

**COMMENTS OF THE GENERAL ELECTRIC COMPANY
ON U.S. ENVIRONMENTAL PROTECTION AGENCY NEW
ENGLAND REGION'S DRAFT RCRA PERMIT MODIFICATION
AND STATEMENT OF BASIS FOR PROPOSED REMEDIAL
ACTION FOR THE HOUSATONIC RIVER – REST OF RIVER**

Volume I

Text, Tables, and Figures

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EXECUTIVE SUMMARY

I. Background and Introduction

At one time, the U.S. Environmental Protection Agency (EPA), the Commonwealth of Massachusetts, the State of Connecticut, and the General Electric Company (GE) decided that consensus, not confrontation, was the best path forward with respect to the polychlorinated biphenyls (PCBs) at the former GE facility in Pittsfield and in the Housatonic River and its floodplain. EPA, Massachusetts, Connecticut, and GE discussed their considerable differences, significant compromises were made, and a comprehensive agreement was reached. That agreement is memorialized in the judicially approved Consent Decree that specified the remedial actions that would be taken to address the PCBs everywhere but in the Rest of River.

Because the evaluations necessary to determine the best remedial course for the Rest of River would take several years to complete, EPA, Massachusetts, Connecticut, and GE agreed on a process for attempting to reach a consensus on the Rest of River as they had for all of the other areas that are addressed in the Consent Decree. That process included EPA's issuance to GE of a Rest of River Permit to conduct the evaluations necessary to select a Rest of River remedy with the understanding that the Permit would later be modified to select the Rest of River remedial action.

Since then, GE's Pittsfield-based project team has remediated the half mile of the Housatonic River beginning at the former GE facility, Silver Lake, and almost all of the other areas covered by the Consent Decree outside the Rest of River, having completed its work in 17 of 19 of those areas. The two remaining areas other than the Rest of River will be remediated as soon as the required remediation plans receive EPA's approval. At the same time, EPA's project team remediated another 1½ mile reach of the River (with a substantial contribution to the costs of that effort by GE).

GE also gave the Pittsfield Economic Development Authority 52 acres of remediated property and approximately \$15 million to allow the creation of the William Stanley Industrial Park. GE gave Pittsfield another \$10 million that has been used by the City to fund numerous projects, including the rehabilitation of the Colonial Theater, support of the Barrington Stage Company, and the creation of the Berkshire Innovation Center. GE also provided \$15.7 million for environmental projects in Massachusetts and Connecticut.

In spite of all of this, there were those who opposed any effort by EPA, Massachusetts, and Connecticut to reach any consensus with GE. These critics have continued to criticize EPA, GE, and any suggestion of a consensus-driven approach to this day.

GE's evaluations necessary to select a Rest of River remedial action, as specified in the Consent Decree and the Permit, have now been completed. They include a massive Corrective Measures Study (CMS), and an even more comprehensive Revised Corrective Measures Study demanded by the Commonwealth of Massachusetts and others who concluded that the CMS did not sufficiently account for the inevitable negative impacts of further attempts to remove PCBs from the Housatonic River and its floodplain. The EPA New England Region (the "EPA

Region” or the “Region”) has proposed a Rest of River remedial action in a draft Permit modification; and that draft Permit modification, and the Region’s accompanying Statement of Basis and Comparative Analysis of Remedial Alternatives, contain (and purport to explain) the Region’s proposed remedial action for the Rest of River.

However, the Region’s proposal ignores the very evaluations that the Region itself demanded, and the Region has not conducted evaluations of its own proposal like those it demanded for every other remedial alternative in the CMS and the Revised Corrective Measures Study. The Region’s proposed remedy is almost three times larger than the one proposed by the Commonwealth of Massachusetts in response to the Revised Corrective Measures Study, and larger than all but two of the alternatives evaluated in the Revised Corrective Measures Study. The Region’s proposal would involve more removal, from more areas, with more negative impacts, and more cost. So it shouldn’t be surprising that there is no consensus about the Rest of River remedy proposed by the Region, like the consensus that was reached with respect to all of the other areas addressed by the Consent Decree. Beginning when the Region first shared with the public and GE its intentions for the Rest of River in the summer of 2012, GE stretched as far as it could to try to achieve a consensus on a common-sense solution to the PCBs in the Rest of River that was consistent with the conclusions of the evaluations that the Region had required. GE was prepared to undertake one of the largest river cleanups in history, including elements important to stakeholders that can’t be required under the Consent Decree or the Permit.

GE agrees that the Rest of River remedy must be fully protective of human health and the environment. However, as anyone who reads the Revised Corrective Measures Study can tell, the consideration of any effort to further reduce the concentrations of PCBs in the Rest of River requires a delicate balancing of the positive and negative impacts of such an effort. The Consent Decree and the Permit specify such a balancing by requiring EPA to select a Rest of River remedy on the basis of criteria that reflect particular kinds of positive impacts – like “overall protection of human health and the environment” and “control of sources of releases” – and negative impacts – like short-term and long-term negative impacts on the community and the ecosystem, as well as cost. The Consent Decree and the Permit do not allow EPA to propose a remedy that will do more overall harm than good, or to ask GE to spend unlimited amounts of money and effort to achieve speculative or minimal incremental benefits.

PCBs are undeniably present in the Rest of River, but PCBs have undeniably been present there for over 70 years, and the River, along with its unique forested banks and floodplains and associated wetlands, including dozens of irreplaceable vernal pools, all continue to support a rich variety of plant and animal life. Indeed, the Rest of River is home to many state-listed rare species that have not been able to maintain their footholds elsewhere.

At the same time, the Rest of River is a vulnerable and even a fragile place. Nearly any effort to remediate PCBs will disrupt it to some extent, and any aggressive cleanup effort will disrupt it beyond recognition and repair – clear cutting its forests, removing its delicate vernal pools, dredging the riverbed and wetlands, eliminating rare steep riverbanks carved by time and nature – destroying the habitats provided by these sensitive areas and destroying or displacing their many animal and plant inhabitants.

Given that removing PCBs from the Rest of River will also disturb its vibrant ecology, and that too many (or too aggressive) steps could result in “[d]estroying the river to clean it,” as the Boston Globe entitled an editorial about an earlier proposal far smaller and less disruptive than what the Region is now proposing, it is essential that any Rest of River remedial decision carefully weigh all of the relevant impacts, positive and negative, of any particular remedy.

The Region’s draft Permit modification does not employ such a balanced approach, and it does not achieve a balanced result. Time and again in the Region’s Comparative Analysis of Remedial Alternatives and its Statement of Basis, the benefits of its unstudied approach are overstated (and benefits achievable by alternative remedial approaches that have been studied are downplayed), inevitable negative impacts are dismissed with a wave of the hand, and cost considerations are completely ignored. The remedy that the Region proposes would lay a heavy glove on the Rest of River even though it is exceedingly clear that a lighter touch will also protect human health and the environment, and be far less destructive. The draft Permit modification is therefore (i) procedurally defective, because the Region has not paid the necessary attention to the criteria specified in the Consent Decree and the Permit, and (ii) substantively wrong (even dangerous) because, in the name of protecting the environment, it would destroy substantial portions of the Rest of River.

II. Off-Site Disposal

Perhaps the most significant example of the Region’s unbalanced approach is its selection of out-of-state disposal as the means of dealing with the nearly one million cubic yards of sediment and soil that would be removed if its proposal is implemented. Out-of-state disposal will be no more beneficial to the environment or the people of the Berkshires than on-site disposal in a secure upland facility on-site. In fact, out-of-state disposal could be more disruptive. Out-of-state disposal will certainly be far more expensive, costing GE about a quarter of a billion dollars more to implement than on-site disposal.

The Region knows this. It admits the vast disparity in cost, and it also admits that on-site disposal would be fully protective of human health and the environment. In fact, in the past, EPA has recognized on-site containment as the “presumptive remedy,” approving on-site disposal of PCB-contaminated sediment and soil at other sites across the United States, including in Massachusetts, and in Pittsfield, after finding that on-site disposal was protective of human health and the environment.

Given EPA’s long history of supporting on-site disposal in Pittsfield and elsewhere, it perhaps is not surprising that the Region’s arguments for abandoning that position are not compelling. For example, an on-site disposal facility would not, as the Region claims, have a significant effect on existing habitat, especially in the context of the remedy that the Region is proposing. One of the locations proposed for such a facility is a sand and gravel quarry and the two others have no special ecological value.

The Region’s other attempted justifications of out-of-state disposal highlight the impacts of on-site disposal while obscuring the essentially equivalent impacts of out-of-state disposal. For example, the Region focuses on the potential for improper operation and maintenance of an on-

site disposal facility (despite its certain ongoing role in overseeing the operation and maintenance of such a facility), but ignores the comparable risks at any out-of-state facility. The Region claims that out-of-state disposal is more reliable in the long term because “it does not rely on operation, monitoring, and maintenance requirements (except at the receiving facility).” The parenthetical qualification at the end of this statement lays bare the Region’s bias: Wherever the material in question goes, the facility that receives it will necessarily be subject to “operation, monitoring, and maintenance requirements.” There is no reason to believe – and the Region certainly has given none – that it would be any more difficult to meet those requirements at an on-site disposal facility than at an out-of-state “receiving facility.”

The fact is that even the EPA Region concedes that on-site disposal is equivalent to out-of-state disposal when it comes to their relative effectiveness. Further, the Region ignores certain impacts of out-of-state disposal that are not associated with on-site disposal. Out-of-state disposal will require construction of a rail loading facility that will, of necessity, have to be located near the River. Also, simply as a function of the total miles traveled, out-of-state disposal will result in many times higher emissions of greenhouse gases and a far higher risk of accidents, injuries, and even deaths.

Why then does the EPA Region insist on out-of-state disposal? The real reason is avoidance of local opposition. The Region claims that on-site disposal is not “implementable” because it would require “extensive coordination with state and local officials,” as well as with “the public,” and would encounter state and local opposition that could render the alternative infeasible. To be sure, implementability is one, albeit only one, of the many criteria EPA is required to consider in selecting a Rest of River remedy. However, as the Region knows, and even says elsewhere in its Comparative Analysis of Alternatives, the Rest of River remedial action is exempt from state and local permit requirements, and state and local opposition are not criteria that EPA is allowed to consider under the Consent Decree or the Permit. This was finally determined when the Court entered the Consent Decree. Thus, any state and local opposition to on-site disposal does not affect the implementability of that option.

On the other hand, cost is one of the criteria that EPA is specifically required to consider. GE estimates that out-of-state disposal will cost between \$200 million and \$300 million more than on-site disposal.

Given the functional equivalence between on-site and out-of-state disposal, EPA cannot require GE to pay for the much more expensive alternative. EPA’s own guidance says that, when more than one potential remedy will meet all the threshold criteria (as is the case here), then “cost becomes an important consideration in choosing the remedy” Nothing in the Permit or Consent Decree authorizes EPA to abandon common sense and ignore its own guidelines. Requiring GE to spend hundreds of millions to achieve no incremental environmental benefit is the essence of arbitrariness.

III. Lack of Health or Environmental Justification for EPA Proposal

When it comes to the actual remediation of the Rest of River, the EPA Region has basically adopted the position that the more soil and sediment GE is required to remove, the better the

outcome. This simplistic formula has caused the Region to propose a remedy that is not calculated to produce a greater benefit than less extensive alternatives, and will have far greater negative impacts.

In determining the appropriate “fix” for the Rest of River, an important initial question is this: Just how “broken” is the Rest of River ecosystem? The answer is: Not very. As the Commonwealth of Massachusetts has observed, despite what it calls a “legacy of contamination” in the River and floodplain resulting from PCB releases that began in the 1930s and did not end until the 1970s, the Housatonic River watershed continues to encompass “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.” Recent field surveys by the Commonwealth have documented the ongoing ecological vitality of the area, finding numerous plant and animal populations that continue to thrive, including several state-listed species found in few other places in the Commonwealth. The same is true with respect to the human population of the area. Studies have shown no elevated cancer rates or elevated blood PCB levels in the people who live in communities along the Housatonic River.

Real-world experience thus calls into question EPA’s assumptions about the risks of PCBs in the Rest of River.

But even if one takes EPA’s concerns at face value, the Region wants to do too much. Similar benefits can be achieved with less extensive, and less destructive, remedial action. For example, the Region’s proposed remedy would require the removal of 890,000 cubic yards of river sediment. This drastic action, however, would still not allow for unrestricted fish consumption, and less radical alternatives would achieve essentially the same level of protection of human health relating to fish consumption.

Likewise, with respect to the risk of direct human contact with contaminated soils and sediment, EPA proposes far more removal – some 75,000-80,000 cubic yards of floodplain soil – than is necessary to protect human health. To justify this position, EPA adopts a set of unrealistic assumptions, this time about the extent of potential human exposure. It supposes that a given individual would visit a given “high use” recreational area three times per week, every week from April to October, every year for 47 years, spending all of his or her time in the most contaminated areas of the floodplain. This is not, of course, how the recreational areas in the Rest of River are actually used. More realistic – but still very conservative – assumptions about exposure indicate that a much less extensive remedy, involving the removal of about 10,000 cubic yards of floodplain soil, would fully achieve the goal of protecting human health. In any event, even accepting EPA’s extreme exposure assumptions, a remedy that involved the removal of only about 26,000 cubic yards of soil would sufficiently address this risk.

In these ways, and others, the Region’s draft Permit modification gets the “benefit” variable of the equation wrong, but that is only one variable in the equation that EPA is required by the Consent Decree and Permit to solve. Equally important are the negative impacts of the remedial actions necessary to achieve these “benefits.” Like the Consent Decree and Permit, EPA’s own internal guidance says that the agency must balance (i) residual risks posed by site contaminants before and after implementation of a selected remedy with (ii) the potential

impacts of the selected remedy on the environment. The Agency has long recognized that “it may not be in the best interest of the overall environment” to actively remediate a site if the remediation would cause more long-term ecological harm than leaving the contamination in place.

When it comes to an assessment of those negative impacts here, more is clearly not better. The proposed remedy would cause substantial, extensive, and irreversible harm to the Rest of River ecosystem. While that ecosystem has thrived in the 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. For example, the proposed remedy would:

- Require the removal of sediment from over 200 acres of the river bed and the removal of riverbank soil from approximately 3.5 miles of river banks, “caus[ing] severe and long-lasting destruction of the Housatonic River ecosystem and state-listed rare species.” Those are the words of the Commonwealth of Massachusetts, not GE. The process of sediment removal and the capping of the riverbed would kill all of the benthic invertebrates that occupy the base of the aquatic food chain in this stretch of the river, and would cause severe damage to native fish populations, creating a vacuum in which invasive plant and animal species could take hold. In addition, the stabilization of the riverbanks would cause an enduring loss of critical habitat for many species, which would not return to their current condition.
- Require the removal of all mature trees from floodplain wetland forests in the area, destroying a vital habitat across 36 acres.
- Damage or destroy as many as 43 vernal pools. While EPA hasn’t even specified which pools would be affected, or how many of them would be “remediated,” it is clear that the vernal pools that would be subject to PCB removal, and the species that rely on them, would suffer long-term damage from which they would not completely recover.
- Adversely affect 25 state-listed species, including significant portions of the local populations of at least 9 of those species.

The Region essentially shrugs off these impacts, and justifies its blindness to the damage that its proposed remedy would cause by waving the banner of what it calls “restoration.” According to the Region, “restoration is expected to be fully effective and reliable in returning [the affected] habitats . . . to their pre-remediation state.” Even more outrageous is the Region’s claim that the likelihood of such complete restoration would be equal across all of the alternatives that have been presented, from the smallest to the largest.

How would this “restoration” be achieved, and what would it look like? The Region doesn’t say. In fact, the Region’s proposed remedy is so lacking in substance in this regard that one can barely make out what the Region really means when it refers to “restoration.” This lapse is a violation of the terms of the Permit, which require EPA to evaluate every significant aspect of

the proposed remedy in light of the Permit criteria. It also stands in stark contrast to, and opposition of, the exhaustive analysis that the Region required in the Revised Corrective Measures Study of the negative impacts of every other remedial alternative, what might be done to avoid or mitigate those impacts, and what the resulting condition of the affected areas would be.

From that Revised Corrective Measures Study and peer-reviewed research ignored by the Region, we know that restoration is not the panacea that the Region promises – not in general and not in the unique circumstances of the Rest of River. For example, there is absolutely no evidence that the complex infrastructure of a vernal pool network can be re-created once it, and its adjacent forest, is impacted in the way suggested by the proposed remedy. While it is narrowly true that forests can generally be “restored” by planting seedlings or saplings in the place of the mature trees that the proposed remedy will destroy, the prospect of “restoration” has to be tempered by the realization that it will, in the best case, be at least 50 to 100 years before the replanted forests could possibly return to their current, mature condition, with the ecological services they provide. That best case ignores the significant threats posed by invasive species, climate, and other forces working against such a possibility. In the meantime, the affected areas will be unable to sustain the species that currently rely on this unique habitat. The best case also ignores the steps that the Region would require to permanently prevent the reforestation of stabilized river banks.

In a critique that is attached to these comments, Professors Brooks, Calhoun, and Hunter, renowned experts on river ecosystems and vernal pools, demonstrate that the EPA Region has no basis for its optimism in the specific context of the Rest of River (because nothing like the “restoration” that the Region envisions has ever been attempted, much less achieved), and that the premise of the Region’s reliance on “restoration” is incorrect. In truth, the affected ecosystems can never be returned to their pre-remediation state. As the Professors explain, what the Region calls “restoration” will actually produce a new ecosystem. The most that can be hoped for, then, is that “restoration” may be partly effective at returning some types of habitats to some semblance of their pre-remediation state after an extended period that cannot be predicted with any certainty. What the Region proposes, in other words, is a speculative technological and ecological gamble. Given the high stakes for this unique and sensitive ecosystem and the low need for the extent of remediation that the Region proposes, this is a very poor wager indeed for the Commonwealth of Massachusetts, and for the people of the affected communities.

IV. Deficiencies in Specific Elements of Proposed Remedy

The picture does not change if one tightens the focus to particular elements of the proposed remedy. In its details, as in its broader outlines, the Region’s proposal is arbitrary and capricious because it fundamentally skews the necessary balance.

A. Proposed Remedies for Specific Parts of the Rest of River

The Region’s plans for remediating PCBs at Woods Pond and Rising Pond, in the Reach 7 impoundments, in the backwaters, and at the precious vernal pools are all microcosms of the

larger proposed remedy: Each suffers in some way from a defective calculation of positive and negative impacts. For each, the Region insists on more dredging, more capping, more removal of sediments and soils, but at every turn it fails to substantiate the assumption – more is better – that animates its insistence.

Thus, for example, at Woods Pond, the proposed remedy would require deep dredging and the placement of an engineered cap throughout the Pond, a remedy that will require the removal of at least 285,000 cubic yards of sediments and likely as much as 340,000 cubic yards, for the ostensible purposes of (i) reducing PCB concentrations in fish in the Pond and downstream, and (ii) reducing the transport of PCBs downstream from the Pond. But projections made using EPA's own model show no discernible difference in outcomes between the Region's proposal and alternatives involving far less removal. Likewise, in Rising Pond and in the Reach 7 impoundments and backwaters, the EPA model indicates that, at most, the Region's proposal would yield only tiny improvements in risk reduction over much more moderate remedies – or, in the case of Reach 7, even over Monitored Natural Recovery (MNR), in which the ecosystem is essentially allowed to recover without intrusion. Indeed, given the minuscule projected differences and the uncertainties inherent in the model, it cannot be said with statistical confidence that any real benefit would be achieved through the extra removal.

In each case, however, it is clear that performing the Region's proposed remedy will both (i) cost more, and (ii) have greater and more detrimental impacts. More dredging and more capping inevitably mean more traffic, and more traffic inevitably means more disruption and the emission of more greenhouse gases. The Region's proposal for Woods Pond would require an extra 30,000 truck trips over an equally effective plan involving much less removal; its plan to remove and replace up to 84,000 cubic yards of sediments in the Reach 7 impoundments would produce about 7,000 additional tonnes of greenhouse gases over "thin-layer capping" (and 10,000 more tonnes than MNR, which would be practically as effective); and its remedy for Rising Pond would necessitate approximately three times as many truck trips and generate nearly seven times as many tonnes of greenhouse gases as a more moderate approach. Remediating Woods Pond according to the proposed remedy would cost as much as \$188 million; the expense of an equally effective alternative would be only \$34-\$39 million. The cost disparities are similarly dramatic for the other areas mentioned.

For the vernal pools in the floodplain, the draft Permit modification does not convey a proposed remedy at all, but only the vaguest outlines of a highly contingent plan. This plan, moreover, is not rooted in the Permit criteria, as any proposed remedy must be, but contemplates the performance of undefined pilot tests and experimental measures whose potential benefits and impacts cannot reliably be predicted. Thus, according to the draft Permit modification, EPA will select 8 to 10 vernal pools for remediation by excavation, an unspecified number of additional pools for treatment with activated carbon, and yet another unspecified number of pools for testing of an unspecified "third remediation method." After these pilot programs are completed, EPA will decide which method to use on the remaining vernal pools.

It is clear that excavation will have a devastating impact on the affected pools and their inhabitants, and that there is no basis for the Region's claim that the damaged pools could be "restored" to anything resembling their pre-excavation state. Where the activated carbon

method would be used, the Region is proposing not a remedy but an experiment; there is no prior research on the effects of this approach, and no data on the harm that it might cause. With respect to the mysterious “third remediation method,” of course, no assessment of impacts is possible and the proposed remedy could not possibly be anything but arbitrary and capricious.

B. Proposed Performance Standards

The draft Permit modification sets a number of “Performance Standards” for GE’s performance of the proposed remedy. Several of these standards are inappropriate because – in line with the Region’s philosophy that more is better – they set much more stringent benchmarks than needed to achieve the intended benefit. For example, engineered caps can be considerably thinner than the Region has estimated and still be effective.

Other proposed standards are arbitrary because the Region cannot tie them to actual reductions in risk or otherwise justify them under the Permit’s selection criteria. For example, the numerical “flux values” set by the Region for downstream transport of PCBs are not related to any demonstrable benefit under the Permit. Moreover, that standard and a standard for PCB concentrations in fish tissue are not authorized under the Permit because they are essentially open-ended and contingent. Those standards suggest that, if GE someday does not meet them, then GE will have to undertake additional remedial actions; but the nature and extent of those actions are not specified in the draft Permit modification – they are instead left for future determination. This is contrary to the letter and spirit of the Consent Decree and the Permit, which are intended to provide everyone with certainty about the response actions that will be required, so that those interested can now take advantage of the review and appeal processes specified in the Consent Decree and the Permit.

V. Additional Requirements

The draft Permit modification contains a number of additional requirements that are inappropriate. For example, the habitat “restoration” requirements exceed EPA’s authority under the Consent Decree, in addition to being too vague to evaluate and unachievable. Requiring GE to pay for the restoration of resources damaged by the implementation of a remedial action falls into the legal category of “natural resource damages.” In the Consent Decree, however, GE entirely resolved its potential liability for natural resource damages by paying millions of dollars and agreeing to perform specified “Restoration Work.” This matter is settled and EPA cannot now assert new claims for additional natural resource damages caused by its own proposed remedy.

Some of the other proposed requirements go beyond EPA’s legal authority in other ways. For example, the draft Permit modification says that, if anyone implements any kind of a project along the river that would require sampling, handling, or disposition of sediment, then GE must pay all testing, handling, and disposal costs associated with PCBs in the sediment. This provision exceeds EPA’s proper role in two ways. First, it does not address any identified risks to human health or the environment, and thus is not within EPA’s purview. Second, EPA simply lacks the power to declare by administrative fiat that GE must pay costs incurred by third parties. If they suffer damages, and if the law makes GE liable for those damages, then they

may seek relief from GE, and if necessary from the courts, which are empowered and obligated to take into account not just the claims of the injured parties but any defenses that GE may offer.

Finally, the draft Permit modification goes wrong in its listing of a litany of state and federal ARARs (Applicable or Relevant and Appropriate Requirements) that must be attained by the on-site remedial actions. Some of these ARARs are in fact unattainable and will have to be waived. Others do not qualify as ARARs at all – for example, because they are not applicable to the proposed remedy or are simply not measurable and attainable using current technology.

VI. Conclusion

The Permit requires EPA to select a remedy for the Rest of River on the basis of specific criteria agreed to by EPA, the Commonwealth of Massachusetts, the State of Connecticut, and GE and then approved by the Federal Court.

The EPA Region has not complied with this essential requirement.

In fact, the Region ignores the very evaluations that it has demanded and refuses to subject its proposed remedy to the same evaluation it required of every other remedial alternative. It has not quantified many of the impacts of its proposed remedy (for example, its impacts on several types of floodplain habitat, marking those impacts as “TBD”). In certain material respects, it has not even specified the remedial actions that might be required (for example, the to-be-determined and therefore not evaluable “third remediation method” for vernal pools or the further work that might be required in the event of a flux or fish tissue Performance Standard exceedance). It also relies on a general and unsupportable claim of the likelihood of success of “restoration” to ignore the negative impacts that it does identify.

For these reasons and others, the Region is proposing a Rest of River remedy that is far larger and more destructive than remedies that have already been rejected by the Commonwealth of Massachusetts as doing more harm than good. This is a much different direction than anticipated by the Consent Decree and the Permit and unlikely to result in a consensus like the one reflected in those documents. However, GE remains committed to implementing a responsible remedy that addresses the PCBs remaining in the Rest of River in a way that is consistent with the requirements of the Consent Decree, the Permit, and EPA precedent.

I. INTRODUCTION

On May 30, 2014, the U.S. Environmental Protection Agency (EPA) New England Region (the EPA Region or the Region) issued a draft modification of the permit previously issued to the General Electric Company (GE) under the Resource Conservation and Recovery Act (RCRA), and reissued on December 5, 2007 (the Permit), relating to the Rest of River portion of the Housatonic River. The Rest of River constitutes that portion of the River and its floodplain located downstream of the confluence of the East and West Branches of the Housatonic River in Pittsfield (the Confluence), extending south through western Massachusetts and Connecticut (Figure 1).¹ The draft Permit modification issued by the Region (Draft Permit) identifies the Region's proposed remedial action to address the polychlorinated biphenyls (PCBs) remaining in the Rest of River. With the Draft Permit, the Region also issued a Statement of Basis for the proposed remedial action (Stmnt. Basis), a Comparative Analysis of Remedial Alternatives for the Rest of River (Comp. Analysis), the very lengthy Administrative Record (AR) compiled by the Region, and other supporting documents.

GE submits these comments on the Region's proposed remedy for the Rest of River, as described in the above-referenced documents. The Statement of Basis and Comparative Analysis of Remedial Alternatives for the Rest of River disregard the painstaking evaluations that the Region required of GE in the Revised Corrective Measures Study (RCMS) and the Region has not subjected its proposed remedy to anything like those evaluations that it required for every other alternative. As these comments demonstrate, the Region's proposed remedy is (a) arbitrary and capricious and (b) irreconcilable with the legal requirements applicable to EPA's selection of a remedy for the Rest of River.

A. Background

The Permit was negotiated and issued as part of a comprehensive settlement among EPA, the Commonwealth of Massachusetts, the State of Connecticut, GE, and other parties relating to the cleanup of GE's facility in Pittsfield, the Housatonic River downstream of GE's facility, and other adjacent and nearby areas, which was embodied in the Consent Decree (CD) for the GE-Pittsfield/Housatonic River Site (the Site). The CD was approved by the federal district court in October 2000. GE and EPA have worked cooperatively since then to complete most of the cleanup activities required by the CD, including GE's remediation of the Upper ½ Mile Reach of the River and various areas adjacent to the River and EPA's remediation of the 1½ Mile Reach of the River. These activities have significantly reduced the amount of PCBs entering the Rest of River.

The Permit and the CD established a defined multi-step process leading to the selection of a remedial action for the Rest of River. That process included investigations of the Rest of River, EPA's performance of human health and ecological risk assessments and development of a

¹ As shown on Figure 1, the Rest of River is divided into the following reaches: Reach 5 (from the Confluence to Woods Pond, encompassing Reaches 5A through 5C), Reach 6 (Woods Pond), Reach 7 (Woods Pond Dam to Rising Pond), Reach 8 (Rising Pond), Reach 9 (Rising Pond Dam to the Connecticut border), and Reaches 10-16 (from Connecticut border downstream).

PCB fate and transport model, GE's proposal of Interim Media Protection Goals (IMPGs), GE's performance of a Corrective Measures Study (CMS) to identify and evaluate remedial alternatives, and EPA's proposal and selection of a final remedy. The Permit specifies nine criteria for the selection of a Rest of River remedy, including three General Standards (threshold criteria) and six Selection Decision Factors (balancing factors). It also specifies that EPA's proposed remedy for the Rest of River remedy would be presented for public comment, and that EPA would then select a final remedy as a modification of the Permit, which is subject to appeal by GE and others. Under the CD, following any such appeals, GE is required to implement the remedy as a remedial action under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

1. EPA's risk assessments, IMPG approval, and model development

In 2005, the EPA Region completed the Human Health Risk Assessment (HHRA) (EPA, 2005a, 2005c) and Ecological Risk Assessment (ERA) (EPA, 2004a, 2005b) of the Rest of River. GE then submitted the IMPG Proposal in September 2005 (GE, 2005), but the EPA Region disapproved that proposal and directed GE to submit a revised IMPG Proposal incorporating a number of revisions specified by EPA. Although GE expressed its disagreements with and objections to a number of the Region's directives, GE submitted a revised IMPG Proposal in March 2006 implementing those directives, as required under the Permit (GE, 2006a). The Region approved that revised IMPG Proposal on April 3, 2006.

The EPA Region's model of the fate, transport, and bioaccumulation of PCBs within the Rest of River for use in predicting future PCB concentrations in water, sediments, and fish under various remedial alternatives was completed in 2006. The Region decided not to extend its model to Connecticut. The Region knew that PCB concentrations in the River there were already very low so it determined that it wasn't worth the effort necessary to collect the data that would be necessary to extend the model to Connecticut. Instead, the Region asked GE to develop a methodology for attempting to estimate future concentrations in four Connecticut impoundments based on extrapolations of the results of EPA's model for the downstream portion of the River in Massachusetts.

2. Corrective Measures Study (CMS)

In 2007, GE submitted a CMS Proposal outlining its plans for the identification and evaluation of remedial alternatives for the Rest of River. That proposal and several supplemental submittals were ultimately approved by the EPA Region subject to various conditions.

On March 21, 2008, in accordance with the Permit, GE submitted the CMS Report. That report evaluated a number of remedial alternatives approved by EPA, including eight alternatives for addressing sediments (designated SED 1 through SED 8), seven alternatives for addressing floodplain soil (designated FP 1 through FP 7), and five alternatives for treatment and/or disposition of removed sediments and soils (designated TD 1 through TD 5). These alternatives were evaluated under the nine criteria specified in the Permit. Based on the inputs and procedures that the Region required GE to use, the CMS Report concluded that the alternatives known as SED 3, FP 3, and TD 3 (on-site disposal) would best meet the remedy selection

criteria under the Permit; but it noted GE's disagreement with many of those inputs and procedures.

The Commonwealth of Massachusetts and others harshly criticized the CMS Report's analyses and conclusions. On May 20, 2008 the Massachusetts Commissioners of the Department of Environmental Protection (MassDEP) and the Department of Fish and Game (MassDFG) wrote that: "[T]he matrix of alternatives contained in the CMS Report is deficient in numerous respects [A] balanced consideration of the benefits and detriments to the resources [of the Rest of River] cannot be performed. EPA should require GE to redo the alternatives analysis in the CMS Report based on [a] more comprehensive assessment of the true costs of the alternatives." When the EPA Region resisted this suggestion, the Commonwealth's Secretary of Energy and Environmental Affairs wrote to EPA on June 16, 2008, reiterating that "there was a "need for extensive discussions with GE and other stakeholders," which "must consider options that do not lie within the four corners of the Corrective Measures Study." As a result of this pressure from the Commonwealth and others, the EPA Region required GE to prepare a revised CMS in a letter dated September 9, 2008, which also contained numerous comments on the March 2008 CMS. In its transmittal letter for those comments, the Region stated that the revised CMS "must provide a detailed discussion of how each alternative will provide species habitat protection through avoidance of negative impacts where possible or restoration where impacts are unavoidable and, if necessary, mitigation." GE then began extensive additional evaluations that were ultimately reflected in the RCMS, as well as the development of a more ecologically sensitive alternative, known as SED 10/FP 9. On March 6, 2009, GE submitted a detailed response to most of the Region's comments on the CMS Report.

On March 30, 2009, the Commonwealth's Secretary of Energy and Environmental Affairs designated the Upper Housatonic River as an Area of Critical Environmental Concern (ACEC) (MA EOEEA, 2009). The ACEC includes the River and its floodplain in the Primary Study Area (PSA), located between the Confluence and Woods Pond Dam, and it also extends slightly downstream of Woods Pond Dam. In designating this area as an ACEC, the Secretary found that this area contains "extensive and diverse wildlife habitats . . . , including rare species habitat for 32 state-listed species," with "unique biological value . . . highlighted by the unfragmented nature of much of the area" (*id.*). On August 31, 2009, GE submitted a Work Plan for the Evaluation of Additional Remedial Alternatives, which proposed to evaluate two new sets of alternatives – one identified by the EPA Region (designated SED 9/FP 8) and the one developed by GE (SED 10/FP 9). That work plan was conditionally approved by the Region.²

On February 12, 2010, at the Region's direction, GE submitted a report providing an in-depth evaluation of six "example areas" in the Rest of River, identified by the Region. That report described in detail the impacts of the remedial alternatives and various combinations of alternatives on the habitats in those example areas, potential options to avoid or minimize those impacts, potential restoration methods, and long-term post-restoration conditions in the example

² GE invoked administrative dispute resolution under the Permit on certain issues in the Region's conditional approval letter. EPA's decision in that dispute resolution proceeding upheld the Regional staff's recommendations. While GE disagreed with that decision, it followed EPA's directives in subsequent submittals, as required under the Permit.

areas under each remedial alternative in terms of the likelihood that implementation of restoration methods would re-establish pre-remediation conditions and functions and the timing in which they might do so.³ The Region never provided any comments on this report. Additionally, no such evaluation has been done by the Region regarding its proposed remedy.

On October 11, 2010, GE submitted the RCMS (ARCADIS et al., 2010). That RCMS provides the detailed evaluations demanded of the remedial alternatives described in the original CMS Report, plus the additional ones identified in the 2009 Work Plan, including an extensive evaluation of the ecological impacts of the remedial alternatives, potential methods to avoid or minimize those impacts, and the likelihood of success of those methods in re-establishing the pre-existing conditions and functions of the impacted habitats in the Rest of River. It also included a detailed assessment of the impacts of the alternatives on the numerous state-listed endangered, threatened, or special concern species identified by MassDFG as present in the Rest of River, and the extent to which those impacts would affect significant portions of the local populations of those species. That evaluation was again based on the nine remedy selection criteria specified in the Permit; and again it used the assumptions, IMPGs, procedures, and other inputs that the Region directed GE to use in the CMS, even though GE disagreed (and continues to disagree) with many of them. The RCMS concluded that, based on the evaluations presented in the report and using the procedures and inputs required by the EPA Region, the sediment/floodplain remedial alternatives designated SED 10/FP 9, together with on-site disposal of the removed sediment and soil (TD 3), would be best suited to meet the General Standards of the Permit in consideration of the Selection Decision Factors, including a balancing of those factors against one another.

3. Post-CMS activities

In January 2011, the Commonwealth of Massachusetts, through the Executive Office of Energy and Environmental Affairs, the MassDEP, and the MassDFG, submitted comments to EPA on the RCMS, “commend[ing] [GE] for presenting a detailed and informative evaluation of the advantages and disadvantages of the different approaches” and “conclud[ing] that none of the current combinations of alternatives achieve the remediation goals without causing irreparable harm to this unique, diverse and vital ecosystem that has been designated by the Commonwealth as an Area of Critical Environmental Concern (ACEC).” The Commonwealth also concluded that “in virtually all instances the actual inevitable damage to this existing, unique ecological resource” “in the name of meeting purported ecological goals” “will far exceed the theoretical benefit of lower PCB concentrations” (MA EOEEA et al., 2011). As a result, the Commonwealth proposed its own remedial alternative, which included no river sediment dredging other than in Woods Pond, no bank stabilization, and floodplain remediation only where necessary based on human health goals (*id.*).

³ In addition, in early 2010, GE produced a short film, entitled *The Housatonic: The Fate of a River*, which described current ecological conditions in the Rest of River and showed the impacts on those conditions from three of the remedial alternatives under consideration. A copy of that film is provided on a digital video disc (DVD) in Annex 1 to these comments.

EPA subsequently conducted a series of meetings with the States of Massachusetts and Connecticut to discuss remedial alternatives; and the Region issued a Status Report in May 2012 (EPA, 2012a) explaining its then-current thinking on a potential preferred remedial alternative. In addition, the Region sought input from its National Remedy Review Board (NRRB) and, in August 2012, issued a detailed Regional Response to the NRRB Comments, outlining a potential remedial action with associated performance standards for the Rest of River (EPA, 2012b).

Thereafter, EPA, GE, and the States of Massachusetts and Connecticut engaged in a series of further discussions in an effort to determine whether those parties could reach consensus on a mutually acceptable remedy. During the course of those discussions, GE presented a number of substantial remedial alternatives in an effort to reach a settlement, but did not concede any of its prior positions on Rest of River. Ultimately, the parties were not able to reach agreement on a remedy.

Finally, on January 17, 2014, the EPA Region issued what it purported to be a “conditional approval” of the RCMS. In that letter, the Region stated that it “does not necessarily agree” with the assertions, analyses, conclusions, or recommendations in the RCMS; but it did not specify which one it disagrees with and did not modify or require modification of the RCMS. Instead, in its May 2014 proposal, the Region presented its own alternative, designated SEP 9/FP 4 MOD, and proposed it as the remedy for the Rest of River.

B. Proposed Remedial Action

The remedy proposed in the Draft Permit includes the following key elements (refer to Figure 1 for identification of reaches):

- In Reaches 5A and 5C, sediment removal and capping to a depth sufficient to accommodate an engineered cap (estimated at 2.5 feet in Reach 5A and 2 feet in Reach 5C);
- For the river banks in Reach 5A, removal of eroding banks with PCB concentrations at or above 5 mg/kg, with reconstruction based on principles of so-called Natural Channel Design;
- In Reach 5B, removal of riverbed sediments with PCB concentrations \geq 50 mg/kg and riverbank soils with PCB concentrations $>$ 50 mg/kg, and placement of activated carbon (after a pilot study) in other riverbed areas;
- In the Reach 5 backwaters, sediment removal (including removal of all sediments with PCBs $>$ 50 mg/kg) and capping to achieve a spatially weighted average concentration (SWAC) of 1 mg/kg in both surface and subsurface sediments in each of various averaging areas, except in Core Area 1,⁴ where the proposed remedy would require removal of sediments

⁴ As described in a July 31, 2012 letter from the Massachusetts Division of Fisheries and Wildlife (MassDFW) within the MassDFG (Attachment B to Draft Permit), Core Area 1 refers to areas identified by the MassDFG as having “the highest quality habitat for [state-listed] species that are most likely to be impacted by PCB remediation activities” due

with PCB concentrations > 50 mg/kg, plus evaluation of the placement of an additive such as activated carbon in areas with PCB concentrations between 1 mg/kg and 50 mg/kg;

- In Woods Pond, deep dredging and placement of a shallower cap to achieve a minimum post-capping water depth of 6 feet;
- For the Reach 7 impoundments: (a) if an entity is planning to use, maintain, or remove a dam or impoundment, a requirement that GE must coordinate with the entity to pay the costs attributable to PCBs; or (b) otherwise, sediment removal (including removal of all sediments with PCBs > 50 mg/kg) and capping to grade to achieve a SWAC of 1 mg/kg in both surface and subsurface sediments in each of various averaging areas;
- In Rising Pond, sediment removal (including removal of all sediments with PCBs > 50 mg/kg) and capping to grade to achieve a SWAC of 1 mg/kg in both surface and subsurface sediments in each of various averaging areas;
- In the floodplain, soil removal/backfilling as necessary to meet the so-called Primary Standards (based on a 10^{-5} cancer risk and a non-cancer hazard index [HI] of 1) except in Core Area 1 and potentially in certain Core Areas 2 and 3 (to be determined on a case-by-case basis), where the so-called Secondary Standards (based on a 10^{-4} cancer risk and a non-cancer HI of 1) must be met;
- For vernal pools in the floodplain, identification of pools with PCB concentrations exceeding 3.3 mg/kg (one of the “purported ecological goals” rejected by the Commonwealth in 2011), after which EPA will designate some of those pools outside Core Area 1 for excavation, some for amendment by activated carbon, and some for a third remediation method to be proposed by GE, to be followed by an EPA determination of the preferred method for remediation of the remaining vernal pools with PCBs > 3.3 mg/kg outside Core Area 1;
- Off-site transport and out-of-state disposal of all removed sediments and soils, with a requirement to maximize the use of rail for such transport;
- Performance of restoration activities for affected habitats, but with no details regarding restoration methods;
- A numerical Downstream Transport Performance Standard, specifying certain flow-dependent PCB flux values over Woods Pond and Rising Pond Dam, which are not to be exceeded in three years out of any five-year period after completion of remedial construction;

to lack of mobility (i.e., plants) or high sensitivity. Core Area 2 refers to areas identified by MassDFG as having “the highest quality habitat for more mobile species that may be less vulnerable to remediation impacts, species where the habitat is likely to be somewhat more easily restored, and listed species that may be of a somewhat lower conservation concern, given their state-wide distribution.” Core Area 3 refers to areas with “dense concentrations of state-listed species” (i.e., overlapping habitat for eight or more such species). As discussed in Section III.C.1 below, the EPA Region’s use of these designations in its proposed remedy in a purported effort to reduce ecological impacts is inadequate to protect the ecosystem in the PSA and is thus inconsistent with the ACEC designation.

- A numerical Biota Performance Standard specifying a PCB concentration (1.5 mg/kg) that must be achieved in fish fillets within 15 years and is not to be exceeded in two consecutive monitoring periods after that 15-year period;
- Requirements that, in the future, if anyone implements a project along the River in Massachusetts or Connecticut that would require sampling, handling or disposition of sediments with PCBs > 1 mg/kg, or if there is any dam failure or unpermitted release with respect to a dam along the River, GE must pay all costs associated with PCBs; and
- Several requirements that address future use of floodplain properties, including requirements relating to Grants of Environmental Restrictions and Easements (EREs), Conditional Solutions, and future cleanup.

C. Organization of Comments

These comments are organized as follows:

Section II demonstrates that the EPA Region's proposed requirement that all removed sediments and soils must be transported to and disposed of at off-site, out-of-state disposal facilities, rather than being disposed of in a secure on-site upland disposal facility, as GE had proposed, abuses the Permit's remedy selection criteria and would be arbitrary, capricious, and unlawful.

Section III demonstrates that the proposed remedy for the sediments and floodplain lacks an adequate health or environmental justification, since it goes well beyond what is necessary to protect human health and would, as the Commonwealth has recognized, cause irreparable harm to the unique Rest of River ecosystem. Section III also shows that the Region has no support for its claim that "restoration is expected to be fully effective and reliable in returning the [unique and diverse] habitats" of the Rest of River "to their pre-remediation state," and that, "[a]s a result, the likelihood of effective restoration is equal under any of the alternatives" (Comp. Analysis, p. 26).

Section IV criticizes several specific elements of the proposed sediment/floodplain remedy, showing that each is arbitrary and capricious or otherwise unlawful. These elements include the proposed remedies for Woods Pond, the Reach 7 impoundments, Rising Pond, and the backwaters; the Region's cap design and thickness proposal; the proposed approach to vernal pools; and the proposed numerical Downstream Transport Performance Standard and Biota Performance Standard.

Section V explains why a number of the additional requirements included in the Draft Permit go beyond EPA's authority under RCRA, CERCLA, and the CD. These include the proposed restoration and compensatory mitigation requirements, the proposed requirement for GE to take actions that provide a net benefit to the conservation of affected state-listed species, the proposed requirements for GE to pay for future PCB costs incurred by third parties in connection with River dams and structures, the proposed requirements relating to future use of floodplain properties, and the proposed adaptive management requirements. This section also

addresses the Region's proposed applicable or relevant and appropriate requirements (ARARs) for the remedy, and shows that in numerous respects the Region's ARARs table is erroneous, unsupported, incomplete, and/or misleading. Finally, this section addresses the Region's proposed risk-based determination under the Toxic Substances Control Act (TSCA).

Section VI shows that, for several key aspects and components of the proposed remedy, the Region has not conducted any evaluation of the Permit's remedy selection criteria, contrary to the Permit's requirement. It then points out numerous misstatements in the evaluation that the Region *has* conducted, and shows that the Region's conclusion that its proposed sediment/floodplain alternative (SED 9/FP 4 MOD) best meets the Permit's criteria is inadequately supported and arbitrary.

Finally, Section VII describes a number of other deficiencies in the proposed remedy, including the Region's refusal to consider alternative toxicological information on PCBs, its directive to base the IMPGs *only* on EPA's risk assessments, and its proposal of a remedy that is not based on the RCMS and fails to provide certain information and evaluations that the Region required GE to include in the RCMS. This section also shows that, in several respects, the Region's proposed remedy violates the federal Data Quality Act.

II. OFF-SITE DISPOSAL REQUIREMENT

The EPA Region's proposed remedy would require that GE dispose of all contaminated sediment and soil removed as part of the remedy at off-site disposal facilities located outside Massachusetts, and that GE "shall maximize the transport of such waste material to off-site facilities via rail" (Draft Permit, p. 31). The Region rejected the alternative approach, proposed by GE, of disposal in a secure on-site upland disposal facility to be constructed in close proximity to the river but outside the 500-year floodplain.⁵ For purposes of the Region's analysis, off-site disposal (assumed to be via truck) has been designated alternative TD 1, off-site disposal by rail has been designated alternative TD 1 RR, and on-site disposition in a secure upland disposal has been designated alternative TD 3. In its Comparative Analysis of Remedial Alternatives, the Region notes that "[t]he Commonwealth of Massachusetts has expressed a strong preference for treatment/disposition alternatives that will permanently relocate contaminated materials in licensed out-of-state facilities, with a strong preference for the use of rail," and that "[o]f the evaluated alternatives, only TD 1 and TD 1 RR could satisfy this requirement" (Comp. Analysis, p. 75). The Region then concludes that, of all the treatment/disposition alternatives evaluation, "TD 1 RR is best suited to meet the General Standards of the RCRA permit in consideration of the Selection Decision Factors" (*id.*, p. 77).

A. Overview

The EPA Region's conclusion and consequent proposal twist the remedy selection criteria specified in the RCRA Permit in a heavy-handed effort to prevent on-site disposal, which is opposed by many in the local communities as well as the Commonwealth. The Region admits, as it must, that disposal of PCB-containing sediment and soil in a properly designed and maintained on-site upland disposal facility would be protective of human health and the environment (Stmt. Basis, p. 35; Comp. Analysis, p. 61). Indeed, EPA has long recognized that on-site disposal facilities are protective, particularly for wastes containing PCBs, which are relatively immobile. On-site disposal of removed PCB-containing sediment and/or soil has been a component of the remedy selected by EPA for numerous PCB sites throughout the country, including in Massachusetts. This is shown in Table 1. Unlike certain other types of waste, such sediment and soil basically consist of inert solid materials that have relatively low levels of contaminants and do not require treatment prior to disposal.

In fact, in the CD, EPA approved the use of such on-site disposal facilities for sediment and soil from other portions of this Site, including the upper two miles of the Housatonic River. In its response to comments on the proposed CD, EPA concluded that ***the use of on-site disposal facilities for PCB-containing material was appropriate*** and consistent with the use of such on-site containment as the "presumptive remedy" for similar situations and types of waste (United States' Response to Comments on proposed Consent Decree, pp. 69, 77). Further, in an attachment to the CD, EPA recognized that the material to be disposed of on-site "consist[s]

⁵ As discussed in the Revised CMS Report (Section 9), GE has identified three potential locations for an upland disposal facility, referred to as the Woods Pond, Forest Street, and Rising Pond Sites. Any of these sites would have the capacity and thus could be used for disposition of the approximately 1 million cubic yards (cy) of sediments and soils that would be removed under EPA's proposed remedy.

of relatively low levels of PCB contaminated soils and/or sediments which are spread over a large area measuring hundreds of acres” and “PCBs are relatively immobile due to their low solubility in water” (CD Appendix D, p. 38). Thus, EPA approved the disposition of this material in on-site facilities, finding that such disposition “will not pose an unreasonable risk of injury to health or the environment” (*id.*, p. 41).

EPA’s prior conclusions about contaminated sediment and soil from the Site apply with equal force to sediment and soil from the Rest of River. In fact, the prior conclusions are even more true at the Rest of River, where the PCB concentrations in the sediment and soil are generally lower on an overall basis than those in the areas above the Confluence, for which on-site disposition has already been authorized.

The EPA Region slants its discussion of many of the Permit criteria by suggesting new-found supposed problems with on-site disposal that are unsupported or overblown and by ignoring similar problems with the off-site disposal alternatives. This is demonstrated by the detailed analysis of the Permit criteria in Section II.B, but a few examples are mentioned here.

- In discussing several of the Permit criteria, the Region claims that an on-site disposal facility would cause a permanent alteration of the habitat at that site of the disposal facility (e.g., Comp. Analysis, pp. 61, 66). Based on the assumed removal/disposal volume of approximately 1 million cubic yards (cy) of sediment and soil, potential configurations of the upland disposal facility at each of the three identified sites – the Woods Pond, Forest Street, and Rising Pond Sites – have been revised and are shown on Figures 2, 3, and 4, respectively. As shown on those figures and discussed further in Section II.B.1, the facility at the Woods Pond Site would be located predominantly (over 90%) within an already disturbed area that has been used for long-term sand and gravel quarry operations, where there would be no impact on any valuable habitat; and the facilities at the other two sites would be located within areas that are not subject to any special protections and are not part of the ACEC. Moreover, these facilities would not include any floodplain or wetland areas or rare species habitat of the sort that would be devastated by the Region’s proposed sediment and floodplain remedy. By contrast, the Region does not even mention the habitat impacts of the on-site rail loading facility that would be necessary for TD 1 RR.
- In discussing several Permit criteria, the Region claims that TD 3 would have a risk of PCB leaks from trucks carrying leachate from the on-site disposal facility or from that facility itself if not operated properly (e.g., Comp. Analysis, pp. 61, 62, 64, 68, 69). In fact, however, as discussed further below, all aspects of the remediation, including the operation and maintenance of an on-site disposal facility, would be subject to EPA’s day-to-day oversight to ensure proper operation. In any case, long-distance transportation of sediment and soil to an out-of-state disposal facility by truck or rail would involve a greater risk from leaks during transport than the much shorter-distance transportation required for on-site disposal; and the potential for leaks from the disposal facility itself is no greater for an on-site disposal facility than for an off-site disposal facility.
- In discussing ARARs, the Region attempts to support its out-of-state disposal requirement by asserting that off-site disposal would have fewer ARARs and would meet all of them,

whereas on-site disposal would be subject to more ARARs and might not meet some of them, notably state ARARs relating to placement of a waste facility in an ACEC (e.g., Comp. Analysis, p. 63). As discussed further in Section II.B.3, that assertion is incorrect and simply another make-weight attempt to bolster the Region's position. Some of the regulations cited by the Region are not applicable at all. To the extent that the regulations prohibiting a waste facility in an ACEC are potentially applicable, they should not be applied to the Woods Pond Site (even though it is located within the ACEC boundaries) because on-site disposal in the quarry would not affect any of the resources of the ACEC. The other two potential disposal sites are well outside the ACEC. In any event, the Region has turned a blind eye to the fact that the very same ACEC prohibitions would also apply to the temporary sediment/soil staging areas necessary for any disposal alternative and to the rail loading facility necessary for TD 1 RR, as well as to the fact that other ACEC prohibitions would also apply to its proposed remedy for sediment (e.g., a state prohibition on dredging in an ACEC).

- Noting that there is “substantial local and state opposition” to on-site disposal, the Region claims that this opposition would make that alternative “very difficult, if not impossible, to implement” (Comp. Analysis, pp. 75, 76). That assertion is demonstrably wrong. As discussed in Section II.B.7, given the on-site permit exemption for remedial actions implemented under CERCLA, no state or local permits or approvals would be necessary for the on-site disposal facilities, and thus “local and state opposition” would pose no impediment to the implementability of this option.

Despite the Region's bias in favor of out-of-state disposal, an objective application of the Permit criteria clearly favors the selection of on-site disposal, as is demonstrated in Section II.B. This is because: (a) both off-site disposal and secure on-site upland 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.

B. Detailed Analysis of Permit Criteria

This section discusses in detail each of the Permit criteria applicable to alternatives TD 1, TD 1 RR, and TD 3. The first three such criteria discussed are the General Standards in the Permit, and the next five are the Selection Decision Factors.⁶

1. Overall protection of human health and the environment

The EPA Region acknowledges that both TD 1 and TD 3 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).

⁶ The Region and GE agree that the Selection Decision Factor of attainment of IMPGs is not applicable to the analysis of disposition alternatives.

As discussed in the prior section and 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.⁷ 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 (see Section II.A). 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.

Potential habitat impacts. The Region notes that TD 3 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). The Region states that the significance of that change in habitat would depend on the location of the facility. As shown on Figures 2, 3, and 4, the upland disposal facility at each of the three identified sites could be configured so that it would not only be located outside the 500-year floodplain, but would also not include any wetlands (although a facility at the Forest Street Site would require building an access road across a small stream) and would be outside of any mapped Priority Habitat for state-listed rare species.

In fact, at the Woods Pond Site, as shown on Figure 2, the facility's operational area would be located predominantly (approximately 27 of 29.5 acres) within an already disturbed area that has been used for many years for sand and gravel quarry operations, with a small portion (total of approximately 2.5 acres) affecting two small currently wooded areas on the northern side of the disturbed area that are of no special ecological significance. Thus, at this site, the post-use planting of this disposal facility area with grass would result in a clear **improvement** of the habitat compared to its current condition. At the other two sites, as shown on Figures 3 and 4, the operational areas of the waste disposal facilities would be located predominantly within currently wooded areas that are not subject to any special protections (such as those relating to wetlands, floodplains, or rare species habitat) and where the trees could be cut without regulatory approval.

At all of these sites, the disposal facility area would be replanted after use with a grassland community, which would provide suitable habitat for a variety of field-dependent wildlife species, as discussed further in Attachment A to these comments. In any case, the impacts of the

⁷ 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.

upland disposal facilities would be minor compared with the much more severe adverse habitat impacts of the river and floodplain remediation, which would impact hundreds of acres of riparian habitat, including floodplain forests, wetlands, and rare species habitat (see Section III.C.1 below).

Moreover, the Region has failed to consider the potential habitat impacts that would be caused by the construction of a rail loading facility under TD 1 RR. While a specific location for such a facility has not been identified, any such facility would need to be located in proximity to the river and therefore would likely impact valuable habitat, including land within the designated ACEC.

In short, contrary to the Region's claim, any habitat impacts of TD 3 do not undermine the protectiveness of that alternative.

Truck traffic and risk of leaks. The EPA Region also asserts that TD 3 would have additional short-term impacts such as truck transport of leachate from the disposal facility over public roads to GE's Pittsfield facility for treatment (Comp. Analysis, p. 61). It 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. This is another red herring. The Region admits 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" (*id.*, p. 61). The Region has made no effort to quantify the risks of such unanticipated circumstances or to estimate the PCB content of the leachate. If fact, if trucks were used to transport leachate to the GE Pittsfield plant for treatment, they would be water-tight to prevent any release. Further, we have calculated that the total mass of PCBs that would be transported in the leachate by truck over the life of the project would be approximately 2 pounds, which is minuscule compared to the total mass of PCBs that would be transported off-site by truck under TD 1 or by rail under TD 1 RR – approximately 38,000 pounds. See Table 2. Alternatively, if a treatment plant for the leachate were constructed at the upland disposal facility, GE could and would install adequate controls, subject to EPA approval, to prevent any leachate from being released into the surrounding environment, let alone into the Housatonic River.

Moreover, the Region appears to ignore the fact that TD 1 RR would likewise involve truck transportation and a potential for releases. Although the Region claims that TD 1 RR "would provide additional protection" by "reduc[ing] the effects on neighborhoods from truck traffic" (*id.*), that alternative would in fact require the use of trucks to transport the excavated sediment and soil to the rail loading facility. There is a potential for releases of PCB-containing materials from those trucks or from the rail loading facility itself, although, for the same reasons mentioned above for TD 3, controls could be installed to prevent such releases. Further, the Region fails to mention the potential for releases from rail cars during long-distance rail transport to out-of-state disposal facilities (e.g., in the event of a derailment), which would involve many more miles of transport than would transfer to an upland disposal facility and thus would increase the risks from TD 1 RR.

The Region also does not discuss other short-term impacts of these alternatives that could affect their protectiveness, but would undercut its effort to prevent on-site disposal in

Massachusetts. For example, as discussed in Section II.B.6, both TD 1 and TD 1 RR would result in considerably more greenhouse gas (GHG) emissions than TD 3 and thus would have a larger carbon footprint. In addition, as also discussed in Section II.B.6, both TD 1 and TD 1 RR would result in a substantially higher estimated incidence (over 20 times higher) of accident-related injuries and fatalities due to off-site truck or rail traffic than would TD 3.

Overall, both off-site disposal (whether by truck or by rail) and on-site upland disposal would provide protection of human health and the environment and, for the reasons discussed above, in several respects, on-site disposal would be more protective.

2. Control of sources of releases

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” (*id.*).

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.

3. Compliance with federal and state ARARs (or waiver of ARARs)

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;⁸ (b) TD 3 “has ARARs associated with being a

⁸ 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,

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.

Massachusetts solid waste facility site assignment regulations. To begin with, these regulations would not apply at all if the disposal facility were subject to the Massachusetts hazardous waste regulations (as the Region claims), because the solid waste site assignment regulations do not apply to facilities that manage hazardous waste (310 CMR 16.01((4)(a)). Thus, the Region cannot rely on both the solid waste regulations and the hazardous waste regulations. If one set applies, the other does not.

In any event, to the extent that the Region nevertheless seeks to rely on the state solid waste site assignment regulations, those regulations should not be considered to be an ARAR here because EPA has not identified them 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. Note that 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 (CERCLA § 121(d)(4)(E); 40 CFR § 300.430(f)(1)(ii)(C)(5)).

For example, at another portion of this same Site, the Massachusetts solid waste facility site assignment regulations were not identified as an ARAR for the Building 71 OPCA at the GE facility (a new on-site disposal facility). See ARARs tables in Annex 1 to Statement of Work for Removal Actions Outside the River (Appendix E to Consent Decree), Documentation Related to On-Plant Consolidation Area Activities. Similarly, these regulations were not listed as an ARAR in the EPA Records of Decision for other sites in Massachusetts that involved on-site disposal. These have included the Norwood PCBs Site (see EPA, 1996), the Sullivan’s Ledge Site (see EPA, 1989, 1991a), and the Silresim Chemical Corp. Site (see EPA, 1991b), at all of which MassDEP concurred in the remedy. Given that EPA and the Commonwealth have not applied the solid waste facility site assignment regulations to other sites in Massachusetts, it would be arbitrary for EPA to apply them here to support its rejection of TD 3.

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.

In addition, the prohibition in those regulations on siting a solid waste management facility in an ACEC, even if applicable, would not bar the implementation of TD 3. Contrary to the Region's claim, the ACEC prohibition in those regulations would, on its face, be inapplicable to two of the three sites identified for an on-site upland disposal facility. Those regulations prohibit a solid waste management facility "within" an ACEC or one that is located outside "but adjacent to" the ACEC and "would fail to protect the outstanding resources of [the] ACEC" (310 CMR 16.40(4)(d)). Neither the Forest Street Site nor the Rising Pond Site is located within or adjacent to the ACEC and thus they would not be affected by this prohibition even if it was applicable.

Moreover, although the Woods Pond Site for an on-site disposal facility is located within the boundaries of the ACEC, the ACEC prohibition should not be applied to it 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 (let alone a "critical" environmental concern). Indeed, in designating the ACEC, the Commonwealth's Secretary of Energy and Environmental Affairs stated that the Commonwealth would work with EPA to resolve any conflict between the ACEC designation and the remedy for the Rest of River (MA EOEEA, 2009, p. 17). In addition, in response a request from the owner of the quarry business at the Woods Pond Site that the ACEC should exclude that site, the Secretary declined to do so, but noted that the ACEC designation would not restrict that existing use of the site and was "not intended to impede development or redevelopment" (*id.*). The Secretary also rejected a request to exclude another project within the ACEC, finding that the ACEC designation was not intended to constitute a determination that that site has unique environmental resources or to place additional burdens on that project (*id.*, pp. 17-18).

Further, other state regulations contain ACEC prohibitions which the Region 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) (310 CMR 9.40(1)(b)); and regulations under the Massachusetts Wetlands Protection Act prohibit alteration of Bordering Vegetated Wetland in an ACEC (310 CMR 10.55(4)(e)). EPA knows this. In designating the Upper Housatonic River ACEC, the Commonwealth's Secretary of Energy and Environmental Affairs reported that EPA "request[ed] that in the ACEC designation, I either exempt the remediation activities [in the Rest of River] from any restrictions imposed by the ACEC designation, or clarify that certain types of activities are allowable under various regulations that are triggered by the ACEC designation." The Secretary declined to do this (MA EOEEA, 2009, page 17). Yet the Region 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 the Region's reliance on such prohibitions to reject on-site disposal is arbitrary and capricious.

Additionally, 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. Those regulations contain several general siting criteria for a "solid waste management facility" (310 CMR

16.40(4)), which includes any facility used for the “handling, storage, transfer, processing, treatment or disposal of solid waste” (310 CMR 16.02). That definition would encompass the temporary sediment/soil staging areas to be used under any alternative and the rail loading facility under TD 1 RR. Those general criteria include the ACEC prohibition (310 CMR 16.40(4)(d)). In addition, the regulations contain specific siting criteria for a “solid waste handling facility” (310 CMR 16.40(3)(d)), which includes any facility used for the “transfer” or “storage” of solid waste (310 CMR 16.02) and thus would also apply to the staging areas and rail loading facility. Among other requirements, these regulations prohibit any such facility within a “Riverfront Area” (i.e., the area within 200 feet of any flowing waterbody, 310 CMR 10.58(2)(a)3.) (310 CMR 16.40(3)(d)6.), which would apply to the staging areas and likely the rail loading facility. The Region does not mention these prohibitions, which further demonstrates its selective and arbitrary consideration of these regulations. See also Section IV.F.12 below.

Federal and state hazardous waste management regulations. 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.⁹ 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).

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. That provision provides that “[n]otwithstanding any other provision of” the state hazardous waste regulations, a hazardous waste management facility may not be located within an ACEC or “adjacent to or in close proximity to” an ACEC if it would “fail to protect the outstanding resources” of the ACEC (310 CMR 30.708). That prohibition applies even to facilities that meet EPA’s TSCA regulations (see 310 CMR 30.501(3)(a)4). Again, this ACEC prohibition would clearly not apply to two of

⁹ A total of over 90 samples of sediment or soil collected by EPA or GE from the 1½-Mile Reach or adjacent floodplain were analyzed for hazardous waste characteristics by the Toxicity Characteristic Leaching Procedure (TCLP). None of these samples showed leachate levels in excess of the regulatory limits that would result in the material being classified as hazardous waste under RCRA. It is expected that the sediments and soils in the Rest of River would be similar to those in and adjacent to the 1½-Mile Reach and thus would likewise not constitute RCRA hazardous waste.

the three sites identified for an on-site disposal facility. Neither of them is within the ACEC. The Forest Street Site is over two miles from the boundary of the ACEC. As such, it is not in such “close proximity” that its use as a disposal facility would “fail to protect” the outstanding resources of the ACEC, and there is nothing in the record that indicates otherwise.¹⁰ The Rising Pond Site is far – over 15 miles – downstream from the boundary of the ACEC.

With respect to the Woods Pond Site, this prohibition should not be identified as an ARAR or should be waived, because, as shown above, the facility footprint at that site would only affect previously disturbed quarry land and two small wooded areas that are not subject to any special protections (such as those relating to wetlands, floodplains, or rare species habitat) and where the trees could be cut without regulatory approval. Moreover, the timing of MassDEP’s proposal and adoption of this provision in 2013, 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. The Commonwealth stated plainly in its January 2011 comments on the RCMS that it strenuously opposed any on-site disposal within the State (MA EOEEA et al., 2011, pp. 14-15), and it reiterated that position in no uncertain terms in a public presentation on its proposed alternative on October 12, 2011 (see Attachment B). The Commonwealth consistently and vigorously continued that opposition through all subsequent discussions in 2012 and 2013. It was in this context that, in 2013, MassDEP proposed and adopted this provision of the hazardous waste regulations, which, unlike all other provisions in those regulations, applies specifically to facilities for the management of wastes containing PCBs at concentrations at or above 50 mg/kg, regardless of their compliance with the TSCA regulations. This context indicates plainly that this provision was directed at attempting to prevent on-site disposal for the Rest of River remedy. 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, as noted above, is a basis for waiver of a state ARAR under CERCLA and the NCP. Again, the fact that the Region has not mentioned the ACEC-based prohibitions in other state regulations (as discussed above) further demonstrates the one-sidedness of its reliance on the ACEC prohibition in the hazardous waste regulations.

Furthermore, the Region disregards and does not even mention the fact that this prohibition would also apply under TD 1 or TD 1 RR. As noted above, unlike the other provisions of the state hazardous waste regulations, the ACEC prohibition applies specifically to any “facility” for the treatment, storage, or disposal of waste containing PCBs at or above 50 ppm, regardless of its compliance with the TSCA regulations. A “facility” is defined under these regulations to include land used for “storing” hazardous waste, and “storage” means “the containment of hazardous waste for a temporary period . . . , at the end of which period the hazardous waste will be used, treated, disposed of, transported, or stored elsewhere” (310 CMR 30.010). Thus, the ACEC prohibition in the hazardous waste regulations would apply to staging areas or a rail loading facility located in or in close proximity to the ACEC. See also Section IV.F.11 below.

¹⁰ In fact, if the Forest Street Site were considered to be in “close proximity” to the ACEC such that it would “fail to protect” the outstanding resources of the ACEC, the same would be true of any hazardous waste management facility in Lee, and thus the ACEC prohibition could impact any businesses in Lee that generate hazardous waste.

Again, the Region's failure to mention this is clear evidence of its arbitrary and capricious bias in favor of out-of-state disposal and against on-site disposal, contrary to the CD and the Permit.

Massachusetts hazardous waste facility site safety council regulations. 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.

"Possible" wetlands ARARs. As previously noted, the Region also asserts that TD 3 has ARARs "possibly" associated with wetland impacts. It provides no further details as to what it might have in mind. As discussed above, however, and shown on Figures 2 and 4, 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.¹¹

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.

4. Long-term reliability and effectiveness

The EPA Region 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 it asserts again, without giving 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 (Comp. Analysis, pp. 63, 64). Presumably, that assertion is based on the same arguments that the Region presented for criteria 1 and 2 above. As such, it has the same flaws

¹¹ As shown on Figure 2, the operational footprint of the disposal facility at the Woods Pond Site would be located near two isolated man-made ponds that were created as part of the quarry operations. These man-made quarry ponds should not be considered regulated wetlands; but even if they were, the facility would not extend into those ponds. Further, in the event that these ponds were considered resource areas under the Massachusetts Wetlands Protection Act regulations and the facility were deemed to affect the buffer zones of those ponds (as defined in those regulations [310 CMR 10.02(2)(b)]), GE would implement erosion and sedimentation controls and other best management practices as necessary to meet any applicable substantive requirements under those regulations.

discussed in Sections II.B.1 and II.B.2. 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.

The Region also notes again that TD 3 would require local trucking of leachate from the disposal facility to the GE Pittsfield plant for treatment, or else the construction of a local treatment facility at the upland disposal facility, which could have releases if not operated properly (Comp. Analysis, p. 64). We have answered this claim in Section II.B.1. As shown there, if trucks were used to transport the leachate, they would be water-tight and would transport only a very small mass of PCBs, estimated at approximately 2 pounds, compared to the PCB mass of over 38,000 pounds that would be transported off-site by truck under TD 1 or by rail under TD 1 RR. Alternatively, if GE constructed a treatment facility at the on-site disposal facility, it would install controls, subject to EPA approval, to prevent leachate from being released into the environment, just as effectively as off-site facilities would do. Further, under TD 1 RR, there could be releases from the trucks transporting excavated materials to the rail loading facility or from the rail loading facility itself (if not operated properly), and there could be releases from the rail cars during the long-distance train transport (e.g., in the event of a derailment), which would cover many more miles of transport than the truck transport under TD 3 (see Tables 5 and 6, discussed in Section II.B.6 below). Again, the Region has provided no evidence that the risk of such releases would be greater with TD 3.

In addressing potential long-term adverse impacts on health or the environment, the Region states that TD 1 and TD 1 RR would not cause any adverse long-term environmental impacts in the Rest of River area, but that TD 3 would cause a permanent alteration of the existing habitat within the waste disposition area, “which, for the Woods Pond site, is located within an [ACEC]” (Comp. Analysis, pp. 65, 66). As discussed in Section II.B.1, 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. In fact, the post-use planting of this disposal facility area with grass would result in a long-term improvement of the habitat (see Attachment A). At the other two sites, the disposal areas would be located within upland wooded areas, which are of no special ecological value and are not subject to any regulatory restrictions on cutting, and there would be no permanent impact on wetlands, rare species habitat, or other particularly valuable or protected types of habitat. Further, any impacts would be minor compared with the adverse habitat impacts of the river and floodplain remediation, which would impact those types of valuable habitat, as described in Section III.C.1 below.

5. Reduction of toxicity, mobility, or volume of waste

The Region does not draw a distinction between the off-site and on-site disposal alternatives in terms of this criterion, noting that neither of these alternatives would reduce the toxicity of the PCB concentrations in the removed material through treatment, that both would reduce the mobility of PCBs in that material through placement in a disposal facility, and that neither would reduce the volume of PCB-containing material (Comp. Analysis, pp. 66-67; Stmt. Basis, p. 37). However, the Region does state in the Statement of Basis (p. 37) that off-site disposal “would reduce the volume of material *that remains at the Site*” (emphasis added). 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.

6. Short-term effectiveness

The EPA Region notes that TD 1, TD 1 RR, and TD 3 would all have some short-term negative impacts, but it overemphasizes the adverse impacts of TD 3 and underplays the adverse impacts of TD 1 RR in a further effort to support its proposed alternative.

Habitat impacts. The Region 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 (Comp. 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.

Greenhouse gas emissions. The Region compares the range of GHG emissions (for the removal volumes of all sediment/floodplain remedial alternatives) resulting from TD 1 to those resulting from TD 3, correctly noting that TD 3 would result in much lower emissions. The Region 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 (Comp. Analysis, pp. 68-69). 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 (approximately 1 million cubic yards). Those estimates are summarized in Table 3. They confirm that TD 1 would result in the greatest amount of emissions (approximately 165,000 tonnes), but they also show that 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 the Region’s specific “green remediation” policies to minimize GHG generation (EPA, 2009, 2012d).

Local community impacts. In terms of impacts on local communities, the Region focuses on the truck traffic that would be involved in the TD alternatives; and it 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 than 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).¹²

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).

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 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).

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.

In addition, 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 are presented in Table

¹² For all of these alternatives, as noted in Table 4, these truck trips would be in addition to the truck trips necessary to import material for backfill, capping, and construction of staging areas and access roads (approximately 72,000 for all TD alternatives) and to dispose of the staging/access material (approximately 11,000 for all TD alternatives).

6. They indicate that TD 1 and TD 1 RR would, respectively, result in a total of approximately 39 and 34 non-fatal injuries and 1.8 and 6.5 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.¹³

The Region also again raises the specter that, under TD 3, there would be a risk that leachate being transported via truck from an upland disposal facility could be released en route, creating impacts to the environment and the local community (Comp. Analysis, pp. 68, 69). It asserts that, while “all alternatives would involve the potential for accidental releases of various PCB-contaminated materials during transportation to off-site or local disposal or treatment facilities,” that potential would be greater with TD 3 (*id.*, p. 73). As shown in Sections II.B.1 and II.B.4, the Region has provided no evidence to justify that asserted difference, and in fact its claim is false.

Risks to remediation workers. The Region states that, for TD 1 and TD 1 RR, worker risks would consist of risks to truck drivers and (for 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; and it provides an estimate of risks to on-site remediation workers for TD 3 (Comp. Analysis, p. 72). 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.¹⁴ 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). As a result, worker risks do not provide a basis for selecting off-site disposal over on-site disposal.

Summary of short-term effectiveness. Overall, the short-term negative impacts from transport and disposal activities would be, depending on the types of impacts, either comparable among the TD alternatives or less for on-site disposal than for off-site disposal.

7. Implementability

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

¹³ Accident risks associated with on-site truck transport are considered under risks to remediation workers, discussed below.

¹⁴ GE estimates that, for the volume of removal under the proposed remedy, the risks to workers from on-site truck transport would include approximately 3 non-fatal injuries and 0.02 fatality for TD 1 RR and approximately 4.8 non-fatal injuries and 0.04 fatality for TD 3, as shown in Table 7.

alternative infeasible (Stmt. Basis, p. 38; Comp. Analysis, p. 75). These claims are unsupported. 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.¹⁵

The Region also asserts that, while TD 1 and TD 1 RR would comply with all ARARs, TD 3 could conflict with the ACEC designation, since “two of the three sites proposed for an upland disposal facility would likely be affected by ACEC and Massachusetts regulations restricting siting of such facilities within or in close proximity to an ACEC” (Comp. Analysis, p. 74). This is primarily an ARARs issue, not an implementability issue, and is discussed in detail in Section II.B.3. As shown there, the ACEC prohibition should not be applied or should be waived for the Woods Pond Site and, contrary to the Region’s assertion, does not even arguably apply to the other two identified sites for an upland disposal facility. Further, as also discussed in that section, to the extent that the ACEC prohibition would present an implementability issue, it would present such an implementability issue for a rail loading facility under TD 1 RR and for staging areas under TD 1 and TD 1 RR – which the Region fails to mention.

The Region also 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 (Comp. Analysis, p. 75). 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.

8. Costs

The Region correctly recognizes that TD 3 would be much less costly than TD 1 or TD 1 RR, although it has only estimated costs for these TD alternatives for the full range of potential

¹⁵ 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.

removal alternatives (Stmt. Basis, p. 38-39; Comp. Analysis, pp. 76, 78). GE has 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 the Region's proposed sediment/floodplain remedy – approximately 1 million cubic yards – using cost estimating methodologies that were previously discussed with the EPA Region without its objection. Those estimates are limited to the transportation and disposal costs – i.e., they do not include the upfront costs of the sediment and floodplain remedial activities. Those estimates are presented in Table 8 and summarized below:¹⁶

- TD 1 (trucking): \$368 million
- TD 1 RR: \$314 million
- TD 3: \$63 to \$127 million (depending on the site used)

These estimates confirm that on-site upland disposal 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.

C. Conclusion

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).¹⁷

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**

¹⁶ GE is submitting supporting information for these cost estimates in a 2014 Supplemental Cost Information Package under separate cover, since that package contains confidential business information subject to the protections in 40 CFR Part 2, Subpart B.

¹⁷ 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).

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 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.

III. LACK OF HEALTH OR ENVIRONMENTAL JUSTIFICATION FOR PROPOSED REMEDY

A. Incorrect Underlying Assumption

The EPA Region'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 (e.g., Stmt. Basis, p, 28); see also *id.*, p. 30, noting that alternatives that remove the most soil and sediment are the most reliable and effective and provide the most reduction in risk. 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).

B. The Proposed Remedy Goes Well Beyond What Is Necessary To Protect Human Health

To begin with, as noted in many of GE's prior submittals to EPA, the best scientific evidence demonstrates that the PCB toxicity values that the Agency 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.¹⁸ 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.¹⁹ At this Site, the lack of adverse human health effects of PCBs is further borne out by empirical evidence showing no elevated cancer rates or elevated blood PCB levels among individuals in communities along the Housatonic River.²⁰

¹⁸ For example, detailed reviews by Golden et al. (2003) and Golden and Kimbrough (2009) of the human epidemiological studies on cancer showed that there is no causal relationship between PCB exposure and any form of cancer. (Copies of these reviews are included in Attachment J.) Similarly, a comprehensive review of the non-cancer data by Bernier et al. (2001) demonstrated that, with the possible exception of dermal and ocular effects in highly exposed PCB workers, there is no reliable evidence of a causal relationship between PCB exposure and adverse non-cancer health effects in humans.

¹⁹ See, e.g., Silkworth et al. (2005); Westerink et al. (2008); Carlson et al. (2009) (copies included in Attachment J).

²⁰ For example, a study conducted by the Massachusetts Department of Public Health (MassDPH), in coordination with the Agency for Toxic Substance and Disease Registry (ATSDR), of cancer incidence rates from 1982 through 1998 for communities along the Housatonic River showed that those cancer rates were not elevated and not associated with areas having high PCB concentrations (ATSDR, 2002). Similarly, the Berkshire Medical Center has reported, based on cancer incidence data from the National Cancer Institute of the National Institutes of Health from 2005 through 2009, that "Berkshire County lands squarely in the middle range of cancer incidence rates for all counties in Massachusetts, which itself has the lowest incidence of cancer in the Northeast U.S." (Berkshire Medical Center, 2012, p. 4; copy included in Attachment J). In addition, an exposure assessment conducted by MassDPH

Nevertheless, even accepting EPA's PCB toxicity values, the Region's proposed remedy clearly goes beyond what is necessary to protect human health. The specific health bases given by the Region 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 (Stmt. Basis, pp. 15, 17). Even accepting EPA's toxicity values, a less extensive remedy would provide human health protection from PCB exposure via both of these pathways, as shown below.

1. Fish consumption

The Region estimates that its proposed remedy would require removal of approximately 890,000 cubic yards of river sediment (Stmt. Basis, p. 21). The primary basis for this enormous sediment removal project is to reduce PCB concentrations in fish and thereby provide protection to individuals who consume fish from the Housatonic River.

The Region 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) (Comp. Analysis, p. 13, Table 2). 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.

In these circumstances, to support its proposed remedy, the Region relies on the predicted attainment of a fish consumption IMPG based on its Central Tendency Exposure (CTE) assumptions (developed for "average" exposure) and derived from a probabilistic risk analysis method set forth in the HHRA. Specifically, the Region explains, its 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 (Comp. Analysis, p. 13 & Table 2). However, attainment of that CTE IMPG would not avoid the need for continued fish consumption advisories.²¹

In any event, a less extensive remedy would likewise achieve the same probabilistic CTE IMPG for fish consumption in Massachusetts. For example, Table 2 in EPA's Comparative Analysis shows that alternative SED 5 (which would involve 377,000 cubic yards of sediment removal) would achieve the same CTE IMPG in all Massachusetts reaches except one (in this case Reach 7B) within the model projection period – and in fact would achieve other CTE IMPG (i.e.,

(1997) on PCB levels in blood from individuals in the Housatonic River valley having a high potential for PCB exposure indicated that the blood PCB levels in non-occupationally exposed individuals in that area did not exceed the background range in the general population.

²¹ While the Region also refers to risks from consumption of waterfowl, it does not present any evaluation the extent to which its proposed remedy or any remedial alternatives would achieve the IMPGs based on waterfowl consumption. This is because its model cannot predict future PCB concentrations in waterfowl, and there is no other available mechanism to do so. Thus, the Region cannot rely on waterfowl consumption as a basis for selecting its proposed remedy.

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. Moreover, as discussed further below, use of 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. See Sections IV.A through IV.D below.

With respect to Connecticut, as noted above (Section I.A), since the Region decided not to extend its model to Connecticut, 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. Given their reliance on such simplifying assumptions and factors and the significant underlying data limitations, 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, as shown in Sections IV.A through IV.D below.

In fact, it appears that any of the active remediation alternatives, including those with much less extensive sediment removal than the Region's proposed alternative, would likely achieve PCB levels in fish that should allow removal or substantial reduction of the PCB fish consumption advisory in Connecticut within the foreseeable future. Under the guidance used by the Connecticut Department of Public Health (CT DPH) to establish and revise its fish consumption advisory (outlined by the EPA Region in note 1 on page 5 of its September 9, 2008 comments on the CMS), when PCB levels in fish fillets fall into the range of 0.1 to 0.2 mg/kg, fish consumption of one meal per week (approximately the same as EPA's assumed fish consumption rate for the RME scenario) would be allowed. While the model extrapolations to Connecticut are highly uncertain, the extrapolation results summarized in the Region's Comparative Analysis indicate that all of the active remediation alternatives evaluated in the RCMS, including the alternative recommended by GE in that report (SED 10/FP 9), would achieve PCB fish fillet levels within or below that range in 18 years or less in the most upstream Connecticut impoundment (Bulls Bridge) and in 11 years or less in the other Connecticut impoundments (see Comp. Analysis, Table 2, p. 14). The model extrapolation results show further that all of those alternatives would achieve or reach the boundary of the CT DPH's "unlimited" fish consumption level – less than 0.1 mg/kg – in all of the Connecticut impoundments within the model projection period (see *id.*, Table 4, p. 22).²²

These comparisons make clear that the Region's proposed remedy requires more removal than is necessary to protect human health and thus cannot be justified on the ground that it is needed to provide such protection.

²² It should also be noted that Connecticut has a state-wide fish consumption advisory, based on mercury, of no more than one meal per month for high-risk individuals (e.g., pregnant or nursing women, young children) and no more than one meal per week for others. Thus, regardless of the reduction in PCB levels, it is likely that a fish consumption advisory will remain on the Housatonic River in Connecticut due to mercury.

2. Direct contact with floodplain soils and river sediments

The EPA Region's proposed cleanup standards for the various identified exposure areas (EAs) in the floodplain are based on the EPA-approved IMPGs for direct human contact with floodplain soil, which, in turn, were based on EPA's assumptions in its HHRA. Specifically, the proposed Primary Cleanup Standards (applicable to all floodplain EAs except those in Core Area 1 and potentially in certain portions of Core Areas 2 or 3) are based on the RME assumptions in the HHRA and on a target cancer risk of 1×10^{-5} and a target non-cancer HI of 1 (Draft Permit, Tables 1 & 2). The proposed Secondary Cleanup Standards (applicable to Core Area 1 and potentially certain portions of Core Areas 2 or 3) are based on the RME assumptions in the HHRA and a target cancer risk of 1×10^{-4} and a target non-cancer HI of 1 (*id.*, Table 1). The Region estimates that application of these cleanup standards would require the excavation and disposal of approximately 75,000 cubic yards of floodplain soil (Comp. Analysis, p. 9 & Att. 6), but GE's estimate of the floodplain soil that would be required to meet these standards is 80,000 cubic yards. In addition, the Region cites the non-cancer-based IMPGs using RME assumptions for direct contact with river sediments as an additional basis for sediment remediation (Stmt. Basis, p. 15).

Many of the HHRA's RME exposure assumptions that underlie the EPA-approved IMPGs based on direct contact 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 (AMEC and BBL Sciences, 2003, 2005; GE, 2003) and in GE's initial IMPG Proposal (GE, 2005), and some examples are provided below.

For many of the floodplain EAs that the Region determined fall into a general recreational scenario, the Region has assigned an assumed exposure frequency (i.e., assumed frequency of use) that is implausibly high and inconsistent with empirical data on actual frequency of use. Specifically, for 62 EAs, which the Region has designated as "high use" recreational areas, the Region assumes that an individual would use those areas 90 days per year (Draft Permit, Table 1), which translates to three days per week, every week, from April through October, and that the individual would spend all of that time within the floodplain (as opposed to other parts of the recreational areas) and be exposed to the upper-bound PCB concentrations in the floodplain, and would continue to do so for 47 years. For other EAs, designated as "medium use" or "low use" recreational areas, the Region has assumed an exposure frequency of 60 days per year or 30 days per year, respectively, for the same duration (*id.*). 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 these assumed exposure frequencies was demonstrated by an empirical Floodplain User Survey conducted from April through October 2002 (TER, 2003, summarized in Attachment A to GE's comments on the initial draft HHRA [AMEC and BBL Sciences, 2003]). That survey included intensive observations of recreational use of most of the floodplain EAs identified by the EPA Region in Reaches 5 and 6. It revealed that most floodplain areas receive little or no recreational use, which shows that many of the exposure frequencies assigned by the Region, as set forth in the HHRA and specified in Table 1 of the Draft Permit, substantially overestimate use. Table 9 lists the floodplain EAs in Reaches 5 and

6, the Region's assumed exposure frequency for each, and the findings of the Floodplain User Survey for each of those EAs. As shown, for example, there are 24 EAs for which the Region has assigned a recreational exposure frequency of 90 days per year but at which the empirical 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 the Region in those EAs were occurring, the survey would have observed more usage.²³

Other unrealistic and overstated exposure assumptions in the HHRA, described in the prior GE submissions cited 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 these overstated exposure assumptions, 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 (GE, 2005), 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. Those more supportable cleanup standards are listed in Tables 10a-10c. GE has applied these cleanup standards to the floodplain EAs using the same approach used by the Region – i.e., applying the more supportable Primary and Secondary Cleanup Standards to the same EAs to which the Region applied its Primary and Secondary Cleanup Standards. The results of this exercise shows 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 the Region's proposed remedy.

Moreover, even accepting EPA's exposure assumptions, a less disruptive remedy than proposed by the Region 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, as demonstrated by Tables 8-7a and 8-8 in the RCMS, 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. In this regard, it is significant that the Region accepts 10^{-4} cancer risks for fish consumption (as discussed above) and for direct contact exposure in Core Area 1, but not for

²³ GE recognizes that EPA needs to consider reasonably anticipated future use as well as current use, and that future use could be somewhat higher than current use in some areas. However, it is not reasonable to anticipate that future use in areas with such low current use would rise to the level assumed by the Region, particularly in EAs that are remote and/or have difficult access due to the presence of wetlands and/or dense vegetation (e.g., EAs 10, 13, 16, 17, 19, 20, 32, 33, 35).

direct contact in other EAs. The Region has provided no health basis for that distinction.²⁴ 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.

As these comparisons demonstrate, the Region's proposed remedy would require far more removal than is necessary to prevent direct contact risks and thus cannot be justified on the basis that it is needed to protect against such risks.

C. The Proposed Remedy Would Cause Overall Harm to the Environment

EPA may not order a remedy that would cause harm greater than 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); and 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. For example, EPA's *Contaminated Sediment Remediation Guidance for Hazardous Waste Sites* states: "[W]hile a project may be designed to minimize habitat loss, or even enhance habitat, sediment removal and disposal do alter the environment. It is important to determine whether the loss of a contaminated habitat is a greater impact than the benefit of providing a new, modified but less contaminated habitat" (EPA, 2005d, p. 6-6). Similarly, EPA's *Ecological Risk Assessment Guidance for Superfund* specifies that "[m]anagement of ecological risks must take into account the potential for impacts to the ecological assessment endpoints from implementation of various remedial options," and must "balance: (1) residual risks posed by site contaminants before and after implementation of the selected remedy with (2) the potential impacts of the selected remedy on the environment independent of contaminant effects" (EPA, 1997a, p. 8-3). Further, EPA's *Ecological Risk Assessment and Risk Management Principles for Superfund* state that, "[e]ven though an ecological risk assessment may demonstrate that adverse ecological effects have occurred or are expected to occur, it may not be in the best interest of the overall environment to actively remediate the site" if the remediation would cause more long-term ecological harm than leaving the contamination in place (EPA, 1999, p. 6). In this case, the Region'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, as demonstrated below.

1. Ecological impacts of proposed remedy

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

²⁴ In fact, EPA's acceptable cancer risk range is between 10^{-6} and 10^{-4} , not between 1×10^{-6} and 1×10^{-4} (40 CFR § 300.430(e)(2)(i)(A)(2)). EPA recently recognized this in its proposed cleanup plan for the Lower Passaic River, where it explained that "[t]he **upper boundary of EPA's acceptable risk range is not a discrete line at 1×10^{-4} ,**" and thus found that risk estimates between 5×10^{-4} and 3×10^{-4} are "within the acceptable range" (EPA, 2014a, p. 27-28; emphasis added).

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 (MA EOEEA, 2009) and its comments on the RCMS (MA EOEEA et al., 2011), this ecosystem is biologically unique, with substantial biodiversity and wildlife habitat and an exceptional number of state-listed rare species owing in part to its rare, unfragmented forested riparian corridor and network of numerous vernal pools. The proposed remedy would severely impact all of these aspects of this unique ecosystem.

Impacts on riverine and floodplain habitats. While the Region 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.²⁵ Those impacts are listed, by habitat type, in Table 11 and depicted, for the PSA, on Figures 5a through 5f.²⁶ As shown in Table 11, 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).

In its discussions of the ecological impacts of the proposed remedy, the Region 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 (Comp. Analysis, pp. 16, 26, 27-32, 56). Specifically, the Region states that there is “a significant body of knowledge” that “documents the ability to reestablish the pre-remediation conditions and functions of the affected habitats” (*id.*, p. 26), citing a 2011 paper by an EPA consultant, which was included as Appendix D to the Region’s 2012 Site Information Package to the NRRB and is reprinted as Attachment 12 to the Comparative Analysis. The Region 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 alternatives” (*id.*).

The Region’s claims regarding the severity and duration of the habitat impacts and the effectiveness and reliability of restoration are unsupported and unjustified.²⁷ The impacts of

²⁵ The Region claims that the access road and staging area estimates presented by GE in the RCMS were not optimized (Comp. Analysis, p. 28 n.5, p. 53 n.9). The Region provides no support for that assertion. In fact, GE has attempted to optimize the locations of these facilities to minimize adverse impacts on forested and other sensitive areas and on residential neighborhoods and other densely populated areas to the extent practicable and to use existing infrastructure where possible.

²⁶ Specifically, the floodplain impacts listed in Table 11 and the “floodplain remediation” areas shown on Figures 5a through 5f, as well as on subsequent Figures 6a through 6c, 7a through 7f, and 9a and 9b, reflect the remediation that would be necessary, based on existing data, to attain the Region’s proposed “Primary Standards” in all floodplain areas except in Core Area 1 and to attain the Region’s proposed “Secondary Standards” in Core Area 1.

²⁷ Several other specific examples of the Region’s unsupported statements regarding the habitat impacts of the proposed remedy and the effectiveness of restoration are listed in Section VI.B.4 below.

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 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 the Region'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 (Comp. Analysis, Attachment 12). The Region's Statement of Basis and Comparative Analysis of Alternatives ignore this critical conclusion of its own consultant.

In addition, these Professors have prepared a separate critique of the Region's claims that restoration would effectively and reliably re-establish the pre-remediation conditions and functions of the affected habitats, including the consultant report on which EPA relies (contained in Attachment 12 to the Comparative Analysis). That critique, which references 30 sources not considered by the Region, most of which have been peer reviewed, is provided in Attachment D hereto. 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 (e.g., Palmer et al., in press 2014, 2010), wetlands (e.g., Moreno-Mateos et al., 2012) and vernal pools (e.g., Calhoun et al., 2014). 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" (Attachment D, section 3).

Some examples of the key adverse impacts of the proposed remedy and the limitations on efforts to ameliorate those impacts through restoration are as follows:

- 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 (Table 11; Figures 5a through 5f). 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 (MA EOEEA et al., 2011, p. 2). Although the proposed remedy specifies that this work should be conducted "considering the principles of Natural Channel Design" (Draft Permit, pp. 14, 15, 16), described in Chapter 11 of the *Part 654 Stream Restoration Design National Engineering Handbook* (U.S. Dep. of Agriculture, 2007), 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 (see RCMS sections 5.3.1.4 & 6.3.5.3; Attachment C hereto, section 2.2.1).

Even more significantly, 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 (see MA EOEEA et al., 2011, pp. 8-9; RCMS sections 5.3.2.4 & 6.3.5.3; Attachment C hereto, sec. 2.2.2).

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.

- The proposed remedy would impact 36 acres of floodplain wetland forested habitat (Table 11). 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 (see RCMS sections 5.3.4.4 & 7.3.5.3; Attachment C hereto, section 3.2). 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 (*id.*).

- The proposed remedy could impact up to 43 vernal pools (27 acres) in the PSA (Table 11).²⁸ 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 (see RCMS sections 5.3.7.4 & 7.3.5.3; Attachment C hereto, section 6.2).²⁹ Moreover, those changes are likely to be irreversible since, contrary to the Region’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. As shown by Professors Brooks, Calhoun, and Hunter in Attachments C (section 6.3) and D (section 2.6.4) and in the recent peer-reviewed publication by Calhoun et al. (2014) (attached to Attachment D), 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” (MA EOEEA et al., 2011, p. 11).

Further, 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 (see Attachment C, section 2.6.3).

- 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. As discussed in Attachment C (section 1.2), those activities would have 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.

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

²⁸ The proposed remedy provides that, after identification of vernal pools with PCB concentrations exceeding 3.3 mg/kg, EPA will designate some of those pools outside Core Area 1 for excavation, some for amendment by activated carbon, and some for a third remediation method to be proposed by GE, and that after the first round of remediation, EPA will determine the preferred method for remediation of the remaining vernal pools with PCBs > 3.3 mg/kg outside Core Area 1. That specific proposal is discussed further in Section IV.F below. GE has determined that, of the 66 vernal pools identified by Woodlot (2002) in the PSA, 43 are located outside of Core Area 1 and have PCB concentrations exceeding 3.3 mg/kg. Thus, that appears to be the upper-bound number of vernal pools that would be remediated under the Region’s proposal.

²⁹ The use of activated carbon in a portion of the vernal pools is discussed in Section IV.F.

corridor in the 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 (see *id.*). Given the constraints and limitations on restoration methods, the PSA ecosystem would not recover entirely from that loss.

Impacts on state-listed species. The Region's proposed remedy would also have severe adverse impacts on state-listed species. The impacts of the proposed remedy in the areas identified by the Natural Heritage and Endangered Species Program (NHESP) of the MassDFG as Core Areas 1, 2, and 3 (defined in Attachment B to the Draft Permit) are shown on Figures 6a, 6b, and 6c, respectively, and the impacts on areas in Reaches 5 and 6 with various densities of priority habitats of state-listed species are shown on Figures 7a through 7f. Although the Region's proposal would limit remediation in Core Area 1, that would not avoid substantial impacts on state-listed species. While the Region has not estimated the number of state-listed species that would be affected by its proposed remedy (Comp. Analysis, p. 33), 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 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 is summarized in Table 12. It 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.

Despite the Region's proposal of limited remediation in Core Area 1, impacts on state-listed species would occur in other areas. For example, NHESP has defined Core Area 2 as areas having "the highest quality habitat for more mobile species that may be less vulnerable to remediation impacts, species where the habitat is likely to be somewhat more easily restored, and listed species that may be of somewhat lower conservation concern" (Draft Permit, Attachment B, p. 2), and has listed American bittern, mustard white, wood turtle, and common moorhen as Core Area 2 species. As shown in Attachment E, given the nature of the work in the proposed remedy, at least three of these 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 (*id.*), Massachusetts Audubon's recent State of the Birds Report lists American bitterns as "locally and strongly declining; conservation action urgent" (Mass Audubon, 2013). NHESP's additional claim that the habitats of the Core 2 species are "more easily restored" is belied by the evidence, as discussed above. 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.

2. Minimal, if any, ecological risks to be addressed by proposed remedy

In contrast to the certain and severe adverse ecological impacts of the proposed remedy, the ecological risks identified by the Region are tenuous and uncertain at best. EPA's *Ecological*

Risk Assessment and Risk Management Principles for Superfund specify that the purpose of ecologically based remediation is to “result in the recovery and maintenance of healthy **local populations and communities** of biota,” not to protect “organisms on an individual basis” (EPA, 1999, p. 3; emphasis added). 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. This was demonstrated in GE’s comments on the initial and revised drafts of the ERA (BBL Sciences et al., 2003, 2005; GE 2004), GE’s initial IMPG Proposal (GE, 2005), GE’s Statement of Position in dispute resolution on EPA’s disapproval of that initial IMPG Proposal (GE, 2006b), and GE’s submission entitled *Evaluation of Remedial Alternatives Using Sound Ecological Assumptions* (GE, 2010), which was submitted concurrently with the RCMS. A few examples follow:

- For amphibians, the ERA relied on a site-specific field wood frog study conducted for EPA. 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 (more females than males), 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.)
- For insectivorous and piscivorous birds, EPA required that the IMPGs be based on a calculated effect level (set forth in the ERA) of less than 20% from a 1974 literature study (at another site) of chickens, which have been consistently 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.
- For mink, the ERA 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 the lower-bound IMPG to be based on that level. However, that level 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).

In addition to requiring use of such overly conservative IMPGs, the EPA Region 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, it is clear that, 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), the Region 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), the Region 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 (EPA, 2004a, Vol. 5, App. E, Attachment E.4). These directives result in an overestimate of the potential impacts of PCBs on the local populations of these wildlife species.³⁰

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 fact that field surveys have documented 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” (MA EOEEA et al., 2011, p. 2).

At a minimum, 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 uncertain theoretical 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” (*id.*, p. 8). Again, “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” (*id.*, p. 1)

³⁰ These points are discussed in more detail in GE’s *Evaluation of Remedial Alternatives Using Sound Ecological Assumptions* (GE, 2010), as well as in GE’s Statements of Position in dispute resolution on EPA’s conditional approval letters for the CMS Proposal and CMS Proposal Supplement (GE, 2007a, 2007b).

3. Conclusion

The Region's proposed remedy does not include remediation that is directed specifically to attaining any ecological protection goals, except for amphibians in vernal pools (discussed further in Section IV.F). However, the Region asserts that the remedy developed on supposed health grounds will also reduce ecological risks (Stmt. Basis, pp. 11-12). As discussed elsewhere, alternative remedies involving much less extensive removal could achieve comparable reduction in human health risks (see Sections III.B and IV.A through IV.E) and would have fewer adverse ecological impacts. Further, as shown above and 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, the Region's proposed remedy would not provide "overall" protection of the environment, would cause more harm than necessary, and is therefore arbitrary and capricious.

IV. DEFICIENCIES IN SPECIFIC ELEMENTS OF PROPOSED REMEDY

This section demonstrates that several specific elements of the EPA Region's proposed remedy are arbitrary and capricious or otherwise unlawful. It includes a discussion of 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 Region's removal volume estimates for these remedy components were based on those presented in the May 2012 Status Report (see Comp. Analysis, Attachment 6), whereas GE has developed updated removal volume estimates based on the Region's description of its actual proposed remedy. As a result, as discussed further in the following subsections, GE's volume estimates for some of these areas differ from those presented by the EPA Region (sometimes higher and sometimes lower). In addition, the following subsections discuss model projections for the proposed remedy and various alternatives. Those model runs are presented in Attachment F.

A. Deep Dredging in Woods Pond

The Region'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) (Draft Permit, p. 18). The Region estimates that this remedy would require removal of 285,000 cubic yards of sediment from Woods Pond (Comp. Analysis, p. 8 & Att. 6). 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. This proposed remedy would be arbitrary and capricious because it would require extensive unnecessary removal and would not have the risk-based benefits claimed by the Region, 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.

The Region claims that its proposed remedy would reduce human health risks from fish consumption (Comp. Analysis, p. 3). 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 in Massachusetts and Connecticut. To illustrate this, we have compared the model results for the Region'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.³¹ The results from these model runs showing the projected fish fillet PCB concentrations under these alternatives for Woods Pond, the four Reach 7 impoundments,

³¹ This alternative was presented to EPA and the States during the 2012 discussions. See GE's presentation slides from December 7, 2012, a copy of which is provided as Attachment G. It is similar in concept to the Woods Pond component of RCMS alternative SED 5, which would involve removal to a depth of 1.5 feet in the shallow portion of the Pond (approximately 89,000 cubic yards) with capping of the entire Pond. The points in this section would also apply to a comparison of the proposed remedy with the Woods Pond component of SED 5.

Rising Pond, and the four Connecticut impoundments are presented on Figures 8-a through 8-j.³² These results show 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. This demonstrates that the substantial additional sediment removal under the Region's proposed remedy (nearly 300,000 cubic yards) would have no benefit in terms of reducing fish PCB concentrations.

The Region also asserts that its proposed remedy would reduce direct contact risks and ecological risks (Comp. Analysis, p. 4). However, the less intrusive remedy described above, 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.

The Region states further that its proposed deep dredging remedy would increase the solids and PCB trapping efficiency of Woods Pond and thereby reduce downstream transport of PCBs. To begin with, 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. While the proposed remedy would appear to result in some increase in solids trapping efficiency compared to smaller alternatives (estimated by the Region to increase from about 15% to 30%, Comp. Analysis p. 17), the model runs indicate very little difference between the proposed remedy and the alternative of partial shallow dredging and capping of the entire Pond in terms of PCB transport past Woods Pond and Rising Pond Dams. 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. More importantly, the modest increase in solids trapping efficiency resulting from the proposed remedy would not translate to any reduction in risk due to fish consumption or anything else compared to the smaller alternative, as discussed above.³³ Thus, the difference in trapping efficiency would not result in an increase in the protectiveness of the remedy.

³² To ensure comparability in these comparisons, both of these alternatives assume the same remediation in other reaches – specifically, for Reach 5, removal and capping in Reaches 5A and 5C, remediation of eroding riverbanks in Reach 5A, and removal and capping of locations with PCBs > 50 mg/kg in Reach 5B (with application of activated carbon in the rest of the Reach 5B riverbed) (jointly referred to herein as the Reach 5 base case); removal and capping in the portions of the backwaters outside Core Area 1 to achieve a SWAC of 5 mg/kg; thin-layer capping in two Reach 7 impoundments and Rising Pond to achieve a SWAC of 1 mg/kg; and monitored natural recovery (MNR) elsewhere.

³³ The Region's estimates of solids trapping efficiency also show that other alternatives that involve some deepening of the Pond but less total sediment removal (i.e., SED 9 with 244,000 of removal and SED 10 with 169,000 cubic yards of removal) would achieve close to the same increase in solids trapping efficiency as the proposed remedy (Comp. Analysis, p. 17). The model shows that, so long as such alternatives involve capping of the entire Pond, they would also achieve the same risk reductions as EPA's proposed remedy. While such alternatives would not result in any appreciable risk reduction compared to the even smaller alternative described in the text (involving 44,400 cubic yards of removal), these comparisons further demonstrate the arbitrariness of the Region's proposed remedy for Woods Pond.

The Region 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 (Comp. Analysis, p. 4). 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 CD'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 (CD ¶ 176). 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 (MA EOEEA et al., 2011, p. 13; see also 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 (see Section V.C.1 below). As shown above, any risks can be reduced to a comparable extent with a remedy that involves much less removal.

In contrast to this lack of difference in risk reduction and protectiveness, the Region's proposed remedy would involve greater adverse impacts due to the extra 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 sediments³⁴), 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 (see Table 13) – approximately 30,000 truck trips less. 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 difference of more than six-fold.

The proposed remedy for Woods Pond would also be much more costly. 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 described above would cost \$34-39 million (see Table 15). 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

³⁴ GE assumes that 20-ton trucks would be used for transport of excavated sediments to off-site disposal facilities and that 16-ton trucks would be used for transport of such sediments to an on-site rail loading facility or an on-site disposal facility.

\$130 million, are not proportional to its incremental benefits (if any), and hence the proposed remedy would clearly not be cost-effective.³⁵

For these reasons, adoption of the Region's proposed deep dredging remedy for Woods Pond would be arbitrary, capricious, and otherwise unlawful.

B. Remedy for Reach 7 Impoundments

The Region's proposed remedy for the Reach 7 impoundments would require that, if any entity is planning to use, maintain, or remove any Reach 7 dam or impoundment, GE must coordinate with that entity, including using "good-faith efforts to reach agreement with that entity(ies) on the scope and extent of costs attributable to the presence of PCBs in sediment and prompt payment by [GE] of these costs in advance of implementation of the necessary work" (Draft Permit, p. 19). It provides further that, if there are no plans for dam removal at the time of GE's work plan, GE must conduct the following remediation in each impoundment: (a) removal of surface sediments (including any such sediments with PCB concentrations > 50 mg/kg) and replacement of those sediments with an engineered cap so as to achieve a SWAC of 1 mg/kg in each of various identified averaging areas; and (b) for areas outside the footprint of the above cap, removal and capping of sediments as necessary to achieve a SWAC of 1 mg/kg in the subsurface sediments in each averaging area (*id.*). (For the subsurface sediments, this SWAC could be achieved by removal/capping of the overlying surface sediments.) The Region estimates that this proposed remedy would, as a "worst case" using prior estimates, require removal of 84,000 cy of sediments (Comp. Analysis, Att. 6), whereas GE has conservatively estimated the required removal volume as 53,000 cy.³⁶

1. Requirement to coordinate with other entities

It is not clear whether the coordination prong of the Region's proposed remedy for the Reach 7 impoundments would require GE to agree to pay the PCB-related costs incurred by a project proponent in using, maintaining, or removing a Reach 7 dam or impoundment, or would just require GE to negotiate with that entity. To the extent that it would require GE to pay such costs of a third party, it would go beyond EPA's authority for the same reasons discussed below in Section V.C with respect to the proposed general requirement for GE to pay the PCB-related costs of any third party that conducts dam removal or another project on the River requiring handling or disposition of sediments containing PCB concentrations above 1 mg/kg. Such a requirement would not address risks to human health or the environment from such a project

³⁵ The same conclusion would be true even if on-site upland disposal were allowed, which GE believes is required, as shown in Section II. In that event, the proposed remedy is estimated to cost \$73-95 million (depending on the location of the on-site disposal facility) versus \$21-24 million for the shallow dredging/full capping alternative (Table 15) – a difference of over \$50 million. Those incremental costs are not proportional to or justified by any incremental benefits.

³⁶ To be conservative, this GE estimate and all other estimates in this section regarding the Region's proposed remedy for the Reach 7 impoundments assume removal of all sediments over 1 mg/kg in two of those impoundments (Reaches 7B and 7C) and removal to achieve a SWAC of 1 mg/kg in the other two impoundments (Reaches 7E and 7G).

(which would need to be addressed by the project proponent), but would simply provide compensation to the project proponent for his or her economic loss. Such a requirement would exceed EPA's remedial authority and represent an impermissible effort to dictate the outcome of the project proponent's claim against GE, as discussed further in Section V.C. Even to the extent that this prong would 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.

2. Proposed sediment removal and capping

The Region has attempted to justify its proposed substantive 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" (Comp. Analysis, p. 4). None of those grounds provides an adequate justification for the proposed remedy.

Projections using EPA's model indicate that the Region's proposed remedy for the Reach 7 impoundments cannot be justified on the ground 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 period³⁷ with those resulting from an alternative that assumes monitored natural recovery (MNR) in those impoundments and another alternative involving implementation of thin-layer capping (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.³⁸ 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):

³⁷ We do not have a set of model predictions for an alternative that would involve achieving a SWAC of 1 mg/kg in all of the Reach 7 impoundments. Hence, to represent the proposed remedy, we have used a model run for an alternative involving removal of all sediments over 1 mg/kg in Reaches 7B and 7C and removal to achieve a SWAC of 1 mg/kg in Reaches 7E and 7G (as noted above). That is more conservative – i.e., would achieve lower concentrations – than the proposed remedy.

³⁸ To ensure comparability in these comparisons, these alternatives all assume the same remediation in other reaches – specifically, the Reach 5 base case, deep dredging and shallow capping over all of Woods Pond (which, as shown in Section IV.A, would have essentially the same results as shallow dredging in the shallow portion of the Pond and capping of the entire Pond), and thin-layer capping in Rising Pond.

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, 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.

These small differences in projected fish PCB concentrations are within the general uncertainty of the model. That model has inherent uncertainties because it can only approximately reflect important future processes and conditions due to incomplete data, simple representations, the inherently variable nature of the environment, and unknown future changes. In particular, the model component used to predict fish tissue concentrations in Reaches 7 and 8 (known as the Reach 7/8 food web model) is especially fraught with uncertainties because: (a) EPA did not have sufficient data to develop a bioaccumulation model for Reaches 7 and 8 and so extrapolated from what it claimed were “analogous” reaches in Reaches 5 and 6, but without sufficient fish data in Reaches 7 and 8 to test that extrapolation; and (b) the model’s food web structure – i.e., the extent to which PCBs in fish derive from sediment versus water column (coming from upstream) – is untested. Due to this uncertainty, it is arbitrary to rely on marginal differences in model predictions about benefits, such as those in the last three lines of the above table, to justify a larger and more costly remedy.

Moreover, the model results show **no** discernible differences among the proposed Reach 7 remedy and the MNR and thin-layer capping alternatives for those impoundments in terms of reducing downstream fish PCB concentrations. The model results indicate that all three of those alternatives would result, at the end of the 52-year model projection period, in an average fish fillet concentration of 0.6 mg/kg in Rising Pond (assuming the same remediation, thin-layer capping, in Rising Pond).

With respect to Connecticut, as discussed above, the EPA Region chose not to extend its PCB model to the Connecticut portion of the River due to the paucity of useable data. As a result, at the Region’s request, GE developed a methodology involving extrapolation from the EPA model, based on a number of simplifying assumptions and factors, to estimate future PCB concentrations in the four main Connecticut impoundments. Given its reliance on numerous

simplifying assumptions and factors and the significant underlying data limitations, the results of this extrapolation procedure are too uncertain to be used in a reliable way to make fine distinctions about the specific impacts of different alternatives, particularly when the PCB concentrations are low and generally similar. In any event, the model extrapolation to Connecticut indicates that proposed removal/capping in the Reach 7 impoundments would have no appreciable benefit on fish PCB levels in the Connecticut impoundments, as compared to the less intrusive alternatives described above. This is shown in the following table, which presents the results of the extrapolation at the end of the 52-year model projection period for these alternatives:³⁹

Scenario	Est. Fish Fillet Concentration (in mg/kg)			
	Bulls Bridge Dam	Lake Lillinonah	Lake Zoar	Lake Housatonic
Current conditions (baseline)	0.39	0.28	0.20	0.19
MNR in Reach 7 impoundments	0.031	0.022	0.016	0.015
Thin-layer capping in Reach 7 impoundments	0.029	0.021	0.015	0.014
Region's removal/capping proposal for Reach 7 impoundments	0.029	0.021	0.015	0.014

In summary, the model results indicate that, compared to less intrusive alternatives, the proposed remedy for the Reach 7 impoundments would produce only small (if any) incremental reductions in future fish PCB concentrations, likely within the model's margin of error, in those impoundments themselves and no appreciable reductions in such concentrations in downstream areas (i.e., Rising Pond and Connecticut). Thus, the proposed remedy cannot be justified on the ground of reducing fish PCB levels.

Despite these model projections for thin-layer capping, the Region dismisses thin-layer capping as an inappropriate remedy component for the Rest of River, asserting that it "is not a suitable technology considering the mass and high concentrations of PCBs in the sediment," "is not expected to result in significant long-lasting benefits," "is not expected to adequately control sources of releases in an extreme event," and "is not expected to be a reliable or effective component for this site" (Comp. Analysis, pp. 12, 18, 26). Thus, the Region concludes that alternatives that contain thin-layer capping "are not likely to perform as well as the model predicts" (*id.*, p. 18).

These conclusions are not well supported for the Reach 7 impoundments, as demonstrated in Attachment H. As discussed in EPA's Contaminated Sediment Guidance, thin-layer capping is a method of enhancing natural recovery and is appropriate for areas where natural recovery is occurring but the rate of that recovery is insufficient to reduce risks within an acceptable time frame and thus should be accelerated by placing a thin layer of clean material on top of the

³⁹ These model extrapolations assume the same remediation in the other Massachusetts reaches as were described above.

existing sediments (EPA, 2005d, p. 4-11). As shown in Attachment H, there is already considerable evidence of natural recovery in the Reach 7 impoundments, as indicated by a decline in PCB concentrations in fish, sediment, and water in the area; and that recovery will continue, given the recent and ongoing remediation efforts upstream of the Confluence and the anticipated remediation of the sediments in Reaches 5 and 6 (the only significant source to Reach 7), whether under the proposed remedy or a less intrusive but equally effective remedy, as illustrated by the model results. In addition, the Reach 7 impoundments are conducive to natural recovery, since expected human exposure is low and/or can be controlled by institutional controls, the impoundments are relatively quiescent and net depositional environments with a reasonably stable sediment bed and a low potential for scour, and sediment PCB concentrations are low compared to upstream areas and do not indicate the presence of “hot spots” (see Attachment H).

Given these characteristics, the addition of thin-layer capping in these impoundments would accelerate and enhance ongoing natural recovery, as demonstrated by the model results discussed above. Despite the Region’s claims that the model results do not properly reflect the effectiveness of thin-layer capping, especially during a high flow event, the model is an appropriate tool for evaluating that remediation method, as also demonstrated in Attachment H. As discussed there, EPA’s model includes simulation of an extreme high flow event (as well other high flow events of lesser magnitude) during the projection period; and it shows that thin-layer caps would remain in place over most of the impoundment areas, even during such events, and would mix with the existing sediments, thereby increasing the rate of recovery. Attachment H further shows that the Region’s technical criticisms of the model’s treatment of thin-layer capping are overstated and fail to undermine the model’s general predictions that, even taking into account the effects of an extreme event, the use of thin-layer capping in the Reach 7 impoundments would be effective in significantly accelerating the reduction in PCB concentrations in those impoundments. Thus, the model projections for an alternative using thin-layer capping in these impoundments are appropriate for consideration in evaluating whether a less intrusive remedy than that proposed by the Region would have comparable or nearly comparable benefits in reducing fish PCB concentrations.

The Region’s claims that its proposed remedy would reduce direct contact risks, ecological risks, and downstream transport are likewise unavailing. Both MNR and thin-layer capping in the Reach 7 impoundments would achieve sediment levels well below those deemed protective by EPA for direct contact. As shown in Attachment H, data collected between 1997 and 2002 showed that the average sediment PCB concentrations in these impoundments were already well below the EPA-approved RME IMPGs for direct contact with sediments, which are 13 mg/kg based on a 10^{-5} cancer risk and 31 mg/kg based on non-cancer impacts, and the concentrations in the impoundments are expected to be lower today. The model projections confirm that, even with MNR throughout the River, those IMPGs would be achieved at the beginning of the projection period. The performance of upstream remediation and/or thin-layer capping in the impoundments would achieve even lower concentrations.⁴⁰

⁴⁰ For example, the model results indicate that, with the same upstream remediation described above, use of MNR in the Reach 7 impoundments would result in surface sediment PCB concentrations of 1.5 to 5.1 mg/kg in those

With respect to ecological impacts, the Region has presented no evidence that MNR or thin-layer capping in the Reach 7 impoundments would cause any incremental increase in ecological risks compared to the proposed removal/capping remedy.

With respect to downstream transport, the model runs do not show any significant incremental decrease in the PCB flux at Rising Pond Dam from the proposed remedy compared to MNR or thin-layer capping in the Reach 7 impoundments. Specifically, assuming the same remediation in other reaches (as described above), those results show a predicted annual PCB flux past Rising Pond Dam of 2.3 kg/year for the proposed Reach 7 remedy, 2.6 kg/year for MNR in the impoundments, and 2.4 kg/year for thin-layer capping in the impoundments. Given the uncertainties in the model, these values can all be considered equivalent.

In terms of 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), depending on whether the dams are licensed by FERC. These regulatory schemes 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, as discussed in the RCMS (section 3.8.2), 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.

In contrast to the absence of any appreciable incremental benefit, the Region's proposed Reach 7 remedy would have greater adverse impacts and costs. For example, GE has estimated that the proposed remedy would require a total of approximately 10,500-11,500 truck trips to import the necessary capping and staging/access material, transport the excavated sediments, and dispose of the staging/access material (with the range dependent on the size of trucks used to transport removed sediments) (see Table 13).⁴¹ By contrast, MNR would not involve any truck trips, and thin-layer capping would require less than 4,000 truck trips (to import the capping and staging/access material and dispose of the staging/access material) (*id.*). Similarly, the proposed Reach 7 remedy is estimated to produce 10,000 tonnes of GHG emissions, compared to none for MNR and 3,100 tonnes for thin-layer capping in these impoundments (see Table 14). In addition, as discussed in the RCMS (section 5.3.3), the proposed removal/capping

impoundments upon completion of the upstream remediation, and use of thin-layer capping in those impoundments would result in surface sediment PCB concentrations of 0.02 to 0.15 mg/kg in the impoundments upon completion of the thin-layer capping.

⁴¹ As previously noted, these estimates, as well as the GHG and cost estimates discussed below, regarding the proposed remedy assume removal of all sediments over 1 mg/kg in Reaches 7B and 7C and removal to achieve a SWAC of 1 mg/kg in Reaches 7E and 7G.

remedy would produce adverse impacts on the aquatic habitat of these impoundments, while MNR would not produce such impacts and thin-layer capping would cause some, but not as severe, adverse impacts.

The estimated costs of the Region's proposed removal/capping remedy for the Reach 7 impoundments with off-site disposal are \$36-37 million (depending on whether rail or truck transport is used) (Table 15).⁴² By contrast, MNR in those impoundments would have minimal costs, and thin-layer capping in those impoundments is estimated to cost \$14 million. As discussed above, the less intrusive alternatives would be protective of human health and the environment and would be as effective or nearly as effective as the proposed remedy. In addition, they would attain ARARs to a greater extent than the proposed remedy, since they would not involve any removal and thus would not implicate the ARARs relating to dredging or handling/disposition of excavated material.⁴³ In these circumstances, the substantial incremental costs of the Region's proposal are clearly not proportional to or justified by the small and uncertain incremental benefits.

For these reasons, adoption of the Region's proposed remedy for the Reach 7 impoundments would be arbitrary, capricious, and otherwise unlawful.

C. Rising Pond Remedy

The Region's proposed remedy for Rising Pond would require: (a) removal of surface sediments (including any such sediments with PCB concentrations > 50 mg/kg) and replacement of those sediments with an engineered cap so as to achieve a SWAC of 1 mg/kg in each of various averaging areas; and (b) for areas outside the footprint of the above cap, removal and capping of sediments as necessary to achieve a SWAC of 1 mg/kg in the subsurface sediments in each averaging area (Draft Permit, p. 21). (For the subsurface sediments, this SWAC could be achieved by removal/capping of the overlying surface sediments.) The Region's "worst-case" estimate is that this proposed remedy would require removal of 71,000 cy of sediments (Comp. Analysis, Att. 6), while GE's updated estimate of the required removal is 50,000 cy. The Region seeks to justify this proposed remedy on the grounds that it "will result in achieving cleanup levels in fish tissue, and reducing ecological risk and downstream transport of contaminants" (*id.*, p. 4).

As with the proposed impoundment remedies discussed above, this proposed remedy is arbitrary and capricious because it would not have significant risk-based benefits compared to a smaller remedy. In terms of reducing PCB concentrations in fish tissue, this is demonstrated by a comparison of the model results for the proposed remedy with those from smaller remedies. Specifically, we have compared the fish fillet PCB concentrations predicted (or extrapolated for Connecticut) to result at the end of the model period from the proposed Rising Pond remedy

⁴² If on-site upland disposal were used, the proposed remedy is estimated to cost \$27-30 million, depending on the location of the disposal facility (Table 15).

⁴³ These alternatives would also achieve EPA's water quality criteria in all impoundments, except for the water quality criterion for human health protection from fish consumption (0.000064 µg/L), which would not be achieved in Reaches 7 or 8 (or any other Massachusetts reach) by the proposed remedy or any other alternative.

with those predicted (or extrapolated) to result from alternatives involving (a) MNR in Rising Pond, (b) implementation of thin-layer capping in Rising Pond, and (c) sediment removal to a depth of 6 inches in the shallow portions of that Pond (approximately 15,300 cy) and placement of a 6-inch engineered cap over the entire Pond, assuming the same remediation in the upstream reaches.⁴⁴ The results of this comparison are shown in the following table, which presents the predicted fish fillet concentrations under these alternatives for both Rising Pond itself and the Connecticut impoundments at the end of the 52-year projection period:

Scenario	Est. Fish Fillet Concentration (in mg/kg)				
	Rising Pond	Bulls Bridge Dam	Lake Lillinonah	Lake Zoar	Lake Housatonic
Current conditions (baseline)	6.3	0.39	0.28	0.20	0.19
MNR in Rising Pond	1.6	0.044	0.031	0.022	0.021
Thin-layer capping in Rising Pond	0.6	0.031	0.022	0.016	0.015
Partial shallow removal & full capping in Rising Pond	0.5	0.031	0.022	0.016	0.015
Region's removal/capping proposal for Rising Pond	0.9	0.033	0.024	0.017	0.016

As shown in the above table, the proposed Rising Pond remedy would result in small incremental reductions in fish PCB concentrations compared to MNR in Rising Pond and *no* incremental reductions in such concentrations (indeed, slightly higher concentrations) compared to thin-layer capping or implementation of a smaller removal alternative with an engineered cap over the entire Pond.⁴⁵ These comparisons demonstrate that neither reduction in fish PCB levels nor attainment of fish consumption standards provides a justifiable basis for the proposed dredging/removal remedy, since the same benefits could be achieved with much less removal.

The Region's claims that its proposed remedy is needed to reduce ecological risks and downstream transport likewise provide no risk-based justification for its proposal. The Region 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

⁴⁴ The last of these alternatives was discussed with EPA and the States during discussions in 2013. Again, to ensure comparability in these comparisons, these alternatives all assume the same remediation in the upstream reaches – specifically, the Reach 5 base case, deep dredging and shallow capping over all of Woods Pond (which, as shown in Section IV.A, would have essentially the same results as shallow dredging in the shallow portion of the Pond and capping of the entire Pond), and MNR in the Reach 7 impoundments.

⁴⁵ Attachment H demonstrates that thin-layer capping can be appropriately used in Rising Pond as well as the Reach 7 impoundments. In any event, the smaller removal alternative would rely on engineered capping of the entire Pond and thus would avoid the asserted concerns raised by the Region regarding thin-layer capping.

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.

As at Woods Pond, dam failure is not a realistic risk at Rising Pond Dam, since GE owns that dam and conducts the necessary monitoring, maintenance, and repair to prevent dam failure, particularly in light of the fact that the CD'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 remedy.

Again, in contrast to the absence of any appreciable incremental benefits, the Region's proposed remedy for Rising Pond would have greater adverse impacts and costs than the smaller alternatives discussed above. 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 (with the range dependent on the size of trucks used to transport removed sediments) (see Table 13). However, 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 (*id.*). 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 tonnes for the thin-layer capping and smaller removal alternatives (see Table 14).

Moreover, as shown in Table 15, the Region'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 that 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. As discussed above, 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.⁴⁶ Thus, as with the proposed remedies for Woods Pond and the Reach 7 impoundments, 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).⁴⁷

For these reasons, adoption of the Region's proposed remedy for Rising Pond would be arbitrary, capricious, and otherwise unlawful.

⁴⁶ In particular, these alternatives would achieve EPA's water quality criteria in Rising Pond, except for the water quality criterion of 0.000064 µg/L, which, as previously noted, would not be achieved in Rising Pond by the proposed remedy or any other alternative.

⁴⁷ Again, the same would be true even if on-site upland disposal were allowed, which GE believes is required, as shown in Section II. In that case, the proposed remedy is estimated to cost \$22-26 million, compared to \$10 million for thin-layer capping and \$14-15 million for the partial dredging/full capping alternative (Table 15). Those incremental costs are not proportional to or justified by any incremental benefits.

D. Remedy for Backwaters

The Region's proposed remedy for the backwaters would require the following in areas located outside of Core Area 1: (a) removal of surface sediments (including any such sediments with PCB concentrations > 50 mg/kg) and replacement of those sediments with an engineered cap so as to achieve a SWAC of 1 mg/kg in each of various averaging areas; and (b) for areas outside the footprint of the above cap, removal and capping of sediments as necessary to achieve a SWAC of 1 mg/kg in the subsurface sediments in each averaging area (Draft Permit, p. 17).⁴⁸ For backwater areas within Core Area 1, the Region is proposing removal of all discrete surface sediment locations with PCB concentrations > 50 mg/kg, capping those areas, and evaluation of the placement of an amendment such as activated carbon (AC) in areas with PCB concentrations between 1 mg/kg and 50 mg/kg, with implementation of such an amendment if required by EPA (*id.*, p. 18). The Region estimates that this proposed remedy would require removal of 95,000 cubic yards of sediments (Comp. Analysis, Att. 6), and GE concurs with that estimate.

Like the remedy components discussed above, this proposed remedy is unjustified because it would not have significant risk-based benefits compared to a less extensive removal/capping remedy in the backwaters.

With respect to reductions in fish PCB concentrations, it should be recognized that the backwaters do not generally provide good habitat for fish (e.g., due 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, PCB concentrations in the backwater sediments do not contribute appreciably to PCB concentrations in the River or its fish. This is demonstrated by a comparison of model projections of fish fillet PCB concentrations in the main stem of the River with and without backwater remediation. For purposes of this comparison, we have used available model runs for (a) the SED 9 MOD alternative that was specified in EPA's May 2012 Status Report with backwater remediation (assumed to be removal of all sediments with PCB concentrations > 1 mg/kg outside Core Area 1 and removal of all sediments with PCBs > 50 mg/kg and application of AC in areas with PCBs > 1 mg/kg in Core Area 1) versus (b) the same alternative with no backwater remediation. The resulting projections at the end of the 52-year model period are as follows:

⁴⁸ Again, for the subsurface sediments, this SWAC can be achieved by removal/capping of the overlying surface sediments.

Scenario	Est. Fish Fillet Concentration (in mg/kg)						
	Reach 5A	Reach 5B	Reach 5C	Wood Pond	Reach 7B	Reach 7C	Reach 7E
SED 9 MOD* with backwater remediation	0.3	1.0	0.7	0.6	0.6	0.7	0.6
SED 9 MOD* without backwater remediation	0.3	1.0	0.7	0.7	0.7	0.8	0.7
	Reach 7G	Rising Pond	Bulls Bridge	Lake Lil-linonah	Lake Zoar	Lake Hous.	
SED 9 MOD* with backwater remediation	0.5	0.5	0.027	0.019	0.014	0.013	
SED 9 MOD* without backwater remediation	0.5	0.5	0.032	0.023	0.016	0.015	

* Per EPA's May 2012 Status Report

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 the Region's proposed remedy. The results indicate that, at the end of the model projection period, the proposed backwater remedy would result in an average fish fillet PCB concentration of approximately 0.3 mg/kg and the alternative (i.e., removal to achieve a SWAC of 3.3 mg/kg) would result in an average fish fillet concentration of 0.8 mg/kg. This difference cannot justify more than doubling the removal volume given: (a) the poor fish habitat in the backwaters; (b) the uncertainties in the model, which the Region has recognized is more uncertain for the backwaters than for other portions of Reaches 5 and 6.⁵⁰ and (c) the fact that the alternative remedy would achieve the Region's proposed fish cleanup level of 1.5 mg/kg (the probabilistic CTE for fish consumption based on non-cancer impacts in adults), just as the proposed remedy would do.

⁴⁹ This alternative was discussed with EPA and the States during the 2013 discussions, and GE has a model projection for it. Since GE does not have a specific model projection for the Region's proposed backwater remedy, the likely model results for that remedy were estimated from model projections for alternatives involving removal to achieve SWACs of 5 mg/kg and 3.3 mg/kg (outside Core Area 1). For both that estimate and the model projection for the smaller alternative described in the text, the Reach 5 base case was assumed.

⁵⁰ The EPA model assumes that fish spend all their time in the backwaters, which is unlikely due to the unfavorable environmental conditions there. In addition, no fish (or water column) samples were collected from the backwaters for PCB analysis, so model predictions cannot be tested. The Region recognized this additional uncertainty in its response to the model validation peer review: "EPA agrees that the PCB concentrations simulated in [the backwaters] . . . are greater than in adjacent reaches and that these simulations cannot be tested due to the lack of fish tissue data for [the backwaters]. The uncertainty in fish tissue and exposure concentrations for [the backwaters] is greater than in other reaches" (EPA, 2006b, p. 11-5).

Moreover, the smaller alternative remedy would be fully protective for human direct contact with sediments and for ecological receptors. That alternative is predicated on achieving a SWAC of 3.3 mg/kg (outside Core Area 1) and is predicted by the model to achieve an average sediment concentration of 1.5 mg/kg at the end of the model projection period. Those concentrations are well below the EPA-approved RME IMPGs for direct contact with sediments (13 mg/kg based on a 10^{-5} cancer risk and 31 mg/kg based on non-cancer impacts) and achieve the EPA-approved lower-bound IMPG for protection of amphibians.

Again, in contrast to its meager, if any, incremental benefits, the proposed alternative would have greater adverse impacts and costs than the smaller removal alternative due its much greater removal volume. GE has estimated that the proposed remedy would require a total of approximately 16,500-18,500 truck trips to import the necessary remediation material and transport the excavated sediments (with the range again dependent on the size of the trucks used), whereas the smaller alternative would require a total of approximately 6,800-7,700 truck trips (see Table 13). Further, the proposed backwaters remedy is estimated to result in 17,000 tonnes of GHG emissions, compared to 6,400 tonnes for the smaller removal alternative (see Table 14).

Moreover, as shown in Table 15, assuming that off-site disposal is required, the Region's proposed remedy is estimated to cost \$58-61 million, whereas the smaller removal alternative is estimated to cost \$26-28 million, less than half of the proposed remedy. For the reasons discussed above, similar to the proposed remedies for Woods Pond, Reach 7, and Rising Pond, these substantial incremental costs of the proposed remedy for the backwaters (over \$30 million) are not proportional to or justified by the incremental benefits.⁵¹

Accordingly, adoption of the Region's proposed remedy for the backwaters would be arbitrary, capricious, and otherwise unlawful.

E. Engineered Cap Performance Standards

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 RCMS, 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

⁵¹ Again, the same would be true even if on-site upland disposal were allowed. In that case, the proposed remedy is estimated to cost \$35-41 million, compared to \$16-19 million for the smaller alternative (Table 15) – a difference of at least \$19 million that could not be justified by the incremental benefits.

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.⁵² 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; and
 - 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.

⁵² 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.

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 Standards should be revised to reflect the principles, design objectives, and target thicknesses described in the Capping Principles Overview document attached hereto as Attachment I.

F. Unspecified Vernal Pool Remediation

For vernal pools in the floodplain, the Region's proposed remedy prescribes the following steps: (1) GE will submit a plan to identify potential vernal pools and EPA will determine which ones constitute vernal pools; (2) GE will conduct sampling to identify vernal pools with PCB concentrations exceeding the proposed vernal pool cleanup standard of 3.3 mg/kg (the lower bound of the EPA-approved IMPGs for protection of amphibians); (3) EPA will select an initial number of 8 to 10 of those pools outside of Core Area 1 for remediation by excavation and reconstruction; (4) EPA will select another, unspecified number of vernal pools for pilot testing of an amendment such as AC; (5) EPA will select another, unspecified number of vernal pools for pilot testing of a "third remediation method" (also unspecified) to be proposed by GE and/or for monitoring as a reference group; and (6) after that initial round of remediation, 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 (Draft Permit, p. 27). We assume that the Region intends that its proposed vernal pool cleanup standard of 3.3 mg/kg would be applied to the average PCB concentration in each pool.

As is obvious from this proposal, there are many aspects of the proposal 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 the Region's subsequent discretion with no standards provided. As such, this proposal does not meet the CD 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), which is discussed further in Section IV.G. Further, given the numerous unspecified components of the proposal, the Region 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.

This proposed approach 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. See *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents* (EPA, 1995b), Section 8.3. EPA guidance states that such a contingency remedy (as well as the selected remedy) "should be

evaluated fully against the [remedy selection] criteria” (*id.*, p. 8-10), and that if that has been done, an Explanation of Significant Differences (ESD) will generally be required to invoke a contingency (*id.*, p. 8-3.) It states further that “if the contingency remedy or the criteria for its selection are not well-documented in the ROD, a ROD amendment may be required to invoke this cleanup option at a later point in time” (*id.*, pp. 8-3 – 8-4), and a ROD amendment requires a full evaluation under the remedy selection criteria (*id.*, p. 7-5). Thus, both under the RCRA Permit and this guidance, the EPA Region 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, the Region’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.

In addition, it is clear that the Region’s proposed vernal pool remediation would cause severe harm to the vernal pools in the floodplain and the amphibians that inhabit them, although the extent of that harm would depend on the number of pools to be remediated and the type of remediation. Based on the Region’s prior identification of 66 vernal pools in the floodplain of the PSA (Woodlot, 2002), it appears that the number of vernal pools to be subject to remediation could range up to 43, since GE has identified 43 of those vernal pools as having average PCB concentrations exceeding 3.3 mg/kg and located outside of Core Area 1.

For those vernal pools slated for excavation, either in the initial round or in a later round, the excavation work would have numerous serious adverse impacts due to changes in the hydrology, vegetation, and soil composition of the pools, as noted in Section III.C.1 and discussed in detail in the RCMS (sections 5.3.7.4 & 7.3.5.3) and by Professors Brooks, Calhoun, and Hunter in their recent comments in Attachment C. Further, as also noted in Section III.C.1, and shown by those Professors in Attachment D, there is no basis for the Region’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 (see also Calhoun et al., 2014).⁵³ As a result, the excavation would, in all likelihood, lead to an enduring loss of vernal pool functions and their obligate species in the PSA. In short, given the state of the science, the Region’s unsupported assumption of successful vernal pool restoration should clearly not be used as a rationale for allowing the destruction of the vernal pools in the first place.

There is also no justification at this time for subjecting a portion of the vernal pools within the PSA to application of AC. (This is a separate issue from the potential use of AC in Reach 5B and the backwaters.) 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 (Comp. Analysis, Att. 3) have no relevance to vernal pools. As EPA’s consultant recognizes, the studies of ecotoxicological effects of AC amendment have had

⁵³ As also noted above, the Commonwealth has likewise recognized 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” (MA EOEAA et al., 2011, p. 11).

differing results for different target species, types of AC, and application methods – which “underscore a need for well-designed pilot studies before widespread use of AC amendment at a particular site (*id.*, p. 4). 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.

In contrast to the adverse impacts from vernal pool remediation, the risks to amphibians that the remediation is designed to address are, at best, theoretical. As discussed in Section III.C.2, the proposed vernal pool cleanup standard of 3.3 mg/kg was based on a calculated 20% effect value for metamorph malformations from an EPA wood frog study, when that study itself showed no effects of PCBs on the frogs’ survival, hatching success, or metamorphosis and when the calculated 20% effect level for metamorph malformations would not be expected to have any impact on the local wood frog population.

Given these factors, the Region’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. In fact, such a conclusion 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. Thus, it is clear that the 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” (MA EOEEA et al., 2011, p. 11). For this reason, the Region’s proposed vernal pool remedy is arbitrary and capricious.

G. PCB Downstream Transport Performance Standard

The Draft Permit contains, in Section II.B.1.a.(1), a Downstream Transport Performance Standard, which specifies particular annual average values for PCB flux over Woods Pond Dam and Rising Pond Dam (Draft Permit, p. 12). These flux values vary depending on flow rates. The Draft Permit provides that an 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. It provides further that, in the event of such an exceedance, GE “shall determine the cause of the exceedances, and EPA may consider modifications to the Rest of River remedy in accordance with its authority under the CD and CERCLA” (*id.*, p. 13).

As the Region notes (*id.*, p. 12), 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 (excluding the use of AC in Reach 5B and the backwaters), using the 95% prediction limits of a regression of annual average flux versus annual average flow rate. These flux values were not based on an analysis of risk, and the Region 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.

In addition, the 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. EPA has previously recognized this fact. In its Model Calibration Responsiveness Summary, EPA stated: "Because [the] projections [of future boundary conditions for flow, solids, and PCBs] will have an unknown degree of uncertainty associated with them that will impact model predictions, **predictions of absolute concentrations are not anticipated to be accurate**. Therefore, EPA will focus primarily on comparisons of relative performance among remedial alternatives against baseline conditions." (EPA, 2006a, p. 3; emphasis added.) Further, in its Responsiveness Summary to the Peer Review of Model Validation, EPA "acknowledge[d] that given the uncertainty in the rate of decline [in PCBs in sediments] (due to the lack of ability to project this from the data), relative predictions by the model are likely more reliable than absolute predictions" (EPA, 2006b, p. 2-12) The National Research Council has also recognized that, since "[m]odels will always be constrained by computational limitations, assumptions and knowledge gaps," they "can best be viewed as tools to help inform decisions rather than as machines to generate truth or make decisions" (NRC, 2007, p. 2). In short, while the 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 the Region has proposed here for the Downstream Transport Performance Standard. That further contributes to the arbitrariness of that proposed standard.⁵⁴ In fact, by using the 95% prediction limits, the proposed standard accounts for year-to-year variability in the PCB load (due to variability in flow), but does **not** account for model uncertainty in any way

We are not aware of any precedent at any of the major contaminated sediment sites in the country for a performance standard such as this, 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.

To begin with, the proposed requirement that, in the event of an exceedance of the 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.

Beyond that, the 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

⁵⁴ The reported analytical results for the five most recent monthly water column samples collected at the sampling location immediately downstream of Rising Pond Dam (Division Street) indicate PCB concentrations higher than those predicted by EPA's model under current conditions. (These detections were a result of a recent lowering of the detection limit used for analysis of the Rest of River water column samples; prior analyses utilizing a higher detection limit showed mostly non-detect concentrations in recent years.) This illustrates the inability of EPA's model to accurately predict absolute PCB concentrations and thus the insufficiency of EPA's model for setting an absolute value for the Downstream Transport Performance Standard.

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 (see CD ¶¶ 162, 163). There are several reasons for this.

First, a more open-ended standard would conflict 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 will propose the draft permit modification pursuant to the RCRA Permit, and (as mentioned above) Special Condition II.J of the Permit states that “EPA will propose Performance Standards, and ***the appropriate corrective measures necessary to meet the Performance Standards***” (emphasis added). This requires that the Region’s proposal 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, 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.

Second, an open-ended standard that allowed the EPA Region to require GE to conduct additional, unspecified response actions if the standard was exceeded would prevent the Region 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.

In fact, this approach would constitute a “contingency remedy” under EPA guidance, because it would be contingent on a future event (i.e., an exceedance of the standard). As discussed in Section IV.F above, EPA guidance requires that a 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, the Region'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.

This approach 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.

Paragraph 39.a of the CD is consistent with this conclusion. 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). Given the above-discussed 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 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.

Finally, an open-ended 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 not the deal that the parties struck in the CD.

H. Biota Performance Standard and Long-Term Benchmarks

The Draft Permit also includes, in Section II.B.1.a.(2)(a), a 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, to be achieved within 15 years of the completion of remedial construction activities in that reach (or, where the reach is subject to MNR, completion of such activities in the closest upstream reach subject to active remediation) (Draft Permit, p. 13).⁵⁵ The standard states that, “[i]n the event that this Biota Performance Standard is exceeded in two consecutive monitoring periods after the 15-year period specified above, [GE] shall determine the cause of the exceedance and EPA may consider modifications to the Rest of River remedy in accordance with its authority under the CD and CERCLA” (*id.*, p. 14).

As the Region notes, this standard 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. (That value is between the probabilistic CTE cancer-based IMPGs for 10^{-5} and 10^{-4} cancer risks.) The Region assumes that the proposed remedy can achieve that standard based on model predictions. However, as discussed above in connection with the Downstream Transport Standard, the EPA model was not designed to be used, and cannot be reliably used, for the prediction of such absolute numerical values.

Moreover, the establishment of such a numerical performance standard with consequences raises similar issues to those discussed above with respect to the consequences of exceeding the Downstream Transport Standard. Again 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 in Section IV.G.

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

⁵⁵ Although the parenthetical regarding reaches subject to MNR states that the standard is to be achieved “upon completion of the closest upstream reach subject to active remediation,” we assume that it means to provide for achievement of the standard in those areas **within 15 years of completion** of remediation activities in the closest upstream reach.

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) (Draft Permit, p. 13). The Draft Permit states that GE “shall evaluate progress toward achieving these benchmarks” (*id.*) 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 on this score, the Region should clarify that no such additional response actions will be required on the basis of these long-term benchmarks.⁵⁶

⁵⁶ We also note that there is no justification for the Region’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 (EPA’s HHRA [EPA, 2005a], Vol. I, p. 8-28). 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 found even those rates unsupported (see EPA’s Responsiveness Summary to Public Comments on New Information for HHRA [EPA, 2005c], pp. 9-11). 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 – and which the Region recognizes cannot be reliably measured (see Section V.F.1 below). 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. The Region 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.

V. ADDITIONAL REQUIREMENTS

A. Restoration and Compensatory Mitigation Requirements

The proposed remedy contains habitat restoration requirements. These include requirements that GE must perform a baseline assessment of pre-remediation conditions, functions, and values of habitats that will be affected and of the occurrence of state-listed species; develop Restoration Performance Objectives and Evaluation Criteria; develop a Restoration Corrective Measures Coordination Plan (for integrating restoration with remediation); and then design and submit a Restoration Plan (Draft Permit, pp. 27-30).

These provisions contain no specifics as to the types of restoration measures that would be required, or an evaluation of their potential for success. Yet the Region summarily concludes that restoration efforts will in fact be able re-establish the pre-remediation conditions and functions of all of the affected habitats (Comp. Analysis, pp. 26, 28-32, 35; Stmt. Basis, p. 31). As discussed in Section III.C.1 and shown in Attachment D, that conclusion is arbitrary and contrary to the evidence, including the conclusions of the Region's own consultant.

Moreover, in this case, as discussed in the RCMS (sections 1.2 and 2.1.3), requirements for restoration of natural resources damaged by implementation of a remedial action exceed EPA's remedial authority under CERCLA, the CD, and the Permit and amount to requiring actions to address natural resource damages (NRD), for which GE has a full covenant not to sue under the CD. The CD and the Permit provide that EPA will select a "remedial action" for the Rest of River. Section 101(24) of CERCLA defines "remedial action" as action "to prevent or minimize the release of hazardous substances so that they do not migrate to cause substantial danger to present or future public health or welfare or the environment." It does not mention restoration. While CERCLA also requires that remedial actions comply with federal and state laws and regulations that constitute ARARs (§ 121(d)(2)) and the Permit specifies compliance with ARARs (unless waived) as a General Standard for evaluation of remedial alternatives, CERCLA defines ARARs as requirements that will address ***pollutants that will remain on-site***.⁵⁷ Thus, as explained in the RCMS (section 2.1.3), requirements that do not address such on-site pollutants or the media containing them, such as requirements for restoration of affected resources, do not constitute ARARs under the statutory definition.

CERCLA separately authorizes recovery by natural resource trustees for damages to natural resources, and specifies that the amounts recovered may be used "only to ***restore***, replace, ***or acquire the equivalent*** of such natural resources (§ 107(f)(1), emphases added). Thus, restoration and acquisition of equivalent resources are part of NRD, not remedial action. This is recognized in the Interior Department's NRD regulations, which specifically allow recovery of

⁵⁷ CERCLA § 121(d)(2)(A) states that ARARs apply "[w]ith respect to any hazardous substance, pollutant or contaminant that will remain onsite," and consist of any "standard, requirement, criteria, or limitation" under a federal or state environmental law (or a state facility siting law) that "is legally ***applicable to the hazardous substance or pollutant or contaminant*** concerned or is relevant and appropriate ***under the circumstances of the release or threatened release*** of such hazardous substance or pollutant or contaminant" (emphases added).

NRD (including restoration) for harm caused by remediation.⁵⁸ This distinction between remediation and restoration/replacement of resources (which is part of NRD) is also recognized in EPA's own guidance.⁵⁹

In the CD, GE resolved its NRD liability through a combination of monetary payments (totaling approximately \$15.7 million) and specified "Restoration Work" (none of which was in the Rest of River). Significantly, the CD provides that GE's satisfaction of the trustees' NRD claims included payment of \$600,000 "as mitigation for wetlands impacts associated with PCB contamination **and with response actions at the Site**" (CD ¶ 114.b, emphasis added). The Rest of River remedial action is such a response action. This demonstrates that, at least with respect to wetlands impacts from the Rest of River remedy, GE already settled any claims for mitigation, and thus EPA cannot require additional restoration or mitigation. In return for the monetary payments and Restoration Work, GE received from both the federal and state governments full covenants not to sue for additional NRD, subject only to a reopener in the event of a failure or breach of Woods Pond Dam or Rising Pond Dam (CD ¶¶ 161, 166, 170, 176). Thus, the proposed habitat restoration requirements would amount to claims for additional NRD in contravention of the CD covenants.

At a minimum, it is clear that any EPA restoration requirements that are directed to enhancing the affected natural resources, rather than attempting to address the impacts of the release by returning affected areas to their pre-remediation condition, would amount to an attempt to recover additional NRD in the form of additional restoration and would thus be barred by the CD. Similarly, although the Region has listed as ARARs EPA regulations that require compensatory mitigation (see Section V.F.3 below), it is plain that requirements to implement on-site or off-site projects designed to "compensate" for the remedy's impacts, as opposed to on-site actions designed to return the affected habitats to their pre-remediation condition (to the extent practicable), would constitute an effort to recover additional NRD and thus would violate the CD's NRD covenants.⁶⁰

⁵⁸ Those regulations define "restoration" as "actions undertaken to return injured resources to their baseline condition . . . **in addition to response actions** completed or anticipated" (43 CFR § 11.82(b)(1)(i), emphasis added); and they specifically allow NRD recovery for harm **caused by remediation**, i.e., for "any increase in injuries that are reasonably unavoidable **as a result of response actions taken** or anticipated" (id. § 11.15(a), emphasis added).

⁵⁹ EPA's guidance recognizes the "different but complementary roles" of remediation and NRD: "In general, EPA selects response actions to protect health and the environment. . . . The NRDA is used to identify additional actions, beyond the response needed, to address natural resources. These include actions needed to restore the productivity of habitats or the species diversity that were injured by the past releases or to replace them with substitute resources." *CERCLA Coordination with Natural Resource Trustees* (EPA, 1997b), p. 3.

⁶⁰ 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, 2014b, p. 3-13 & App. F at p. 3-46).

B. MESA Conservation Plan/Net Benefit Requirement

The Region 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 (Draft Permit, Attachment C, p. 9; Comp. Analysis, p. 20). Such a requirement is both overstated and unauthorized.

While MESA prohibits a take of any state-listed species, the State's regulations under MESA allow the Director of the Massachusetts Division of Fisheries and Wildlife (MassDFW) within the MassDFG to permit a take, at his/her discretion, if three conditions are met: (a) the project proponent has "adequately addressed alternatives to both temporary and permanent impacts" to the species; (b) an "insignificant portion of the local population would be impacted"; and (c) the project proponent "agrees to carry out a conservation and management plan that provides a long-term Net Benefit to the conservation of the State-listed species" (321 CMR 10.23). Thus, under these regulations, 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. The Region's ARARs table does not mention this. Its Comparative Analysis asserts that the impacts on state-listed species can be limited to an insignificant portion of the local populations (Comp. Analysis, p. 20), 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, as discussed in Section III.C.1 above.

In any event, as discussed in the RCMS (section 5.4), the requirement 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. Section 10.23 provides that, if the three above-listed conditions are met, the MassDFW Director may or may not permit a take, thereby giving him complete discretion as to whether to do so. Thus, if those conditions are met, 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)). In addition, application of the Net Benefit requirement here, 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 above, 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, not relevant here). Thus, any attempt to require additional conservation and management measures would undermine those covenants and conflict with the CD.

C. Requirements to Pay for Future PCB Costs Related to River Dams/Structures

The Draft Permit includes, in Section II.B.7.b (under the heading of "Institutional Controls and Related Requirements"), certain requirements relating to dams and other structures in the Housatonic River in both Massachusetts and Connecticut. Some of those requirements would

mandate that GE pay PCB-related costs incurred by third parties. As shown below, those requirements do not constitute institutional controls, go beyond EPA's remedial authority, and conflict with the Permit requirement to apply the specified remedy selection criteria.

1. Requirement to pay PCB costs for river projects

Section II.B.7.b.(2) of 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) (Draft Permit, p. 32). 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.

It is clear under both CERCLA and RCRA that EPA's authority to select and require remedial actions or corrective measures pertains to prescribing such actions as are necessary to protect human health and the environment from identified risks due to releases. As noted above, CERCLA defines "remedial action" as actions to address releases of hazardous substances so "they do not migrate to cause substantial danger to present or future public health or welfare or the environment" (CERCLA § 101(24); and it provides that remedial actions must attain a degree of cleanup and release control that "assures protection of human health and the environment" and must require "a level or standard of control" that achieves ARARs (unless waived) (*id.* § 121(d)(1)). The RCRA corrective action provisions likewise provide for "corrective action to be taken beyond the facility boundary where necessary to protect human health and the environment" (RCRA § 3004(v)). The RCRA Permit recognizes this focus by specifying General Standards of protection of human health and the environment, control of sources of releases, and compliance with ARARs (unless waived), with balancing factors to be considered in determining the alternative that is best suited to meet the General Standards.

The Region'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.

Moreover, contrary to the heading in the Draft Permit, this proposed requirement does not constitute an institutional control. EPA 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.” *Institutional Controls: A Guide to Planning, Implementing, Maintaining, and Enforcing Institutional Controls at Contaminated Sites* (EPA, 2012c), p. 2. 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.

In addition, even if it were otherwise authorized, this proposed requirement 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, as discussed in Section IV.F above and recognized in EPA guidance, 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 Region 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.⁶¹

For these reasons, Section II.B.7.b.(2) of the Draft Permit should be deleted from the final Permit.

2. Requirement to pay PCB costs resulting from dam failure or unpermitted release

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” (Draft Permit, p. 32). As it relates to non-GE-owned dams, this requirement is unauthorized for similar reasons to those discussed in the prior subsection. GE is not responsible to prevent failure of any of those dams or unpermitted

⁶¹ In fact, as discussed above, any such evaluation would demonstrate clearly that this proposed requirement would not meet those criteria since that payment requirement is not based on protecting human health or the environment and would not control sources of releases, and ARARs are not pertinent to such a requirement.

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, like the requirement discussed in the prior section, 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 flatly 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 (CD ¶¶ 161, 166, 170, 176).

For these reasons, Section II.B.7.b.(3) of the Draft Permit should also be deleted.

D. Requirements for EREs, Conditional Solutions, and Future Cleanup at Floodplain Properties

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 (Draft Permit, pp. 33-35, Tables 3-5). To be consistent with the CD, applicable legal principles, and EPA guidance, several changes are needed in these provisions.

Trigger level. 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 (see CD ¶ 28). 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 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 (CD ¶ 8.b(i)). 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.”⁶²

1. EREs for GE and State properties

Subsection c.(1) of this section 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 97.⁶³ See Twelfth Modification of Consent Decree, filed with the District Court on September 24, 2014. Subsection c.(1) of the Draft Permit should be changed to be consistent with that CD Modification.

2. EREs for other non-residential properties

Subsection c.(2) 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.” See *Land Use in the CERCLA Remedy Selection Process* (EPA, 1995a); *Considering Reasonably Anticipated Future Land Uses and Reducing Barriers to Reuse at EPA-lead Superfund Remedial Sites* (EPA, 2010); *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents* (EPA, 1995b). In addition, the Region should make clear, in accordance with EPA’s 1995 land use guidance, that this determination must be based on “existing information” and “reasonable assumptions” (EPA, 1995a), not speculation or theoretical possibility.

3. Conditional Solutions for non-residential properties

Subsection c.(3) 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 (EPA, 2012c) (see definition in Section V.C.1 above), since it would

⁶² If this trigger were changed to 1 mg/kg, that change would lead to the inconsistent situation in which the A/P Lawns of current residential properties in the Rest of River area (or any properties above the Confluence) that have an average PCB concentration below 2 mg/kg would be deemed suitable for unrestricted use, but other properties in the Rest of River that have concentrations between 1 and 2 mg/kg would not, and would be subject to restrictions. There is no justification for that distinction.

⁶³ The reason for this modification is that the Massachusetts Division of Capital Asset Management and Maintenance (DCAMM), which manages State properties, recently advised GE, EPA, and MassDEP that State properties that are not subject to Article 97 are generally in the same position with respect to EREs as State properties subject to Article 97 – i.e., regular EREs cannot be imposed on such properties without specific legislative authorization.

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 (see Section IV.F above). The EPA Region 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.

However, 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 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.⁶⁴

- First, 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 owner must provide evidence of a commitment to the future use.
- Second, 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, as discussed further in Section V.D.7 below, the Region's specification in Table 5 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).
- Third, to meet the Permit's requirements for the Rest of River, the Region 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.

⁶⁴ In addition to the conditions listed below, to be consistent with EPA guidance, this requirement should apply to non-residential properties where a change in use is “reasonably anticipated,” based on “existing information” and “realistic assumptions,” for the same reasons discussed in Section V.C.2.

In addition to the provision discussed above, 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 Section V.C.1 above 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.

4. Conditional Solutions for residential properties

Subsection c.(4) provides that for floodplain portions of residential properties downstream of the Confluence that are not part of the A/P 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 if the use should change to residential or agricultural. This provision should be changed in several respects.

First, 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. Table 16 provides several examples of residential properties in the floodplain that are not part of the A/P Lawns of the Downstream Floodplain Residential Properties and for which the HHRA concluded that there is no reasonable potential for a change to a different 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."

Moreover, this Conditional Solution requirement must be limited by the same conditions described in Section V.D.3. 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 the Region needs to estimate the potential implications of this requirement and evaluate it under the Permit criteria.

In addition, as in subsection c.(3), 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 Section V.C.1 and summarized in Section V.D.3 above, this requirement to pay the owner's future costs exceeds EPA's authority.

5. Requirement to pay future PCB costs at other non-residential properties

Subsection c.(5) 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 Section V.C.1 and summarized in Section V.D.3 above, this requirement exceeds EPA's authority.

6. Five-year review requirement

Subsection c.(6) 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 (see CERCLA § 121(c); CD ¶ 43.c).⁶⁵ 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 (CD ¶ 44). 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.

7. Cleanup standards for future uses

Subsection c.(7) 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 (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.

⁶⁵ See also EPA's *Comprehensive Five-Year Review Guidance* (EPA, 2001a), pp. 4-5 & 4-7, and its 2010 future use guidance (EPA, 2010), p. 9.

Application of these proposed cleanup standards for future uses is unjustified and could lead to extensive and unnecessary remediation, as discussed below

The Region's proposed future use cleanup standard of 1 mg/kg for residential properties (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). As mentioned above, 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)). Further, as also noted above, the EPA Region has previously determined, in its April 3, 2006 approval letter for GE's revised (March 2006) 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" (emphasis added). 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.

The formula in Table 4 for agricultural uses could lead to extremely low cleanup standards, well below even the standards specified in the Region'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.⁶⁶ 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.

The Region'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, as discussed above.
- 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

⁶⁶ While the formula allows for adjustment based on the percentage of the farm area in the floodplain, its application even with such adjustments would still result in very low cleanup levels.

constitutes an end run around the Permit requirement to consider those factors in selecting a remedy and is inconsistent with EPA guidance, as also discussed above. Similarly, 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 an 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.

Thus, in the absence of an evaluation of the future-use cleanup standards under the Permit criteria at this time, and apart from the limited Conditional Solution context described above, the appropriate cleanup standards for a changed use would need to be evaluated when the change occurs, based on consideration of all relevant factors.

E. Adaptive Management Requirements

The Draft Permit contains a section on Adaptive Management (Section II.B.10.a). That section includes a proposed requirement that GE must perform the remedy in accordance with any modifications that are identified by GE (with EPA approval) “**or are required by EPA**” (Draft Permit, p. 36, emphasis added). The latter requirement contains no limitation on EPA’s authority to require GE to make modifications to the remedy.

That requirement directly conflicts with the limitations in the CD on EPA’s authority to require such modifications – namely: (a) the provision in ¶ 39 that EPA can require such a modification only if it is “consistent with the scope” of the selected Remedial Action and does not modify the Performance Standards; and (b) the covenant that EPA cannot otherwise require GE to conduct additional response actions unless it determines that there is new information or conditions that render the selected remedy not protective of health or the environment. The Region cannot legally abrogate those limitations simply by inserting into the remedy, under the rubric of adaptive management, a requirement that GE must comply with any future modifications required by EPA.

In addition, this proposed requirement would give EPA unfettered discretion to direct GE to conduct additional response actions without an evaluation of them under the Permit’s remedy selection criteria. The Region cannot use adaptive management to avoid evaluating those criteria for such a future requirement.

F. ARARs

The EPA Region’s Draft Permit contains, in Attachment C, a table listing the federal and state ARARs and to-be-considered (TBC) requirements that EPA has identified for the proposed remedy, along with a synopsis of each and a description of the actions to be taken to achieve

each of these identified requirements or the basis for a waiver. In numerous respects, this table is erroneous, unsupportable, incomplete, and/or misleading, as shown below.⁶⁷

1. Water quality criteria

The Region lists the national ambient water quality criteria for PCBs and the comparable Massachusetts and Connecticut water quality criteria (included in those States' water quality standards) as chemical-specific ARARs (Att. C, pp. 1-2). These include a freshwater chronic aquatic life criterion of 0.014 µg/L and a human health criterion of 0.000064 µg/L based on consumption of water and organisms. The Region proposes to waive the latter criterion in Massachusetts on the ground of technical impracticability since that criterion is not predicted to be met in Massachusetts by the proposed remedy or any other sediment remediation alternative. Instead, the Region says, the remedy will be required to meet the Biota Performance Standard and the Downstream Transport Performance Standards, described above. Our comments on those performance standards were provided in Sections IV.G and IV.H above. In any event, those proposed standards cannot constitute ARARs, since they are not promulgated standards of general applicability, and thus should not be cited in the ARARs table.

For Connecticut, the Region declines to waive the 0.000064 µg/L water quality criterion, stating that the modeling results indicate that the proposed remedy would achieve that criterion in "at least 3 of the 4 Connecticut impoundments" (*id.*, p. 1). It notes that the results from the "Connecticut model" (which is actually not a model, but a procedure for extrapolating the EPA model results to Connecticut) are "very uncertain due to the empirical, semi-quantitative nature of the analyses," and thus "it is not possible to predict with certainty attainment or lack of attainment" of this criterion in Connecticut" (*id.*).⁶⁸ The Region then asserts that "EPA does not believe there is a basis to waive this criterion at this time" (*id.*). The Region also recognizes that this concentration (0.000064 µg/L) "cannot be reliably measured using available analytical techniques"; but instead of waiving the criterion on this basis, it states that the lowest available detection limit will be used to measure progress toward this criterion (*id.*, p. 2).

This conclusion is unsupportable. The preamble to the NCP states that "ARARs must be **measurable** and **attainable** since their purpose is to set a standard that an actual remedy will attain" (55 Fed. Reg. 8720, 8752, March 8, 1990; emphases added). As the Region recognizes, the 0.000064 µg/L water quality criterion is below current ability to measure consistently and

⁶⁷ This section provides comments on the Region's ARARs table for its proposed remedy, as set forth in Attachment C to the Draft Permit. All references in this section to "Att. C" refer to that table. The Region's discussion of ARARs in connection with its selection of off-site disposal over on-site disposal was addressed in Section II.B.3 above.

⁶⁸ As discussed in Sections III.B.1 and IV.B.2, since the EPA Region decided not to extend its PCB model to Connecticut, GE developed a methodology, at the Region's request, involving extrapolation from the EPA model to estimate future PCB concentrations in the four main Connecticut impoundments. Unlike the EPA model, that methodology was not subject to peer review. Further, since that extrapolation methodology relies on numerous simplifying assumptions and factors without adequate or any supporting data, its results are highly uncertain and cannot be regarded as reliable predictions of specific PCB concentrations, particularly at these low levels.

reliably using an EPA-approved method.⁶⁹ Under the NCP, that is a basis to waive the ARAR as technically impracticable (not to specify that the lowest achievable detection limit will be used). Indeed, EPA guidance on ARARs indicates where compliance with applicable standards cannot be measured due to detection limit issues, “the technical impracticability waiver should generally be invoked,” and that, in the absence of a reliable measurement tool, extrapolations should not be used because they “cannot be verified scientifically with any degree of certainty” (*ARAR Q’s and A’s: Compliance with Federal Water Quality Criteria*, EPA, 1990). In addition, given the high uncertainties in the extrapolation of the model results to Connecticut (as noted above), there is no reliable method to predict the attainment of this criterion in Connecticut. This is exacerbated by the continued input of PCBs at and above these low levels from atmospheric sources, which decreases the chances of ever attaining a criterion of 0.000064 µg/L.⁷⁰ Since the Region thus has no reliable basis to determine that the criterion is attainable in Connecticut, it should waive the criterion as technically impracticable on that ground as well (not the converse, as EPA concludes).⁷¹

This conclusion is further supported by EPA’s requirements under the Clean Water Act. Just as the water quality criteria serve as ARARs under CERCLA, they also serve as endpoints for total maximum daily load (TMDL) calculations under the Clean Water Act, since TMDLs must be established at levels necessary to attain and maintain applicable water quality standards (40 CFR § 130.7(c)). And just as these standards must be waived as ARARs on the ground of technical impracticability, so too must they be waived if the “proper technical conditions” are not present for TMDL calculation (43 Fed. Reg. 60662, 60665, December 28, 1978). EPA has defined “proper technical conditions” as “the availability of the analytical methods, modeling techniques and data base necessary to develop a technically defensible TMDL” (*id.* at 60662). If the existing analytical methods and models are not sufficiently precise to be able to measure and/or predict attainment of the particular water quality criterion at issue, then the criterion cannot serve as the endpoint (or ARAR) for the cleanup plan. Otherwise, it would be impossible to determine whether the plan was necessary, more than necessary, or less than necessary to achieve the applicable water quality criterion. The same applies here.

⁶⁹ None of the EPA-approved analytical methods for PCBs in water can reliably quantify total PCBs at this level due to laboratory performance issues and laboratory and field background levels. Even EPA’s proposed Method 1668 (which is not yet an approved method under 40 CFR Part 136) is incapable of reliably quantifying total PCBs at this concentration. Indeed, in 2010, EPA declined to reduce the level of the National Primary Drinking Water Standard for PCBs (0.5 µg/L), which was based on the Practical Quantitation Limit (PQL) for PCBs, due to the absence of data showing that PCBs could be reliably quantitated by an EPA-approved method at a lower PQL (75 Fed. Reg. 15500, 15555, March 29, 2010).

⁷⁰ For example, a review of several literature studies reporting monitoring results for PCB concentrations in remote waters for which atmospheric inputs represent the only known PCB source, as well as measurements in precipitation, shows that such waters contain PCB concentrations well above the level of this criterion. See GE’s Model Input Addendum to Rest of River CMS Proposal (QEA and ARCADIS BBL, 2007), pp. 3-9 – 3-10. The impact of atmospheric/precipitation PCB inputs at these levels confounds any effort to use the simplified model extrapolation approach to predict attainment of the 0.000064 µg/L criterion.

⁷¹ The Region states in the Statement of Basis that “[t]hese criteria are not being waived in Connecticut because they can potentially be met in the future,” but that “[s]uch a waiver may be considered in the future should it become apparent that these criteria cannot be met based on technical impracticability” (p. 40). That conclusion is backwards. Since ARARs must be attainable, they should be waived if there is no basis to conclude that they will be attained.

In addition to citing these criteria as chemical-specific ARARs, the Region cites the national and state water quality criteria for PCBs as action-specific ARARs, stating that all remedial activities performed in a waterway “will be conducted so as not to contribute to an exceedance” of these criteria (Att. C., pp. 13, 15, 17). That assertion is incorrect. The Housatonic River does not currently meet these water quality criteria. Thus, the performance of any excavation/dredging in the river, which will unavoidably involve some resuspension of PCB-containing sediments and releases of PCBs to the water column, will necessarily **contribute** to an exceedance of those criteria.

2. Connecticut Remediation Standard Regulations

The Region lists the direct exposure criteria for soil specified in the Connecticut Remediation Standard Regulations (RSRs), including those specified for residential use, as chemical-specific ARARs (Att. C, p. 2). As mentioned in Section V.D, those criteria include a residential direct exposure criterion for PCBs of 1 mg/kg. The numerical criteria in the RSRs should not be listed as ARARs because the RSRs allow for alternative direct exposure criteria based on a site-specific assessment of risks. Specifically, for PCBs, the RSRs allow the CT DEEP to approve an alternative direct exposure criterion at a specific site if that criterion is shown to protect human health and the environment and is consistent with EPA’s TSCA regulations and its Superfund guidance (Regulations of Conn. State Agencies, section 22a-133k-2(d)(7)).

In this case, EPA has conducted site-specific risk analyses. As discussed above, 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 specific 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)). That determination, in effect, constituted the approval by CT DEEP of an alternative PCB criterion for residential exposure at this Site. Further, based on the CD Performance Standard of 2 mg/kg for residential areas, the EPA Region approved an IMPG of 2 mg/kg for residential areas in the Rest of River. In its April 3, 2006 approval letter, the Region stated that while “EPA typically considers the numeric criteria established in the RSRs to be ARARs,” “a numerical Performance Standard for PCBs of 2 mg/kg for residential properties was established in the Consent Decree (to which CTDEP is a party) **which constitutes the Performance Standard for residential properties in the Rest of River, including Connecticut**” (emphasis added). To be consistent with that conclusion, the Region should not cite the RSRs’ residential direct exposure criterion of 1 mg/kg for PCBs as an ARAR for this remedy.

3. Clean Water Act Section 404 and implementing regulations

The Region cites the EPA regulations and those of the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act (relating to the discharge of dredged or fill material) as location-specific ARARs, and it states that the remedy will be conducted in accordance with those regulations (Att. C, p. 4). That is wrong.

First, those regulations provide that, for a discharge of dredged or fill material, there must be no practicable alternative with less adverse impact on the aquatic ecosystem. The Region claims that there is no practicable alternative to the proposed remedy with lesser effects on the aquatic ecosystem, because any alternative with lesser effects would not be adequately protective (see *id.* and Comp. Analysis, Attachment 14, pp. 8-9. However, we have shown above in Sections III and IV that there are practicable alternatives that would be protective and have less adverse ecological impacts than the proposed remedy.

Second, those regulations provide that such a discharge cannot cause or contribute to a violation of a state water quality standard. The proposed remedy would not meet this requirement since, as noted above, the Housatonic River does not currently meet the Massachusetts water quality criteria for PCBs (including the 0.000064 µg/L criterion discussed above), and thus any discharge of PCB-containing dredged or fill material (which will be part of any in-river work) would necessarily contribute to that exceedance. Hence, this requirement would need to be waived.

Third, these regulations include EPA's and the Corps' regulations requiring compensatory mitigation for projects with unavoidable adverse impacts on the aquatic ecosystem after all practicable steps have been taken to avoid or minimize the impacts (40 CFR Part 230, Subpart J; 33 CFR Par 332). For the reasons discussed in Section V.A, to the extent that these regulations require additional actions beyond efforts to return the affected resources to their pre-remediation condition (to the extent practicable) – e.g., enhancement of the resources, other on-site or off-site projects designed to “compensate” for the remedy's impacts – they would go beyond EPA's remedial authority at this Site. Rather, they would constitute an effort to recover additional NRD, which GE has fully settled at this Site in the CD (including for impacts caused by remediation actions), and would thus violate the NRD covenants that the United States provided to GE in the CD. Thus, such compensatory mitigation requirements should not be considered ARARs for the proposed remedy.

4. Floodplain management and protection of wetlands

The Region cites, as an “applicable” location-specific ARAR, the regulations at 44 CFR Part 9, which, it says, set forth policy, procedures, and responsibilities to implement and enforce Executive Order 11988 on Floodplain Management and Executive Order 11990 on Protection of Wetlands (Att. C, p. 5). The Region fails to mention, however, that these regulations apply only to actions of the Federal Emergency Management Agency (FEMA) and thus are not “applicable” to the proposed remedy at all. As such, they should be deleted.

In addition, the Region cites those Executive Orders themselves as TBCs (*id.*, p. 6), which is correct since the orders were not promulgated after notice-and-comment rulemaking and thus cannot constitute ARARs. However, the Region's statements regarding attainment of those TBCs contain some errors. Regarding Executive Order 11988 on Floodplain Management, the Region states that “[a]ll activities will be conducted to ensure that they do not result in occupancy and modification of the floodplain” (*id.*). It attempts to support that assertion on the grounds that the soil excavation work in the floodplain will be followed by backfilling to grade, and that the access roads and staging areas in the floodplain will be temporary and the affected

floodplain areas will be restored to their natural state (Comp. Analysis, Attachment 14, p. 9). That claim cannot withstand scrutiny. To begin with, the Executive Order applies to **any** proposed agency action in a floodplain, and requires that the agency must consider alternatives to avoid adverse impacts and, if there is no practicable alternative, design or modify its action to minimize harm to or within the floodplain. Further, the floodplain soil excavation and supporting activities in the floodplain **would** result in modification of the current condition of the floodplain, because they would involve extensive clearing of trees and other vegetation and changes to the soil composition and stratigraphy, with long-term impacts (see Section III.C.1 and Attachment C). In this case, the Region's proposal would not comply with this Executive Order because, as discussed above, there are practicable (and protective) alternative remedies that would have less adverse impact on the floodplain and because, given the existence of such alternatives, the proposed remedy has not been designed to minimize harm to the floodplain.

Similarly, regarding Executive Order 11990 on Protection of Wetlands, the Region erroneously states that all activities in wetlands would meet the substantive requirements of that order (Att. C, p. 5). Again, the proposed remedy would not meet the requirement of that order that agencies should avoid construction in wetlands unless there is no practicable alternative. Here, there are practicable alternatives with less adverse impact on wetlands.

5. Rivers and Harbors Act of 1899

The Region cites Section 10 of this Act (33 USC § 403) as a location-specific ARAR and states that the remedy "will comply with the substantive requirements of this provision" (Att. C., p. 5). That section of the Rivers and Harbors Act prohibits work in the navigable waters of the United States without authorization from the U.S. Army Corps of Engineers. It does not contain any substantive requirements. Since no permit will be required for the remediation activities due to the on-site permit exemption, this provision of the Rivers and Harbors Act will be addressed through EPA's coordination with the Corps of Engineers. The reference to "substantive requirements" should be deleted.

6. Fish and Wildlife Coordination Act

The Region cites the Fish and Wildlife Coordination Act as another location-specific ARAR and states that the remedy will comply with the substantive requirements of this Act (Att. C, p. 5). That ARAR only requires consultation with the U.S. Fish and Wildlife Service and the appropriate state wildlife agency; there are no separate substantive requirements. However, to the extent that this consultation leads to a requirement that GE must compensate for losses to fish or wildlife, such a requirement would be unauthorized for the same reasons given in Sections V.A and V.B.

7. Massachusetts Waterways Law and regulations

The Region cites MGL Chapter 91 and the state regulations thereunder (310 CMR 9.00) and asserts that measures undertaken as part of the remedy will meet the substantive environmental standards of these regulations (Att. C, p. 7). It fails to mention a key provision of these regulations – the prohibition on 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) (301 CMR 9.40(1)(b)). That prohibition would not be met by the proposed remedy and thus would need to be waived. The Region's failure to mention this prohibition is striking given its emphasis on the prohibitions on locating a solid or hazardous waste disposal facility in an ACEC, on which it relies to reject an on-site upland disposal facility (see Section II.B.3 above).

8. Massachusetts water quality certification regulations

The Region cites the state water quality certification regulations (314 CMR 9.01-9.08) as both a location-specific ARAR (Att. C, pp. 7-8) and an action-specific ARAR (*id.*, pp. 14-15). In both cases, it asserts that “[a]ll activities subject to these requirements will be conducted in accordance with these regulations.” Again, that assertion is wrong.

To begin with, as the Region notes, these regulations prohibit the discharge of dredged or fill material, as well as dredging itself, if there is a practicable alternative that would have less adverse impact on the aquatic ecosystem. As we have shown above, there are practicable alternatives to the proposed remedy that would be protective and would have less adverse impact on the aquatic ecosystem.

Moreover, as the Region recognizes in its synopsis of these regulations as an action-specific ARAR (*id.*, p. 14) but not in its synopsis of the regulations as a location-specific ARAR (*id.*, p. 7), these regulations prohibit a discharge of dredged or fill material that would adversely affect the Estimated Habitats of rare (i.e., state-listed) wildlife species as specified in the Massachusetts Wetlands Protection Act (WPA) regulations (314 CMR 9.06(2)) (unless that prohibition is waived for projects that will restore or otherwise improve the natural capacity of wetlands or waterbodies [314 CMR 9.06(8)], which has not occurred here). As shown on Figures 9a and 9b, nearly all of the proposed remediation and supporting activities would occur within the Estimated Habitats of state-listed wildlife species, as delineated by the NHESP under the WPA regulations, and would unavoidably have an adverse impact on those habitats. As a result, the prohibition in these regulations on actions that would adversely affect such habitats would not be met.

We also note that these regulations require a minimum of 1:1 restoration or replication of affected bordering or isolated wetlands, (again subject to waiver for projects that will restore or otherwise improve the natural capacity of wetlands or waterbodies [314 CMR 9.06(2), 9.06(8)]). Application of this requirement to require compensatory mitigation (e.g., acquisition or construction of new wetlands, rather than or in addition to attempting to restore the affected wetlands) would be unauthorized for the same reasons discussed in Section V.A.

9. Massachusetts Wetlands Protection Act and regulations

The Region cites the Massachusetts WPA and regulations (310 CMR 10.00) as location-specific ARARs and states that any remedial activities that would affect resource areas subject to these regulations “will be conducted in accordance with these standards” (Att. C., p. 8). It does not specifically cite 310 CMR 10.53(3)(q), which provides that response actions in accordance with

the MCP are authorized as a “limited project” if they meet certain specified requirements. The Rest of River remedial action would be considered a response action under the MCP – and thus a limited project under this provision – if MassDEP concurs with it, because the MCP considers EPA-selected remedial actions under CERCLA to be “adequately regulated” under the MCP, provided that MassDEP concurs with EPA’s remedy decision (310 CMR 40.0111). Thus, that specific provision should be cited.

More significantly, the Region’s conclusion that the proposed remedial activities would meet the WPA regulations is incorrect. The WPA regulations provide that, for both regular projects and limited projects subject to 310 CMR 10.53(3)(q), any project that would alter a resource area within the mapped Estimated Habitat of state-listed wildlife species, as mapped by the NHESP, must not have any short- or long-term adverse effects on the habitat of the local population of that species (310 CMR 10.59). As noted above and shown on Figures 9a and 9b, the proposed remediation and supporting activities would occur within, and have adverse effects on, the NHESP-mapped Estimated Habitats of state-listed wildlife species. Thus, this requirement of the WPA regulations would not be met.

Moreover, while the regulations in 310 CMR 10.53(3)(q) allow latitude which respect to some of the other regulatory performance standards for a qualified “limited project” consisting of remedial activities, they require that there be no practicable alternatives that would be less damaging to resource areas subject to the WPA. Here, as shown above, there are such practicable alternatives for the Rest of River. Further, in the event that the remedial actions do not qualify as a “limited project,” they would not meet other requirements of the WPA regulations – e.g., the prohibition on work that results in loss of more than 5,000 square feet of bordering vegetated wetlands or impairs such wetlands in an ACEC (310 CMR 10.55(4)), and potentially the requirement to maintain a 100-foot-wide area of undisturbed vegetation along the river in a Riverfront Area (with certain exceptions) (310 CMR 10.58(4)(d)1).

10. Massachusetts and Connecticut dam safety regulations

The Region cites the Massachusetts Dam Safety Standards and the Connecticut Dam Safety Regulations as “potentially applicable” location-specific ARARs, stating that, to the extent that these regulations are applicable to a dam in the area of remedy activity, “the remedy will comply with these regulations” (Att. C, pp. 8, 10). For Massachusetts, these regulations would constitute ARARs only as they would apply to the GE-owned dams (i.e., Woods Pond and Rising Pond Dams). For the other dams in Massachusetts, those that are regulated by FERC are not subject to these state regulations at all because the FERC regulation under the Federal Power Act preempts state regulatory requirements.⁷² For the non-GE-owned dams that are subject to the state dam safety regulations, those regulations establish responsibilities of the

⁷² See the Supreme Court’s decisions in *First Iowa Hydro-Electric Cooperative v. Federal Power Comm’n*, 328 U.S. 152 (1946), and *California v. Federal Energy Regulatory Comm’n*, 495 U.S. 490 (1990).

dam owners (who are not subject to this remedy) and thus cannot be ARARs for the proposed remedy. The ARARs table should be revised accordingly.⁷³

For Connecticut, the state dam safety regulations are not applicable at all because all of those dams are subject to FERC regulation, which preempts the state regulations, and in any event the regulations relate to the responsibilities of the dam owners and are thus not ARARs for this remedy. Accordingly, those regulations should be deleted from the ARARs table.

11. Massachusetts hazardous waste regulations

The Region cites some of the Massachusetts hazardous waste regulations (310 CMR 30.000) as potentially applicable. Specifically, it cites the location standards for hazardous waste management facilities in floodplains as location-specific ARARs (Att. C, p. 8), and it cites a number of the general state hazardous waste regulations as action-specific ARARs for the proposed remedy (*id.* pp. 16-17).⁷⁴ Under those state regulations, as the Region recognizes, wastes that contain PCB concentrations at or above 50 mg/kg are listed as hazardous wastes; but the regulations provide that (with one relevant exception, discussed below) their requirements do not apply to facilities that manage such PCB hazardous waste in compliance with EPA's regulations under TSCA (310 CMR 30.501(3)(a)). As the Region notes (Att. C, p. 16), waste materials at this site that are deemed hazardous in Massachusetts based solely on containing PCB concentrations at or above 50 mg/kg will be managed in compliance with EPA's TSCA regulations. Accordingly, the Region specifies that its citations of the hazardous waste location standards and other substantive provisions of these regulations apply to any "non-PCB" hazardous waste – i.e., materials that are found to constitute hazardous waste on the basis of criteria applicable to non-PCB constituents, which are the same as the criteria used to identify hazardous waste under the federal RCRA.⁷⁵

Significantly, however, the Region does not cite a key location standard of the Massachusetts hazardous waste regulations, which would constitute a location-specific ARAR. As discussed in

⁷³ The same considerations apply to the Massachusetts guidance documents on dam removal that are cited by the Region as TBCs and which the Region claims that "the remedy will comply with" (Att. C, p. 11). With respect to dams owned by parties other than GE, these guidance documents relate to activities performed by the dam owners (who are not subject to this remedy), and the Region has no basis for concluding that they will be complied with. As such, these entries should be deleted from the table.

⁷⁴ In addition, in its entry for the state hazardous waste location standards, the Region cites a provision of the Massachusetts Hazardous Waste Facility Site Safety Council Regulations (990 CMR 5.04) (Att. C, p. 8). As discussed in Section II.B.3, those 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. These regulations do not establish substantive requirements or restrictions on hazardous waste management facilities, and GE would not seek the state assistance and special permitting procedures under these regulations. As such, these regulations are totally irrelevant to this project and should be deleted from the ARARs table.

⁷⁵ As noted in Section II.B.3, based on prior experience at other portions of this Site, it is not anticipated that the excavated sediments or soils would constitute hazardous waste on the basis of the criteria applicable to non-PCB constituents.

Section II.B.3, MassDEP has recently adopted an amendment to the state hazardous waste regulations that (unlike all other requirements of those regulations) applies specifically to a facility that manages state hazardous waste with PCB concentrations at or above 50 ppm. That provision states that, “[n]otwithstanding any other provision of” the state hazardous waste regulations, no hazardous waste management facility may be located within an ACEC or may be located “adjacent to or in close proximity to” an ACEC if it would “fail to protect the outstanding resources” of the ACEC (310 CMR 30.708). Since a “facility” is defined in these regulations to include land used for “storing” hazardous waste, and “storage” means “the containment of hazardous waste for a temporary period . . . , at the end of which period the hazardous waste will be used, treated, disposed of, transported, or stored elsewhere” (310 CMR 30.010), and since some of the removed sediments and soils will contain PCB concentrations at or above 50 mg/kg, this ACEC provision would apply to temporary staging areas for such removed sediments and soils and (as discussed in Section II.B.3) to a rail loading facility for such materials.⁷⁶ Given that the proposed remedy would require the location of at least some such facilities in or in close proximity to the ACEC, that location-specific ARAR would not be met and would need to be waived.

12. Massachusetts solid waste site assignment regulations

The Region cites the site suitability criteria in the Massachusetts site assignment regulations for solid waste facilities (310 CMR 19.40(3)&(4)) as “potentially applicable” location-specific ARARs (Att. C, p. 9). It states: “To the extent that solid waste is managed outside the Area of Contamination but remaining on-site, the remedy will comply with these requirements” (*id.*).

At the outset, it is doubtful that these regulations would apply at all, at least to staging areas that contain excavated material with PCB concentrations at or above 50 mg/kg. These regulations provide expressly that they do not apply to facilities that manage hazardous waste (310 CMR 16.01(4)(a)). As discussed above, the state hazardous waste regulations list wastes with PCB concentrations ≥ 50 mg/kg as hazardous waste, and the proposed remedy will require on-site management of removed sediments or soils with PCB concentrations ≥ 50 mg/kg in at least some of the temporary staging areas. Those areas would therefore not be subject to the solid waste site assignment regulations.⁷⁷

In addition, the state solid waste assignment regulations would not apply to a remedial action with which MassDEP concurs. Specifically, 310 CMR 19.013(2) provides an exemption from those regulations for remedial actions conducted under the MCP; and, as noted above, the MCP considers EPA-selected remedial actions under CERCLA to be “adequately regulated”

⁷⁶ The Region’s references to “the Area of Contamination” in its entries relating to the Massachusetts hazardous waste regulations are irrelevant. Even if that policy were otherwise applicable, it would not trump the ACEC prohibition in these regulations.

⁷⁷ While the hazardous waste regulations provide that their requirements (with the ACEC exception noted above) do not apply to facilities that manage such PCB hazardous waste in compliance with EPA’s TSCA regulations, that does not undercut the applicability of the exemption in the solid waste siting regulations for facilities that manage hazardous waste.

under the MCP, provided that MassDEP concurs with EPA's remedy decision (310 CMR 40.0111).

Moreover, to the extent that the solid waste regulations' site suitability criteria were applicable, the Region's assertion that its proposed remedy would meet those criteria is erroneous. The Region's reference to "the Area of Contamination" in discussing these criteria is irrelevant, since the state solid waste regulations contain no reference to such a concept or exception for wastes managed within such an area. However, the site suitability criteria in those regulations do explicitly include a prohibition on siting any "solid waste management facility" – defined as any facility used for the "handling, storage, transfer, processing, treatment or disposal of solid waste" (310 CMR 16.02) – in an ACEC (310 CMR 16.40(4)(d)). That prohibition would not be met for any solid waste staging areas (or a rail loading facility for such waste) within the ACEC. Additionally, the regulations' siting criteria for a "solid waste handling facility" – which includes any facility used for the "transfer" or "storage" of solid waste (310 CMR 16.02) – prohibit any such facility within a "Riverfront Area" (i.e., the area within 200 feet of any flowing waterbody, 310 CMR 10.58(2)(a)3.) (310 CMR 16.40(3)(d)6.), which would also apply to at least some staging areas (and potentially a rail loading facility). Thus, to the extent that these siting criteria are applicable, some of them would not be met.

13. Massachusetts Endangered Species Act and regulations

The Region cites MESA and the MassDFW's regulations thereunder as location-specific ARARs, stating that those regulations prohibit a "take" of a state-listed 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" (Att. C, p. 9). The Region states further: "To the extent that unavoidable impacts result in a take of state-listed species, a conservation and management plan providing for a long-term net benefit to the affected state-listed species will be implemented" (*id.*; see also Comp. Analysis, p. 9). Those statements are incomplete and unsupportable.

The Region fails to mention that the MESA regulations explicitly prohibit the MassDFW from authorizing a take of a state-listed species unless the take would impact "[a]n insignificant portion of the local population" of the affected species (321 CMR 10.23(2)(b)). If the take would impact a significant portion of the local population, the take is prohibited altogether and the requirement for a conservation and management plan providing a long-term "net benefit" to the species does not come into play. As shown in Section III.C.1 and Attachment E, the proposed remedy would result in a take of 25 state-listed species, and those takes would affect a significant portion of the local population of at least 9 of those species. As a result, the MESA regulations would prohibit the activities causing such a take, and that prohibition would need to be waived in order for the proposed remedy to be compliant with ARARs.

In addition, as we have shown in Section V.B, the requirement that, for takes that would affect an insignificant portion of the local populations, GE must implement a conservation and management plan providing for a long-term net benefit to the affected species does not constitute an ARAR under CERCLA (due to the unfettered discretion that it gives to the

MassDFW) and is unauthorized in this case as an effort to recover additional NRD, for which GE has a covenant from the federal and state governments.

14. Connecticut Endangered Species Act

The Region also cites the Connecticut Endangered Species Act as a location-specific ARAR and states that, “[t]o the extent that any remedy activity takes place in Connecticut that is subject to these regulations, the remedy will comply with these regulations” (Att. C., p. 11). Since the proposed remedy does not include any currently defined remediation activities in Connecticut, there is no basis to evaluate its impact on any listed threatened or endangered species in Connecticut, and thus there is no basis for the Region to conclude that the remedy would comply with the requirements of this statute.

15. Clean Water Act NPDES regulations

The Region cites EPA’s National Pollutant Discharge Elimination System (NPDES) regulations under the Clean Water Act as action-specific ARARs, stating that these requirements will be met “if water from the remedy, such as from dewatering or other processing of sediment and wetland soils, is discharged to surface waters” (Att. C, p. 13). However, to the extent that these regulations require that any discharge must meet effluent limitations necessary to meet state water quality standards, they could not be met because, as noted above, current water quality conditions in the Housatonic River do not meet the Massachusetts water quality criteria (i.e., the aquatic life criterion of 0.014 µg/L and the human health criterion of 0.000064 µg/L), and thus those criteria would not be met at the point of discharge. The EPA Region itself used a standard of 0.5 µg/L for discharges from its treatment facility used in the 1½-Mile Reach Removal Action, and the data from discharges in that project were generally in the range of 0.01 to 0.1 µg/L and often above 0.014 µg/L. Nevertheless, GE agrees that this ARAR could be met through discharges in compliance with instructions from the EPA On-Scene Coordinator (see 40 CFR § 122.3(d)). The Region should clarify that basis for its determination.

16. Potential violation of state law

As discussed above, there are several state ARARs identified by the Region that would not be met by the proposed remedy and that the Region is not proposing to waive. These include requirements of the Massachusetts Waterways Law regulation, the Massachusetts water quality certification regulation, the Massachusetts WPA regulations, the Massachusetts hazardous waste regulations, potentially the Massachusetts solid waste site assignment regulations, and the MESA regulations. To the extent that EPA does not waive those requirements, the remedy would constitute a violation of state law.

G. TSCA Risk-Based Determination

The Region’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, 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, 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.⁷⁸ The same should be done here.

⁷⁸ See, e.g., the TSCA risk-based determinations for the OPCAs at this Site (CD 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).

VI. DEFICIENCIES IN REGION'S EVALUATION OF PROPOSED SEDIMENT/FLOODPLAIN REMEDY UNDER PERMIT CRITERIA

The EPA Region 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" (Comp. Analysis, p. 59).

In fact, as we show in Section VI.A, the Region 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, as we show in Section VI.B, for the aspects and components of the remedy that the Region has evaluated, its evaluation of remedial alternatives is not adequately supported and is thus arbitrary and capricious. In demonstrating these points, this section of GE's comments cross-references to prior sections as appropriate.

A. Region's Failure To Consider Permit Criteria

Although the Region has issued a Comparative Analysis of Remedial Alternatives and included a summary of it in its Statement of Basis, it has not in fact conducted a complete evaluation of some aspects of its proposed alternative under the Permit criteria, has not conducted any such evaluation at all for some components of its proposed remedy, and has not provided the information necessary for others to make such evaluations in their comments.

First, as noted in Section III.C.1 above, while the Region has listed the acreage (or miles) of each habitat type that would be impacted by the RCMS 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 (Comp. Analysis, p. 29). 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" (*id.*). Similarly, it has not estimated the number of state-listed species that would be affected by its proposed alternative (*id.*, p. 33). In the absence of such quantification, the Region 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.⁷⁹

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. These components include the following:

- For vernal pools, as discussed in Section IV.F, the Region 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

⁷⁹ As discussed in Section III.C.1, GE has quantified the above impacts and shown that the proposed remedy would cause overall harm to the environment.

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 the Region with no standards provided. Given the absence of such information, the Region 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.

- The Region has not conducted an evaluation of the proposed PCB Downstream Transport Performance Standard against potential alternative standards. Further, as discussed in Section IV.G, 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.
- The same applies to the proposed Biota Performance Standard.
- As noted in Section V.A, although the proposed remedy includes a requirement for restoration of affected habitats, it contains no specifics regarding the types of restoration measures that will be required or evaluation of their potential for success (apart from an incorrect summary conclusion that they will be able to return the habitats to their pre-remediation condition). In the absence of knowing what restoration activities will be required, neither the Region nor others can evaluate such restoration requirements or potential alternatives to them under the Permit criteria.
- As discussed in Section V.C, 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 > 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.
- As discussed in Sections V.D, the Region'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, the Region 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.

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.

B. Region's Unsupportable Evaluation of Remedial Alternatives Under Permit Criteria

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, as shown below by a discussion of each of the Permit's criteria.

1. Overall protection of human health and the environment

The Region's comparison of remedial alternatives based on their overall protectiveness of human health and the environment constitutes a misapplication of that General Standard. To begin with, as discussed in Section III.A, the Region's underlying conclusion that alternatives that address the largest volume of sediment and floodplain soil provide the highest level of human health and environmental protection (Stmt. Basis, p. 28) 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).

Other, specific misstatements in the Region's analysis of this criterion include the following:

- The Region rejects capping without removal and thin-layer capping as not protective (Comp. Analysis, 12). In fact, as shown above, capping without removal can be an appropriate and protective part of the remedy in the deeper portions of Woods Pond and Rising Pond (see Sections IV.A and IV.C), and thin-layer capping can be effectively used in quiescent impoundments (such as in Reaches 7 and 8) to accelerate natural recovery (see Section IV.B and Attachment H).
- The Region refers to attainment of the federal and state water quality criteria in its discussion of protectiveness (Comp. Analysis, p. 16). 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.
- The Region erroneously indicates that the more a remedy relies on institutional controls over longer time frames and larger areas, the less protective it is (*id.*). 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 the Region 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” (*id.*), 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 (as shown in Sections III.B and IV.A through IV.E above); and it does not recognize or describe the serious adverse environmental impacts of its proposed alternative or the tenuous ecological benefits (as discussed in Sections III.C and IV.F). Instead, it simply concludes that restoration of the affected habitats can be achieved and that short-term impacts can be successfully mitigated (Comp. Analysis, p. 16) – which is not the case (see Section III.C.1 and Attachments C and D). Thus, contrary to the Region’s assertions, the proposed alternative does not “provide the best overall protection of human health and the environment” (Comp. Analysis, p. 16).

2. Control of sources of releases

In comparing remedial alternatives based on control of releases, the Region 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 (Comp. Analysis, p. 17). However, as shown above, remedial alternatives with substantially less removal would result in comparable annual PCB loads passing Woods Pond and Rising Pond Dams (see Sections IV.A, IV.B, and IV.C).

Additionally, the Region 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” (Comp. Analysis, p. 17). However, as shown in Section IV.A, 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, as also shown in Section IV.A, the potential for a failure or serious breach of Woods Pond is not realistic due to GE’s monitoring and maintenance of the dam.

Further, the Region 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 (*id.*, p. 18). However, as discussed in Section IV.B and Attachment H, 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. Attachment H further shows that the Region’s criticisms of the model’s representation of thin-layer capping are overstated and unwarranted.

3. Compliance with ARARs

The Region’s evaluation of ARARs for the various alternatives also fails to provide a justifiable basis for selecting SED 9/FP 4 MOD. The Region 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” (Comp. Analysis, p. 19). As shown in Sections III.B.1 and V.F.1, 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” (Comp. Analysis, p. 20). That claim is unfounded. First, as previously discussed, SED 9/FP 4 MOD is not the least damaging practicable alternative, because, as we have shown, there are practicable alternatives that would be protective and have less adverse ecological impacts than that alternative. 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, as we have demonstrated, the proposed alternative has definitely *not* balanced the extent of remediation with avoidance, minimization, and mitigation in sensitive areas (see Section III.C).

The Region cites MESA and its regulations and states 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 (Comp. Analysis, p. 20). The Region provides no support for this assertion or counter-assessment to GE’s detailed MESA analysis in the RCMS. Indeed, the Region states that “a final MESA evaluation will not be completed until the remedy design phase” (*id.*). As discussed in Sections III.C.1, V.B, and V.F.13 and Attachment E, the Region’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). The Region 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” (Comp. Analysis, p. 20). However, as also discussed in Sections V.B and V.F.13, 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, the Region fails to mention that its proposed alternative would not meet specific provisions of several other ARARs, as shown in Sections V.F.3, 7, 8, 9, 11, and 12.

Overall, the Region’s discussion of ARARs does not provide a basis for selecting its proposed alternative over others.

4. Long-term reliability and effectiveness

Under the long-term reliability and effectiveness criterion, the Region first discusses the magnitude of residual risk. That discussion focuses primarily on the reductions in fish fillet PCB concentrations resulting from the various alternatives (Comp. Analysis, pp. 21-23). However, as we have shown, alternatives with substantially less removal than SED 9/FP 4 MOD could achieve comparable or nearly comparable reductions in fish fillet PCB concentrations (see Sections IV.A through IV.E). In addition, the Region relies on the extent to which the alternatives would achieve the direct-contact IMPGs in the floodplain and sediment EAs (Comp. Analysis, pp. 23, 25). However, as we have also shown, even accepting EPA's PCB toxicity values and overstated 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 (see Section III.B.2).

The Region next addresses the adequacy and reliability of the technologies involved, and in doing so makes a number of misstatements. First, its blanket statement that thin-layer capping "is not expected to be a reliable or effective component for this site (Comp. Analysis, p. 26) fails to recognize the appropriateness of that technology for certain areas, such as the Reach 7 impoundments and Rising Pond, as discussed in Section IV.B and Attachment H. Second, the Region'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" (Comp. Analysis, p. 26), is incorrect, as shown in Section III.C.1 and Attachments C and D. Third, the Region's suggestion that reliance on institutional controls is unreliable and may not be effective (Stmt. Basis, p. 31) is misguided, since, as EPA has recognized (EPA, 2012c), 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.

The Region also addresses the long-term impacts of the alternatives on habitats and biota (Comp. Analysis, pp. 27-32), but that discussion is unsupported and wrong in many respects. As mentioned in Section VI.A, in contrast to the exhaustive assessment of habitat impacts in the RCMS, the Region has failed to quantify the impacts of SED 9/FP 4 MOD on any of the floodplain habitats, marking those as "TBD" (*id.*, p. 29). 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 Section III.C.1 and Attachment C. The Region'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. In addition to the statements mentioned above, other examples of the Region's statements that are shown to be unjustified by the evaluations in the RCMS and Attachments C and D include the following:

- "There may be a temporary loss of woody debris and shade in Reaches 5A and 5B" (Comp. Analysis, p. 28). 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.

- The impact of invasive species can be mitigated “via active control of invasive species” (*id.*). 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.
- “[P]roven techniques are available to provide adequate bank stabilization with minimal loss of this type of habitat” (*id.*, p. 29). This is flatly untrue as recognized by the Commonwealth (MA EOEEA et al., 2011) and discussed in Section III.C.1; 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.
- 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” (*id.*, p. 30). The Region 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.
- “[O]ver time [stabilized riverbanks] are expected to” return to their current condition or level of function (*id.*). In fact, as discussed above, the contrary is true; stabilized riverbanks will **not** return to their current condition or level of function.
- 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” (*id.*, p. 31). As discussed in Section III.C.1, 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.
- “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” (*id.*, p. 32). As also discussed in Section III.C.1, recognized by the Commonwealth, and shown in Attachments C and D, 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.

- Restoration methods “will reestablish functions and values and minimize the potential for long-term negative impacts from the remediation” (*id.*, p. 35). Once again, this blanket statement is incorrect, as demonstrated in Attachments C and D.

In addition, the Region 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 (*id.*, p. 33). As shown in Section III.C.1 and Attachment E, while 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.

5. Attainment of IMPGs

The Region’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 (Comp. Analysis, pp. 35-44). For the human health IMPGs based on direct contact, the Region notes that, for the floodplain EAs, SED 9/FP 4 MOD would achieve the IMPGs based on a “human health risk target of 1×10^{-5} or 1×10^{-4} for RME receptors (depending on the impact to core habitat areas . . .), or an HI of 1” (*id.*, p. 36). As discussed in Section III.B.2, alternatives with considerably less floodplain removal could likewise achieve the RME IMPGs based on either a 1×10^{-5} or 1×10^{-4} cancer risk and a non-cancer HI of 1 in all floodplain EAs. For direct contact with sediments, the Region 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 1×10^{-5} cancer risk and a non-cancer HI of 1 in less than 10 years (*id.*).

For the human health IMPGs based on fish consumption, as discussed in Section III.B.1, the Region 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. As we have shown, various alternatives with much less sediment removal would likewise achieve that IMPG (see Sections III.B.1 and IV.A through IV.D).

With respect to the ecological IMPGs, the Region 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, the Region 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, the Region 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. The Region 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” (Comp. Analysis, p. 38). As we have shown, that is manifestly incorrect (see Sections III.C.1 and IV.F and Attachments C and D). For insectivorous birds and piscivorous mammals, the Region 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 (Comp. Analysis, pp. 40, 41). However, as we have also shown, 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 (MA EOEEA et al., 2011).

In short, the IMPG attainment factor does not provide a justifiable basis for favoring the Region's proposed alternative.

6. Reduction of toxicity, mobility, or volume of wastes

In discussing this factor, the Region claims that SED 9/FP 4 MOD "surpasses all other alternatives" in reducing PCB toxicity and mobility because it would involve the application of AC (Comp. Analysis, p. 45). 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.

The Region also relies on the fact that, by deepening Woods Pond, SED 9/FP 4 MOD would increase the solids trapping efficiency of the Pond (*id.*, pp. 45-46). However, as we have shown, 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 (see Section IV.A).

7. Short-term effectiveness

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, the Region 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 (Comp. Analysis, pp. 47-48). As the Region recognizes, the alternatives with the greater amounts of sediment removal, including SED 9/FP 4 MOD, would result in the most PCB resuspension (*id.*, p. 48).

The Region also addresses the adverse short-term impacts of the remediation activities on the various aquatic and terrestrial habitats. In virtually every case, the Region downplays these impacts by claiming that many of the impacts "can be mitigated by appropriate restoration activities" (*id.*, pp. 49, 50). As we have previously noted, that alleged panacea cannot be supported. Due to its extensive remediation requirements and substantial habitat impacts (described in Section III.C.1 and shown in Table 11 and Figures 5a through 5f in that section), 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, the Region 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 (*id.*, pp. 51-52). The Region'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 in Table 14 above). 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.

The Region also notes that all alternatives would involve an increase in truck traffic, with its attendant impacts (*id.*, p. 53). To address this factor, the Region 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 the Region's own estimates for SED 9/FP 4 MOD (*id.*). The Region'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) (see Table 13 above).⁸⁰ 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.

Indeed, the Region compares the risk of accident-related injuries due to the increased off-site truck traffic, again using GE's estimates from the RCMS and the Region's own estimates for SED 9/FP 4 MOD (*id.*, p. 54). 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.⁸¹ This is more than would result from most other alternatives.

Finally, the Region compares the risk of accident-related injuries to remediation workers, again using GE's estimates from the RCMS and the Region's own estimates for SED 9/FP 4 MOD (*id.*, p. 55). 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.⁸² 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.

⁸⁰ To be consistent with the Region's estimates, these estimates are based only on the number of truck trips for importation of backfill, capping, and staging/access material (72,000) plus those for transport of excavated sediments to an off-site disposal facility (82,750) (Table 13). Increased truck traffic would occur even if rail is ultimately used for transport of the excavated material to off-site disposal facilities, because trucks would still be needed to transport the excavated material to a rail loading facility (estimated at 103,400 truck trips), as well as to import clean material for backfill, capping, and staging/access (72,000) (see Table 13).

⁸¹ The Region's estimates of off-site accident risks for SED 9/FP 4 MOD are roughly comparable to GE's estimates for that alternative using the same assumptions, which indicate that the off-site truck traffic associated with that alternative would result in an estimated 6.4 non-fatal injuries and 0.3 fatality over the life of the project.

⁸² The Region's estimates of remediation worker injuries for SED 9/FP 4 MOD are roughly comparable to GE's estimates for that alternative using the same assumptions, which indicate that SED 9/FP 4 MOD would result in an estimated 7.3 non-fatal worker injuries and 0.1 worker fatality over the life of the project.

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.

8. Implementability

In its discussion of implementability, the Region repeats a number of assertions that we have shown 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” (Comp. Analysis, p. 56), 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” (*id.*, p. 57).

The Region also states that “[n]o regulatory restrictions are known that would affect the implementability of any of the alternatives under evaluation” (*id.*). However, it contends elsewhere that regulatory restrictions, notably, the prohibition on location of waste facilities within an ACEC, would constitute an obstacle to the implementability of on-site disposal at two of the three identified sites (*id.*, p. 74) (a contention that we have shown is untrue). As we have previously discussed, but is not mentioned by the Region, the prohibitions on certain activities within an ACEC would also apply to the Region’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 (see Sections II.A.3 and V.F.11 &12 above), and the state regulatory prohibition on dredging in an ACEC would likewise apply to that alternative (see Section V.F.7).

Overall, there are no implementability issues that would favor SED 9/FP 4 MOD over other alternatives.

9. Costs

The Region has presented costs 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, the Region’s cost estimates are based on GE’s cost estimates in the RCMS, although the Region states that it “generally believes that GE may have under-estimated all costs” (Comp. Analysis, p. 58). The Region provides no support whatsoever for that bald assertion. GE has made its best estimate of the costs of each alternative, using cost estimating methodologies that were discussed with the EPA Region without its objection and providing detailed backup in the RCMS; and it has no way to evaluate the Region’s unsupported claim that GE “may have under-estimated all costs.”⁸³ For SED 9/FP 4 MOD, the Region made its own estimate – which is \$326 million for the sediment and floodplain remediation excluding TD (*id.*, p. 59). GE’s estimate for that remediation, again excluding TD, is \$364 million, as shown in Table 15.⁸⁴ With off-site disposal

⁸³ It is worth noting that, for the 1½-Mile Reach Removal Action under the CD, which was conducted by the EPA Region, the Region’s initial cost estimate, as set forth in its Engineering Evaluation/Cost Analysis, was approximately \$50 million, whereas the actual cost after the Region had completed the project was approximately \$106 million.

⁸⁴ GE is providing backup cost information for this cost estimate in its 2014 Supplemental Cost Information Package, which is being submitted to EPA separately as it contains confidential business information.

(as required by the Region's proposal), GE's cost estimate for the proposed alternative is \$678 million (with transport by rail) or \$732 million (with transport by truck) (Table 15). As we have discussed, 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.

10. Conclusion

For the reasons given above, the Region's overall conclusion that "SED 9/FP 4 MOD is best suited to meet the General Standards in consideration of the Selection Decision Factors " (Comp. Analysis, p. 59) is not supportable and is thus arbitrary and capricious.

VII. OTHER DEFICIENCIES

In addition to the numerous defects in the EPA Region's proposed remedy for the Rest of River (as described above), the Region's course of conduct during the process leading to this proposal included a number of other deficiencies. Some of those deficiencies are described in this section.

A. Region's Refusal To Consider Alternative Toxicological Information on PCBs

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. 93-1251, 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 is provided in Attachment J, 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.

B. Region's Requirement to Base IMPGs *Only* on EPA's Risk Assessments

GE's 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 (GE, 2005). The EPA Region disapproved that proposal in December 2005. In doing so, the Region 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 (see Sections II.B and II.C above), there is at least sufficient uncertainty regarding the risks and effects of PCBs that it was arbitrary for the Region 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.

C. Region’s Development of a Proposed Remedy That Is Not Based on the RCMS

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 the Region’s comments) an even more detailed Revised CMS Report (RCMS), as well as various ancillary reports required by the Region. However, in its January 17, 2014 letter on the RCMS, which was styled as a “conditional approval,” the Region 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, the Region’s action deprived GE of its right under the Permit and the CD to administrative dispute resolution on the substance of

the Region's determination on the RCMS, because the Region provided no substantive determinations for GE to dispute.

Instead, the Region developed its own proposed remedy, which is different from any of the RCMS alternatives. In doing so, the Region 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).

Even more significantly, the Region 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:

- The Region's September 9, 2008 comments on GE's initial CMS Report (pp. 7, 14), as well as its January 15, 2010 conditional approval letter for GE's proposal to evaluate additional remedial alternatives (pp. 3-5), 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 minimize adverse effects to state-listed species. As discussed above, the Region 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 (see Sections III.C.1, V.B, and V.F.13).
- The Permit requires consideration of the long-term and short-term adverse habitat impacts of the alternatives, and the Region's September 9, 2008 letter required GE to give more consideration to measures to avoid, minimize, or mitigate those impacts (p. 7). Yet the Region has not attempted to quantify the impacts of its proposed alternative on any of the specific floodplain habitat types, as noted in Section VI.A.
- The Region'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 (pp. 2-3, 18). As discussed in Section III.C.1 and Attachment D, the Region's discussion of restoration is cursory and inadequate (and it does not include a discussion of any example areas).
- The Region's September 2008 comments required that the RCMS include the assumptions regarding staging areas, access roads, and infrastructure (p. 7). The Region has not provided such assumptions for its proposed remedy.
- The Region September 2008 comments required that the RCMS provide a thorough description of the operation, maintenance, and monitoring (OM&M) requirements for each alternative (pp. 3-4). The Region has not provided such a description for its proposed remedy.

- The Region'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 (p. 2). Since the Region 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 (p. 26). The Region has not provided such an analysis.
- The Region's September 2008 comments required that the RCMS describe how work in vernal pools could avoid impacts to the species indigenous to those pools (p. 31). As discussed above, the Region has not done that (and could not do so, since work in vernal pools could not avoid such impacts).
- The Region's September 2008 comments required that the RCMS identify locations for off-site disposal of excavated material (pp. 1-2). The Region has not done that either.

In short, 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 – the Region acted contrary to the Permit and the CD.

D. Violation of Data Quality Act

In several respects, the EPA Region's Rest of River proposal would contravene the federal Data Quality Act, also known as the Information Quality Act, enacted as Section 515(a) of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Public Law 106-554). That Act required federal agencies, such as EPA, to issue guidelines "ensuring and maximizing the quality, objectivity, utility, and integrity of information . . . disseminated by the agency." EPA has issued such guidelines (EPA, 2002). Those guidelines apply to information disseminated by EPA and establish certain rigorous quality standards for "influential scientific, financial, or statistical information," including information that will have a "clear and substantial impact . . . on important public policies or private sector decisions" (*id.*) They require, among other things, that the substance of that information be "accurate, reliable and unbiased," including the use of "the best available science and supporting studies conducted in accordance with sound and objective scientific practices" (*id.*). The guidelines also provide mechanisms for challenges to and correction of information that the Agency disseminates.

These requirements apply to the Region's Rest of River remedy decision, since it would have a clear and substantial impact on a private sector decision. However, the Region's proposal does not meet the information quality requirements specified in the EPA guidelines in a number of respects. The deficiencies include the following:

- The Region's biased evaluation of the on-site upland disposal alternative under the Permit criteria (see Section II above);

- The Region's reliance on the HHRA and ERA which did not, even at the time, use the best available science or realistic exposure assumptions (see Sections III.B.2 and III.C.2);
- The Region's assertions that implementation of restoration techniques will restore the affected habitats to their pre-remediation conditions and functions and that the likelihood of effective restoration is equal under any of the alternatives, without presenting an objective evaluation of the likelihood of success of restoration efforts or differences among alternatives based on the current state of the science of ecological restoration (see Section III.B.1 and Attachment D);
- The Region's use of EPA's model to set absolute numerical limits on PCB transport past Woods Pond and Rising Pond Dams and on PCB concentrations in fish fillets, when the Region itself admits that the model's "predictions of absolute concentrations are not anticipated to be accurate" (EPA, 2006a, p. 3) (see Sections IV.G and IV.H); and
- The Region's reliance on extrapolations of the model results to Connecticut to conclude that the water quality criterion of 0.000064 µg/L would be achieved in some Connecticut impoundments and thus would not be waived, when that extrapolation procedure (which was not subject to peer review) is too uncertain and reliable to support such a conclusion (see Section V.F.1).

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