirements
443	Connecticut Department of Energy and Environmental Protection	VI. Other Permit-Specific Language Comments
443	Connecticut Department of Energy and Environmental Protection	VIII. Role of State Agencies, local government and other stakeholders
444	Connecticut Department of Energy and Environmental Protection	VI. Other Permit-Specific Language Comments
445	Connecticut Department of Energy and Environmental Protection	IIIA. Performance Standards and Corrective Measures
446	Connecticut Department of Energy and Environmental Protection	VII. Financial Assurance and GE's Responsibility to Address Contamination in Perpetuity
447	Connecticut Department of Energy and Environmental Protection	III.B.1 Downstream Transport and Biota Performance Standards
448	Connecticut Department of Energy and Environmental Protection	III.B.1 Downstream Transport and Biota Performance Standards
449	Connecticut Department of Energy and Environmental Protection	III.B.1 Downstream Transport and Biota Performance Standards
450	Connecticut Department of Energy and Environmental Protection	III.B.1 Downstream Transport and Biota Performance Standards
451	Connecticut Department of Energy and Environmental Protection	VII. Financial Assurance and GE's Responsibility to Address Contamination in Perpetuity
452	Connecticut Department of Energy and Environmental Protection	III.E Inspection, Monitoring and Maintenance/Operation and Maintenance
453	Connecticut Department of Energy and Environmental Protection	III.E Inspection, Monitoring and Maintenance/Operation and Maintenance
454	Connecticut Department of Energy and Environmental Protection	III.C.1 Reaches 5A, 5B, and 5C
455	Connecticut Department of Energy and Environmental Protection, Select Board, Town of Great Barrington	III.B.2 Restoration Performance Standards
456	Connecticut Department of Energy and Environmental Protection	III.B.1 Downstream Transport and Biota Performance Standards
457	Connecticut Department of Energy and Environmental Protection	III.C.3 Woods Pond
458	Connecticut Department of Energy and Environmental Protection	III.C.5 Rising Pond
459	Connecticut Department of Energy and Environmental Protection	III.C.7 Engineered Capping
460	Connecticut Department of Energy and Environmental Protection	III.D.1 Floodplains
461	Connecticut Department of Energy and Environmental Protection	III.C.6 Monitored Natural Recovery (MNR) for Flowing Subreaches in Reach 7 and Throughout Reaches 9 – 16, Including Impoundments
462.a	Connecticut Department of Energy and Environmental Protection	III.G Institutional Controls and Related Requirements
462.b	Connecticut Department of Energy and Environmental Protection	III.C.6 Monitored Natural Recovery (MNR) for Flowing Subreaches in Reach 7 and Throughout Reaches 9 – 16, Including Impoundments
462.c	Connecticut Department of Energy and Environmental Protection	III.G Institutional Controls and Related Requirements
462.d	Connecticut Department of Energy and Environmental Protection	III.G Institutional Controls and Related Requirements
462.e	Connecticut Department of Energy and Environmental Protection	III.G Institutional Controls and Related Requirements

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Comment Number	Commenter	Response to Comment Section	
463	Connecticut Department of Energy and Environmental Protection	VIII.B	State and Local Roles
464	Connecticut Department of Energy and Environmental Protection	III.E	Inspection, Monitoring and Maintenance/Operation and Maintenance
465	Connecticut Department of Energy and Environmental Protection	III.G	Institutional Controls and Related Requirements
466	Connecticut Department of Energy and Environmental Protection	X.	Comments on the Statement of Basis
467	Connecticut Department of Energy and Environmental Protection	IV.	Applicable or Relevant and Appropriate Requirements (ARARs)
468	Connecticut Department of Energy and Environmental Protection	IV.	Applicable or Relevant and Appropriate Requirements (ARARs)
469	Connecticut Department of Energy and Environmental Protection	IV.	Applicable or Relevant and Appropriate Requirements (ARARs)
470	Connecticut Department of Energy and Environmental Protection	IV.	Applicable or Relevant and Appropriate Requirements (ARARs)
471	Connecticut Department of Energy and Environmental Protection	IV.	Applicable or Relevant and Appropriate Requirements (ARARs)
472	Connecticut Department of Energy and Environmental Protection	IV.	Applicable or Relevant and Appropriate Requirements (ARARs)
473	Connecticut Department of Energy and Environmental Protection	IV.	Applicable or Relevant and Appropriate Requirements (ARARs)
474	Connecticut Department of Energy and Environmental Protection	IV.	Applicable or Relevant and Appropriate Requirements (ARARs)
475	Connecticut Department of Energy and Environmental Protection	IV.	Applicable or Relevant and Appropriate Requirements (ARARs)
476	Connecticut Department of Energy and Environmental Protection	IV.	Applicable or Relevant and Appropriate Requirements (ARARs)
477	Connecticut Department of Energy and Environmental Protection	IV.	Applicable or Relevant and Appropriate Requirements (ARARs)
478	Connecticut Department of Energy and Environmental Protection	III.E	Inspection, Monitoring and Maintenance/Operation and Maintenance
479	Connecticut Department of Energy and Environmental Protection	XI.F	Other Miscellaneous Comments
480	Connecticut Department of Energy and Environmental Protection	XI.F	Other Miscellaneous Comments
481	Alsop	II.D	The Proposed Remediation is Insufficient
482	Alsop	III.B.1	Downstream Transport and Biota Performance Standards
483	Alsop	II.D	The Proposed Remediation is Insufficient
484	MA Executive Office of Energy and Environmental Affairs	II.C.1	Supporting Comments from State Government
485	MA Executive Office of Energy and Environmental Affairs	II.C.1	Supporting Comments from State Government
485	MA Executive Office of Energy and Environmental Affairs	III.F.1	General Comments on Treatment/Disposition
486	MA Executive Office of Energy and Environmental Affairs	III.C.3	Woods Pond
487	MA Executive Office of Energy and Environmental Affairs	II.C.1	Supporting Comments from State Government
487.a	Connecticut Department of Energy and Environmental Protection, MA Executive Office of Energy and Environmental Affairs	II.C.1	Supporting Comments from State Government
488	MA Executive Office of Energy and Environmental Affairs	III.D.1	Floodplains
489	MA Executive Office of Energy and Environmental Affairs	V.	Adaptive Management
489	MA Executive Office of Energy and Environmental Affairs	III.D.2	Vernal Pools
490	MA Executive Office of Energy and Environmental Affairs	III.D.2	Vernal Pools
490	MA Executive Office of Energy and Environmental Affairs	V.	Adaptive Management
491	MA Executive Office of Energy and Environmental Affairs	III.G	Institutional Controls and Related Requirements
492	MA Executive Office of Energy and Environmental Affairs	III.B.2	Restoration Performance Standards
493	MA Executive Office of Energy and Environmental Affairs	IV.	Applicable or Relevant and Appropriate Requirements (ARARs)
493	MA Executive Office of Energy and Environmental Affairs	III.F.1	General Comments on Treatment/Disposition
493	MA Executive Office of Energy and Environmental Affairs	III.F.2	Comparative Analysis for Treatment/Disposition Remedy
494	MA Executive Office of Energy and Environmental Affairs	III.F.2	Comparative Analysis for Treatment/Disposition Remedy
495	MA Executive Office of Energy and Environmental Affairs	III.F.1	General Comments on Treatment/Disposition
496	MA Executive Office of Energy and Environmental Affairs	X.	Comments on the Statement of Basis
497	MA Executive Office of Energy and Environmental Affairs	IV.	Applicable or Relevant and Appropriate Requirements (ARARs)

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Comment Number	Commenter	Response to Comment Section
498	MA Executive Office of Energy and Environmental Affairs	IV. Applicable or Relevant and Appropriate Requirements (ARARs)
499	MA Executive Office of Energy and Environmental Affairs	IV. Applicable or Relevant and Appropriate Requirements (ARARs)
500	MA Executive Office of Energy and Environmental Affairs	IV. Applicable or Relevant and Appropriate Requirements (ARARs)
501	MA Executive Office of Energy and Environmental Affairs	V. Adaptive Management
502	Housatonic Environmental Action League	III.C.6 Monitored Natural Recovery (MNR) for Flowing Subreaches in Reach 7 and Throughout Reaches 9 – 16, Including Impoundments
503	Housatonic Environmental Action League	III.C.6 Monitored Natural Recovery (MNR) for Flowing Subreaches in Reach 7 and Throughout Reaches 9 – 16, Including Impoundments
504	Housatonic Environmental Action League	III.C.6 Monitored Natural Recovery (MNR) for Flowing Subreaches in Reach 7 and Throughout Reaches 9 – 16, Including Impoundments
505	Housatonic Environmental Action League	III.C.6 Monitored Natural Recovery (MNR) for Flowing Subreaches in Reach 7 and Throughout Reaches 9 – 16, Including Impoundments
506	Wentworth	XI.F Other Miscellaneous Comments
507	Green Berkshires, Inc.	VIII.C Other Stakeholders Roles
508	Green Berkshires, Inc.	IX.A Quality of Life Issues
509	Green Berkshires, Inc.	IV. Applicable or Relevant and Appropriate Requirements (ARARs)
510	Green Berkshires, Inc.	XI.F Other Miscellaneous Comments
511	DeBartolo, M.	II.E The Proposed Remedy is too Extensive and the River/Floodplain will be Destroyed
512	DeBartolo, M.	II.E The Proposed Remedy is too Extensive and the River/Floodplain will be Destroyed
513	DeBartolo, M.	III.C.1 Reaches 5A, 5B, and 5C
514	DeBartolo, M.	III.F.3 New and Innovative Technology
515	DeBartolo, M.	XI.B Future Storm Events
516	DeBartolo, M.	III.B.2 Restoration Performance Standards
517	DeBartolo, M.	III.B.2 Restoration Performance Standards
518	DeBartolo, M.	IX.D Compensation
519	DeBartolo, M.	III.C.1 Reaches 5A, 5B, and 5C
520	DeBartolo, M.	III.B.2 Restoration Performance Standards
521	DeBartolo, M.	III.B.2 Restoration Performance Standards
522	Goclowski, B. and L.	II.D The Proposed Remediation is Insufficient
523	Select Board, Town of Great Barrington	VIII.B State and Local Roles
524	Select Board, Town of Great Barrington	IX.H Environmental Education
525	Select Board, Town of Great Barrington	XI.C Operational Details and Engineering Controls
526	Select Board, Town of Great Barrington	XI.C Operational Details and Engineering Controls
527	MacLeod	III.F.3 New and Innovative Technology
528	Brielman, Select Board, Town of Great Barrington	II.E The Proposed Remedy is too Extensive and the River/Floodplain will be Destroyed
529	Eisley	VIII.A Lack of Detail in Permit
530	General Electric Company	III.F.1 General Comments on Treatment/Disposition
531	General Electric Company	II.E The Proposed Remedy is too Extensive and the River/Floodplain will be Destroyed

Comment Number	Commenter	Response to Comment Section	
532	General Electric Company	II.E	The Proposed Remedy is too Extensive and the River/Floodplain will be Destroyed
533	General Electric Company	III.B.2	Restoration Performance Standards
534	General Electric Company	III.C.3	Woods Pond
535	General Electric Company	III.C.3	Woods Pond
536	General Electric Company	III.C.3	Woods Pond
537	General Electric Company	III.G	Institutional Controls and Related Requirements
538	General Electric Company	III.C.4	Reach 7 Impoundments
539	General Electric Company	III.C.7	Engineered Capping
540	General Electric Company	III.D.2	Vernal Pools
541	General Electric Company	III.D.2	Vernal Pools
542	General Electric Company	III.D.2	Vernal Pools
543	General Electric Company	V.	Adaptive Management
544	General Electric Company	IV.	Applicable or Relevant and Appropriate Requirements (ARARs)
545	General Electric Company	II.F	PCB Toxicity and Risk Assessments
546	General Electric Company	III.F.2	Comparative Analysis for Treatment/Disposition Remedy
547	General Electric Company	III.F.2	Comparative Analysis for Treatment/Disposition Remedy
548	General Electric Company	III.F.2	Comparative Analysis for Treatment/Disposition Remedy
549	General Electric Company	III.F.2	Comparative Analysis for Treatment/Disposition Remedy
550	General Electric Company	III.F.2	Comparative Analysis for Treatment/Disposition Remedy
551	General Electric Company	III.F.2	Comparative Analysis for Treatment/Disposition Remedy
551.a	General Electric Company	III.F.2	Comparative Analysis for Treatment/Disposition Remedy
552	General Electric Company	III.F.2	Comparative Analysis for Treatment/Disposition Remedy
553	General Electric Company	III.F.2	Comparative Analysis for Treatment/Disposition Remedy
554	General Electric Company	III.F.2	Comparative Analysis for Treatment/Disposition Remedy
555	General Electric Company	III.F.2	Comparative Analysis for Treatment/Disposition Remedy
556	General Electric Company	III.F.2	Comparative Analysis for Treatment/Disposition Remedy
557	General Electric Company	III.F.2	Comparative Analysis for Treatment/Disposition Remedy
558	General Electric Company	III.F.2	Comparative Analysis for Treatment/Disposition Remedy
559	General Electric Company	III.F.2	Comparative Analysis for Treatment/Disposition Remedy
560	General Electric Company	III.F.2	Comparative Analysis for Treatment/Disposition Remedy
561	General Electric Company	III.F.2	Comparative Analysis for Treatment/Disposition Remedy
562	General Electric Company	III.F.2	Comparative Analysis for Treatment/Disposition Remedy
563	General Electric Company	III.F.2	Comparative Analysis for Treatment/Disposition Remedy
564	General Electric Company	III.F.2	Comparative Analysis for Treatment/Disposition Remedy
565	General Electric Company	III.F.2	Comparative Analysis for Treatment/Disposition Remedy
566	General Electric Company	III.F.2	Comparative Analysis for Treatment/Disposition Remedy
567	General Electric Company	III.F.2	Comparative Analysis for Treatment/Disposition Remedy
568	General Electric Company	III.F.2	Comparative Analysis for Treatment/Disposition Remedy
569	General Electric Company	III.F.2	Comparative Analysis for Treatment/Disposition Remedy
570	General Electric Company	III.F.2	Comparative Analysis for Treatment/Disposition Remedy
571	General Electric Company	III.F.2	Comparative Analysis for Treatment/Disposition Remedy

Comment Number	Commenter	Response to Comment Section	
572	General Electric Company	III.F.2	Comparative Analysis for Treatment/Disposition Remedy
573	General Electric Company	III.F.2	Comparative Analysis for Treatment/Disposition Remedy
574	General Electric Company	III.F.2	Comparative Analysis for Treatment/Disposition Remedy
575	General Electric Company	III.F.2	Comparative Analysis for Treatment/Disposition Remedy
576	General Electric Company	III.F.2	Comparative Analysis for Treatment/Disposition Remedy
577	General Electric Company	II.E	The Proposed Remedy is too Extensive and the River/Floodplain will be Destroyed
578	General Electric Company	II.F	PCB Toxicity and Risk Assessments
579	General Electric Company	II.F	PCB Toxicity and Risk Assessments
580	General Electric Company	II.E	The Proposed Remedy is too Extensive and the River/Floodplain will be Destroyed
581	General Electric Company	III.B.1	Downstream Transport and Biota Performance Standards
582	General Electric Company	III.B.1	Downstream Transport and Biota Performance Standards
583	General Electric Company	III.B.1	Downstream Transport and Biota Performance Standards
584	General Electric Company	II.E	The Proposed Remedy is too Extensive and the River/Floodplain will be Destroyed
585	General Electric Company	II.F	PCB Toxicity and Risk Assessments
586	General Electric Company	II.F	PCB Toxicity and Risk Assessments
587	General Electric Company	II.F	PCB Toxicity and Risk Assessments
588	General Electric Company	II.F	PCB Toxicity and Risk Assessments
589	General Electric Company	II.F	PCB Toxicity and Risk Assessments
590	General Electric Company	II.F	PCB Toxicity and Risk Assessments
591	General Electric Company	II.F	PCB Toxicity and Risk Assessments
592	General Electric Company	II.E	The Proposed Remedy is too Extensive and the River/Floodplain will be Destroyed
593	General Electric Company	III.B.2	Restoration Performance Standards
594	General Electric Company	III.B.2	Restoration Performance Standards
594.a	General Electric Company	III.B.2	Restoration Performance Standards
595	General Electric Company	III.B.2	Restoration Performance Standards
596	General Electric Company	III.B.2	Restoration Performance Standards
597	General Electric Company	III.B.2	Restoration Performance Standards
598	General Electric Company	III.B.2	Restoration Performance Standards
599	General Electric Company	III.B.2	Restoration Performance Standards
600	General Electric Company	III.B.2	Restoration Performance Standards
601	General Electric Company	III.B.2	Restoration Performance Standards
602	General Electric Company	III.B.2	Restoration Performance Standards
603	General Electric Company	III.B.2	Restoration Performance Standards
604	General Electric Company	III.B.2	Restoration Performance Standards
605	General Electric Company	III.B.2	Restoration Performance Standards
606	General Electric Company	III.B.2	Restoration Performance Standards
607	General Electric Company	II.F	PCB Toxicity and Risk Assessments
608	General Electric Company	II.F	PCB Toxicity and Risk Assessments

Comment Number	Commenter	Response to Comment Section	
609	General Electric Company	II.F	PCB Toxicity and Risk Assessments
610	General Electric Company	II.F	PCB Toxicity and Risk Assessments
611	General Electric Company	II.F	PCB Toxicity and Risk Assessments
612	General Electric Company	II.F	PCB Toxicity and Risk Assessments
613	General Electric Company	II.F	PCB Toxicity and Risk Assessments
614	General Electric Company	II.F	PCB Toxicity and Risk Assessments
615	General Electric Company	II.E	The Proposed Remedy is too Extensive and the River/Floodplain will be Destroyed
616	General Electric Company	III.C.3	Woods Pond
617	General Electric Company	III.C.3	Woods Pond
618	General Electric Company	III.C.3	Woods Pond
619	General Electric Company	III.C.3	Woods Pond
620	General Electric Company	III.C.3	Woods Pond
621	General Electric Company	III.C.3	Woods Pond
622	General Electric Company	III.C.3	Woods Pond
623	General Electric Company	III.C.3	Woods Pond
624	General Electric Company	III.C.4	Reach 7 Impoundments
625	General Electric Company	III.C.4	Reach 7 Impoundments
626	General Electric Company	III.C.4	Reach 7 Impoundments
627	General Electric Company	III.C.4	Reach 7 Impoundments
628	General Electric Company	III.C.4	Reach 7 Impoundments
629	General Electric Company	III.C.4	Reach 7 Impoundments
630	General Electric Company	III.C.4	Reach 7 Impoundments
631	General Electric Company	III.C.4	Reach 7 Impoundments
632	General Electric Company	III.C.4	Reach 7 Impoundments
633	General Electric Company	III.C.4	Reach 7 Impoundments
634	General Electric Company	III.C.4	Reach 7 Impoundments
635	General Electric Company	III.C.4	Reach 7 Impoundments
636	General Electric Company	III.C.4	Reach 7 Impoundments
637	General Electric Company	III.C.4	Reach 7 Impoundments
638	General Electric Company	III.C.4	Reach 7 Impoundments
639	General Electric Company	III.C.4	Reach 7 Impoundments
640	General Electric Company	III.C.5	Rising Pond
641	General Electric Company	III.C.5	Rising Pond
642	General Electric Company	III.C.5	Rising Pond
643	General Electric Company	III.C.5	Rising Pond
644	General Electric Company	III.C.5	Rising Pond
645	General Electric Company	III.C.5	Rising Pond
646	General Electric Company	III.C.2	Backwaters adjacent to Reaches 5, 6, and 7
647	General Electric Company	III.C.2	Backwaters adjacent to Reaches 5, 6, and 7
648	General Electric Company	III.C.2	Backwaters adjacent to Reaches 5, 6, and 7
649	General Electric Company	III.C.2	Backwaters adjacent to Reaches 5, 6, and 7

Comment Number	Commenter	Response to Comment Section	
650	General Electric Company	III.C.2	Backwaters adjacent to Reaches 5, 6, and 7
651	General Electric Company	III.C.2	Backwaters adjacent to Reaches 5, 6, and 7
652	General Electric Company	III.C.2	Backwaters adjacent to Reaches 5, 6, and 7
653	General Electric Company	III.C.7	Engineered Capping
654	General Electric Company	III.C.7	Engineered Capping
655	General Electric Company	III.D.2	Vernal Pools
656	General Electric Company	III.D.2	Vernal Pools
657	General Electric Company	III.D.2	Vernal Pools
658	General Electric Company	III.D.2	Vernal Pools
659	General Electric Company	III.D.2	Vernal Pools
660	General Electric Company	III.D.2	Vernal Pools
661	General Electric Company	III.D.2	Vernal Pools
662	General Electric Company	III.B.1	Downstream Transport and Biota Performance Standards
663	General Electric Company	III.B.1	Downstream Transport and Biota Performance Standards
664	General Electric Company	III.B.1	Downstream Transport and Biota Performance Standards
665	General Electric Company	III.B.1	Downstream Transport and Biota Performance Standards
666	General Electric Company	III.B.1	Downstream Transport and Biota Performance Standards
667	General Electric Company	III.B.1	Downstream Transport and Biota Performance Standards
668	General Electric Company	III.B.1	Downstream Transport and Biota Performance Standards
669	General Electric Company	III.B.1	Downstream Transport and Biota Performance Standards
670	General Electric Company	III.B.1	Downstream Transport and Biota Performance Standards
671	General Electric Company	III.B.1	Downstream Transport and Biota Performance Standards
672	General Electric Company	III.B.1	Downstream Transport and Biota Performance Standards
673	General Electric Company	III.B.1	Downstream Transport and Biota Performance Standards
674	General Electric Company	III.B.1	Downstream Transport and Biota Performance Standards
675	General Electric Company	III.B.1	Downstream Transport and Biota Performance Standards
676	General Electric Company	III.B.1	Downstream Transport and Biota Performance Standards
677	General Electric Company	III.B.2	Restoration Performance Standards
678	General Electric Company	III.B.2	Restoration Performance Standards
679	General Electric Company	IV.	Applicable or Relevant and Appropriate Requirements (ARARs)
680	General Electric Company	III.B.2	Restoration Performance Standards
681	General Electric Company	III.B.2	Restoration Performance Standards
682	General Electric Company	III.B.2	Restoration Performance Standards
683	General Electric Company	III.B.2	Restoration Performance Standards
684	General Electric Company	III.B.2	Restoration Performance Standards
685	General Electric Company	III.B.2	Restoration Performance Standards
686	General Electric Company	III.B.2	Restoration Performance Standards
687	General Electric Company	III.G	Institutional Controls and Related Requirements
688	General Electric Company	III.G	Institutional Controls and Related Requirements
689	General Electric Company	III.G	Institutional Controls and Related Requirements
690	General Electric Company	III.G	Institutional Controls and Related Requirements
691	General Electric Company	III.G	Institutional Controls and Related Requirements

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692	General Electric Company	III.G	Institutional Controls and Related Requirements
693	General Electric Company	III.G	Institutional Controls and Related Requirements
694	General Electric Company	III.G	Institutional Controls and Related Requirements
695	General Electric Company	III.G	Institutional Controls and Related Requirements
696	General Electric Company	III.G	Institutional Controls and Related Requirements
697	General Electric Company	III.G	Institutional Controls and Related Requirements
698	General Electric Company	III.G	Institutional Controls and Related Requirements
699	General Electric Company	III.G	Institutional Controls and Related Requirements
700	General Electric Company	III.G	Institutional Controls and Related Requirements
701	General Electric Company	III.G	Institutional Controls and Related Requirements
702	General Electric Company	III.G	Institutional Controls and Related Requirements
703	General Electric Company	III.G	Institutional Controls and Related Requirements
704	General Electric Company	III.G	Institutional Controls and Related Requirements
705	General Electric Company	III.G	Institutional Controls and Related Requirements
706	General Electric Company	III.G	Institutional Controls and Related Requirements
707	General Electric Company	III.G	Institutional Controls and Related Requirements
708	General Electric Company	III.G	Institutional Controls and Related Requirements
709	General Electric Company	V.	Adaptive Management
710	General Electric Company	IV.	Applicable or Relevant and Appropriate Requirements (ARARs)
711	General Electric Company	IV.	Applicable or Relevant and Appropriate Requirements (ARARs)
712	General Electric Company	IV.	Applicable or Relevant and Appropriate Requirements (ARARs)
713	General Electric Company	IV.	Applicable or Relevant and Appropriate Requirements (ARARs)
714	General Electric Company	IV.	Applicable or Relevant and Appropriate Requirements (ARARs)
715	General Electric Company	IV.	Applicable or Relevant and Appropriate Requirements (ARARs)
716	General Electric Company	IV.	Applicable or Relevant and Appropriate Requirements (ARARs)
717	General Electric Company	IV.	Applicable or Relevant and Appropriate Requirements (ARARs)
718	General Electric Company	IV.	Applicable or Relevant and Appropriate Requirements (ARARs)
719	General Electric Company	IV.	Applicable or Relevant and Appropriate Requirements (ARARs)
720	General Electric Company	IV.	Applicable or Relevant and Appropriate Requirements (ARARs)
721	General Electric Company	IV.	Applicable or Relevant and Appropriate Requirements (ARARs)
722	General Electric Company	IV.	Applicable or Relevant and Appropriate Requirements (ARARs)
723	General Electric Company	IV.	Applicable or Relevant and Appropriate Requirements (ARARs)
724	General Electric Company	IV.	Applicable or Relevant and Appropriate Requirements (ARARs)
725	General Electric Company	IV.	Applicable or Relevant and Appropriate Requirements (ARARs)
726	General Electric Company	IV.	Applicable or Relevant and Appropriate Requirements (ARARs)
727	General Electric Company	IV.	Applicable or Relevant and Appropriate Requirements (ARARs)
728	General Electric Company	IV.	Applicable or Relevant and Appropriate Requirements (ARARs)
729	General Electric Company	IV.	Applicable or Relevant and Appropriate Requirements (ARARs)
730	General Electric Company	IV.	Applicable or Relevant and Appropriate Requirements (ARARs)
731	General Electric Company	IV.	Applicable or Relevant and Appropriate Requirements (ARARs)
732	General Electric Company	IV.	Applicable or Relevant and Appropriate Requirements (ARARs)
733	General Electric Company	IV.	Applicable or Relevant and Appropriate Requirements (ARARs)

Attachment D
Cross-Reference Response Matrix for Public Comments on the 2014 Draft Permit Modification and Statement of Basis
Response to Comments Housatonic River "Rest of River"

Comment Number	Commenter	Response to Comment Section	
734	General Electric Company	IV.	Applicable or Relevant and Appropriate Requirements (ARARs)
735	General Electric Company	IV.	Applicable or Relevant and Appropriate Requirements (ARARs)
736	General Electric Company	III.F.2	Comparative Analysis for Treatment/Disposition Remedy
737	General Electric Company	II.B	Comparative Analysis for Sediment and Floodplain Remedy
738	General Electric Company	III.B.2	Restoration Performance Standards
739	General Electric Company	II.B	Comparative Analysis for Sediment and Floodplain Remedy
740	General Electric Company	III.D.2	Vernal Pools
741	General Electric Company	III.B.1	Downstream Transport and Biota Performance Standards
742	General Electric Company	III.B.1	Downstream Transport and Biota Performance Standards
743	General Electric Company	III.B.2	Restoration Performance Standards
744	General Electric Company	III.G	Institutional Controls and Related Requirements
745	General Electric Company	III.G	Institutional Controls and Related Requirements
746	General Electric Company	II.B	Comparative Analysis for Sediment and Floodplain Remedy
747	General Electric Company	II.B	Comparative Analysis for Sediment and Floodplain Remedy
748	General Electric Company	II.B	Comparative Analysis for Sediment and Floodplain Remedy
749	General Electric Company	II.B	Comparative Analysis for Sediment and Floodplain Remedy
750	General Electric Company	II.B	Comparative Analysis for Sediment and Floodplain Remedy
751	General Electric Company	II.B	Comparative Analysis for Sediment and Floodplain Remedy
752	General Electric Company	II.B	Comparative Analysis for Sediment and Floodplain Remedy
753	General Electric Company	II.B	Comparative Analysis for Sediment and Floodplain Remedy
754	General Electric Company	II.B	Comparative Analysis for Sediment and Floodplain Remedy
755	General Electric Company	II.B	Comparative Analysis for Sediment and Floodplain Remedy
756	General Electric Company	II.B	Comparative Analysis for Sediment and Floodplain Remedy
757	General Electric Company	II.F	PCB Toxicity and Risk Assessments
758	General Electric Company	II.F	PCB Toxicity and Risk Assessments
759	General Electric Company	II.B	Comparative Analysis for Sediment and Floodplain Remedy
760	General Electric Company	II.B	Comparative Analysis for Sediment and Floodplain Remedy
761	General Electric Company	XI.F	Other Miscellaneous Comments
Attachment A	General Electric Company (Part of Comment 547 et al.)	III.F.2	Comparative Analysis for Treatment/Disposition Remedy
Attachment B	General Electric Company (Part of Comment 534 et al.)	III.C.3	Woods Pond
Attachment C	General Electric Company (Part of Comment 595)	III.B.2	Restoration Performance Standards
Attachment C; C1	General Electric Company	III.B.2	Restoration Performance Standards
Attachment C; C2	General Electric Company	III.B.2	Restoration Performance Standards
Attachment C; C3	General Electric Company	III.B.2	Restoration Performance Standards
Attachment C; C4	General Electric Company	III.B.2	Restoration Performance Standards
Attachment C; C5	General Electric Company	III.B.2	Restoration Performance Standards
Attachment C; C6	General Electric Company	III.B.2	Restoration Performance Standards
Attachment C; C7	General Electric Company	III.B.2	Restoration Performance Standards
Attachment C; C8	General Electric Company	III.B.2	Restoration Performance Standards
Attachment C; C9	General Electric Company	III.B.2	Restoration Performance Standards
Attachment C; C10	General Electric Company	III.B.2	Restoration Performance Standards

Comment Number	Commenter	Response to Comment Section
Attachment C; C11	General Electric Company	III.B.2 Restoration Performance Standards
Attachment C; C12	General Electric Company	III.B.2 Restoration Performance Standards
Attachment C; C13	General Electric Company	III.B.2 Restoration Performance Standards
Attachment C; C14	General Electric Company	III.B.2 Restoration Performance Standards
Attachment C; C15	General Electric Company	III.B.2 Restoration Performance Standards
Attachment C; C16	General Electric Company	III.B.2 Restoration Performance Standards
Attachment C; C17	General Electric Company	III.B.2 Restoration Performance Standards
Attachment C; C18	General Electric Company	III.B.2 Restoration Performance Standards
Attachment C; C19	General Electric Company	III.B.2 Restoration Performance Standards
Attachment C; C20	General Electric Company	III.B.2 Restoration Performance Standards
Attachment C; C21	General Electric Company	III.B.2 Restoration Performance Standards
Attachment C; C22	General Electric Company	III.B.2 Restoration Performance Standards
Attachment C; C23	General Electric Company	III.B.2 Restoration Performance Standards
Attachment C; C24	General Electric Company	III.B.2 Restoration Performance Standards
Attachment C; C25	General Electric Company	III.B.2 Restoration Performance Standards
Attachment C; C26	General Electric Company	III.B.2 Restoration Performance Standards
Attachment C; C27	General Electric Company	III.B.2 Restoration Performance Standards
Attachment C; C28	General Electric Company	III.B.2 Restoration Performance Standards
Attachment C; C29	General Electric Company	III.B.2 Restoration Performance Standards
Attachment D	General Electric Company (Part of Comment 596, C1)	III.B.2 Restoration Performance Standards
Attachment D; D1	General Electric Company	III.B.2 Restoration Performance Standards
Attachment D; D2	General Electric Company	III.B.2 Restoration Performance Standards
Attachment D; D3	General Electric Company	III.B.2 Restoration Performance Standards

Attachment D
Cross-Reference Response Matrix for Public Comments on the 2014 Draft Permit Modification and Statement of Basis
Response to Comments Housatonic River "Rest of River"

Comment Number	Commenter	Response to Comment Section	
Attachment D; D4	General Electric Company	III.B.2	Restoration Performance Standards
Attachment E	General Electric Company (Part of Comment 605)	III.B.2	Restoration Performance Standards
Attachment F-1	General Electric Company (Part of Comment 618)	III.C.3	Woods Pond
Attachment F-2	General Electric Company (Part of Comment 538, 625)	III.C.4	Reach 7 Impoundments
Attachment F-3	General Electric Company (Part of Comment 640)	III.C.5	Rising Pond
Attachment G	General Electric Company (Part of Comment 618)	III.C.3	Woods Pond
Attachment H	General Electric Company (Part of Comment 631)	III.C.4	Reach 7 Impoundments
Attachment H	General Electric Company (Part of Comment 640)	III.C.5	Rising Pond
Attachment I	General Electric Company (Part of Comment 539, 653, 654)	III.C.7	Engineered Capping
Attachment J	General Electric Company (Part of Comment 578)	II.F	PCB Toxicity and Risk Assessments