BEFORE THE ENVIRONMENTAL APPEALS BOARD UNITED STATES ENVIRONMENTAL PROTECTION AGENCY WASHINGTON, D.C.

In re: PERMIT UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) AS AMENDED (42 U.S.C. SECTION 6901 ET SEQ.)	)	United States, et al. v. General Electric Company (D.Mass.) ("Consent Decree").]

Appeal from Permit Decision.
Docket No MAD002084093
Statute: Resource Conservation and Recovery Act

Dated this [day] of [Month], [year]

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Cover Letter
November 3, 2016

U.S. Environmental Protection Agency
Clerk of the Board, Environmental Appeals Board (MC 1103B)
Ariel Rios Building
1200 Pennsylvania Avenue, N.W.
Washington, D.C. 20460-0001

Appeal from Permit Decision.
Docket No MAD002084093
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To the Clerk of the Board:

We would like to inform the Environmental Appeals Board (EAB) of several unique circumstances regarding the Housatonic River Initiative, Inc.'s (HRI) Appeal of the PERMIT UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) AS AMENDED (42 U.S.C. SECTION 6901 ET SEQ.), the United States, et al. v. General Electric Company (D.Mass.) ("Consent Decree").

On October 20, 2016, Region 1 of the United States Environmental Protection Agency (EPA) issued its "FINAL PERMIT MODIFICATION TO THE REISSUED RCRA PERMIT
AND SELECTION OF CERCLA REMEDIAL ACTION AND OPERATION & MAINTENANCE FOR REST OF RIVER" following the Final Administrative Decision of Carl F. Dierker, Regional Counsel, Region 1 regarding GE's Dispute of EPA's Intended Final Decision on Rest of Housatonic River Remedy.

HRI is a small community-based non-profit without significant financial resources. As such we are unable to hire attorneys with significant staff support. We knew that with only a thirty day window for commenting, and anticipating that there would be few substantive changes to EPA's Final Decision on the Rest of Housatonic River Remedy, and that our primary issues with the Remedy would stand, we are submitting our Appeal with citations from the September 2015, U.S. EPA Region I (EPA) Permit Under The Resource Conservation And Recovery Act (RCRA) As Amended (42 U.S.C. Section 6901 Et Seg.) and its Intended Final Decision regarding the General Electric Company's (GE) cleanup of the Housatonic River's Rest of River.
(https://semspub.epa.gov/work/01/582991.pdf).

Similarly, we are aware of your instructions regarding pitfalls to avoid, specifically "Not pointing out relevant EAB decisions that support your position." And "Trying to avoid reference to relevant EAB decisions that don't support your position."

Please understand that HRI has engaged in a good faith effort to study a range of EAB decisions and perhaps it is just our lack of sufficient legal resources but we were unable to find similar cases that raised the kind of serious and comprehensive issues regarding an EPA decision.

Finally, please be aware that we have been commenting on issues before Region 1 since 1992 but just recently Region 1 undertook a comprehensive revision of its website, and unfortunately moved every document, rendering useless every http website address the public has relied on previously.

In response, we have made a major effort – expending far too many hours – relocating documents and finding web addresses that function but there remain major problems with the Region 1 website.

Thank you for your consideration.

Sincerely,

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I hereby certify that excluding The Table of Contents and Attachments this petition to the Environmental Appeals Board is under 14,000 words.

Sincerely,

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November 3, 2016

U.S. Environmental Protection Agency
Clerk of the Board, Environmental Appeals Board (MC 1103B)
Ariel Rios Building
1200 Pennsylvania Avenue, N.W.
Washington, D.C. 20460-0001

I certify that the foregoing Notice of Appeal and Appeal Brief are identical copies of the Notice of Appeal and Appeal Brief electronically filed in this case with the Environmental Appeals Board on November 3, 2016.

Sincerely,

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INTRODUCTION:

In September 2015, U.S. EPA Region 1 (EPA) issued its Permit Under The Resource Conservation And Recovery Act (RCRA) As Amended (42 U.S.C. Section 6901 Et Seg.) and its Intended Final Decision regarding the General Electric Company's (GE) cleanup of the Housatonic River's Rest of River.
(https://semspub.epa.gov/work/01/582991.pdf).

The Housatonic River Initiative, Inc. (HRI), the EPA Technical Assistance Grant Recipient for the GE/Housatonic River Site, welcomes this opportunity to comment to the Environmental Appeals Board (EAB) regarding EPA Region 1's proposed GE/Housatonic River Rest of River Remedy.

HRI appeals EPA's Rest of River Remedy for the following reasons:
1) EPA allows GE to leave too many toxic PCBs in both riverbank soils and river sediments when there are demonstrably effective and ecologically sound ways to first, remove them from the environment, and then second, successfully restore the environment that has been remediated. EPA's Rest of River Remedy unnecessarily allows these remaining PCBs at high levels to continue to put both human health and the health of wildlife and the environment at risk.

2) EPA arbitrarily and without significant or sufficient scientific analysis, unnecessarily neglects CERCLA Section 9621(b)'s preference for alternative remedial technologies. Not only has Region 1 failed to mandate a Conceptual Site Model for analyzing the potential for bioremediation or other potential alternative remedial technologies, or mandating pilot tests for such technologies, its Final Remedy relies in part on the unproven Monitored Natural Recovery remedy for several sections of the River. Choosing not to mandate the treatment and significant reduction of PCB-contaminated sediment and bank soil results in the unnecessary landfilling of great amounts of contaminated material. This decision therefore perpetuates unnecessary risks to human health and the environment. Not only that, GE's appeal of Region 1's Remedy and its claim that mandating off-site disposal is "arbitrary and capricious" makes it quite possible that this unnecessary landfilling will ultimately be located in one or more of our home communities in South Berkshire County, Massachusetts.
(CERCLA, https://www.law.cornell.edu/uscode/text/42/9621).
(U.S. EPA Contaminated Site Cleanup Information (CLU-IN) Bioremediation Overview https://clu-in.org/techfocus/default.focus/sec/Bioremediation/cat/Overview/ (Page 1-2)
(GE "Dispute of EPA's Intended Final Decision Selecting Rest of River Remedy Submission of GE's Statement of Position" January 19, 2016).
(https://semspub.epa.gov/work/01/586218.pdf)

THE ARGUMENT:
HOW EPA'S REST OF RIVER REMEDY FAILS TO EFFECTIVELY PROTECT PUBLIC HEALTH AND THE ENVIRONMENT

HRI believes that EPA's decision to "consolidate" with both the Commonwealth of Massachusetts and GE has resulted in a Final Remedy that sacrifices scientific rigor for political expediency. EPA's scientific analysis of the PCB contamination of the Rest of River - an analysis based on its extensive studies of human health and ecological risks - and the development of the most logical and most appropriate Remedy that follows from such analysis has been unnecessarily compromised.

Much as the inadequate 1980 GE Stewart Report influenced events for years, (see Appendix A) GE's Corrective Measures Study (CMS) and the limitations it brought to the process was critical to the development of the Final Remedy for the Rest of River. So let us restate our problems with the CMS. Given the bias GE brought to the process, an analysis shaped by their desire to save as much money as possible, the most comprehensive removal option that GE included in its range of remediation scenarios for the Rest of River was SED 8/FP 7. That option called for the "Removal of 2,252,000 cy of sediments (followed by backfilling) from 351 acres of the River, including all of Reaches 5A, 5B, and 5C, the Reach 5 backwaters, Woods Pond, the Reach 7 impoundments, and Rising Pond ... Stabilization of both riverbanks in Reaches 5A and 5B (total of 14 linear miles considering both banks), including removal of 35,000 cy of bank soil ... MNR in the remaining portions of the River in the Rest of River area; and ... Removal of 615,000 cy of floodplain soil (followed by backfilling) from 377 acres in various habitat types of the floodplain." (GE Revised Corrective Measures Study (CMS) Report, Housatonic River - Rest of River, 10/11/2010, Part 2, Page 8-6). https://semspub.epa.gov/work/01/580275.pdf

SED 8/FP 7 calls for the removal of a total of 2,902,000 cy of combined contaminated sediment and bank soil.

GE quickly rejected a large-scale remediation and dismissed option SED 8/FP 7: "The basic problem is this: the Rest of River is a flourishing ecosystem. The more aggressively you work to remove PCBs from this ecosystem, the more you damage it in the name of 'remediating' it.

"Removing or capping sediments in the bottom of the River to address PCBs will have similar consequences. The more sediment you dredge, the more you displace fish and change the nature of the riverbed and its hospitability to aquatic life. Likewise, the more soil you remove from the floodplain, the more you change the nature of the floodplain and its hospitability to the plants and animals that currently live there (including the sensitive species living in the area's dozens of vernal pools and other areas …At some point, the balance tips and you will find yourself, as the Boston Globe entitled a 2008 editorial about the Housatonic, "Destroying a river to clean it." This is in nobody's interest." (CMS**,** Executive Summary, 1-2).

GE's solution: "Answering the question of what to do about the Rest of River, then, comes down to a comparison of what we do know and don't know. We know that the Rest of River is flourishing without any remediation at all. We know that the less intrusive removal alternatives will fully protect human health using EPA's assumptions. We don't know how much damage the Rest of River can bear from an attempt to remove more PCBs.

"Therefore, GE believes that the least intrusive approach – "Monitored Natural Recovery" – is best here ... SED 10/FP 9 has been carefully designed to minimize the severe harm that will result from more invasive measures, and it will still meet all of EPA's human-health based goals (except for those relating to fish consumption, which can't be achieved by any remedial alternative)." (CMS**,** Executive Summary, 3)

SED 10 calls for "**Removal of sediments to a depth of 2 feet in portions of Reach 5A that have been selected to avoid or minimize ecological harm**, and removal of sediments to a depth of 2.5 feet in portions of Woods Pond that contain elevated PCB concentrations, without subsequent capping or backfilling." (CMS**,** 6-2) Which translates to the removal of 235,000 cy of sediment, the removal of 6,700 cy of riverbank soil, and the capping of 20 acres. (CMS**,** Executive Summary, 9, Emphasis added).

FP 9 "would involve the removal of approximately 26,000 cy of soil from approximately 14 acres of the floodplain." (CMS 7-189) GE's preferred option SED 10/FP 9, then, would require the company to remediate and remove a total of 267,700 cy. (CMS**,** Executive Summary, 12).

Quite the striking contrast to the most rigorous remediation option studied, SED 8/FP 7, which calls for the removal of 2,902,000 cy of combined contaminated sediment and bank soil.

HRI strenuously objected to GE's claim that "the Rest of River is flourishing without any remediation at all." As we stated in our Comments: "GE continues to deny the scientific evidence that PCBs cause cancer and other adverse health effects in humans, or that PCBs cause any harm to ecosystems and ecological receptors. The CMS flies in the face of scientific evidence and ignores the independent scientific research, citing instead the work of their own scientists or scientists funded by GE. The international scientific community long ago recognized the dangers and toxicity of PCBs; GE's continued denial simply undermines the credibility and scientific veracity of the CMS." (Comments on Housatonic River Corrective Measures Study Submitted to EPA by GE Corporation, October 2010 prepared by ESC, LLC, Dr. Peter L. deFur, January 19, 2011, On behalf of Housatonic River Initiative, Inc., Page 2).
(https://d10k7k7mywg42z.cloudfront.net/assets/4d3843d4dabe9d135c00008f/final_comments_cms_11911.pdf)

Sadly, some of this analysis has been accepted by the Commonwealth and made its way via negotiations with EPA and GE into the Final Remedy.

Considering GE's less than comprehensive analysis of treatment/disposition alternatives and the significant absence of a larger range of alternative technologies in the CMS, including but not limited to many varieties of in-situ technologies like Bioremediation, Phytoremediation, and Sediment Ozonation, HRI's preference among the very limited alternatives covered by the CMS would be "TD 5 (thermal desorption)" which "would provide human health protection by reducing the PCB concentrations in the sediments and soils, followed by on-site reuse and/or off-site disposal of those treated materials and off-site disposal/destruction of the liquids containing the condensed PCBs ... From an environmental perspective, TD 5 would provide protection of ecological receptors from potential exposure to PCBs for the same reasons discussed for human receptors." (CMS, 9-154)

For an examination of possibly relevant and appropriate alternative technologies for Rest of River see "EPA Technology Alternatives for the Remediation of PCB Contaminated Soils and Sediments, EPA/600/S-13/079.")
(https://clu-in.org/download/contaminantfocus/pcb/PCB-EPA-600-S-13-079.pdf)

When GE combined the costs of the most comprehensive cleanup SED 8/FP 7 with treatment option TD 5, it concluded it would cost them "approximately $3.0 billion." (CMS, 10-4.)

Rather than opt for treatment, "GE has also concluded that the excavated sediments and soils should be placed in a secure disposal facility built near the River but outside the floodplain, which will avoid the detriments of the other disposal and treatment options, especially with larger removal volumes." (CMS**,** Executive Summary, 3)

We appreciate EPA's continuing burden to balance the need to protect human health and the environment with the imperatives of CERLA to consider the cost-effectiveness of potential remedies. But we suspect that our community is impacted by this balancing act in ways the EAB may not be aware of.

HRI and the citizens of Berkshire County have often been affected by the occasional collision of the diligent enforcement of environmental law and the changing imperatives of bureaucratic and political pressure. Sadly, we have suffered at the hands of both lazy and incompetent regulators at the state level, and have watched as some of the best and brightest and most competent regulators and best environmental scientists have been replaced or made to feel unwelcome.

EPA renewed its commitment to the GE/Housatonic River Site when Attorney Douglas Luckerman and Mr. Bryan Olson came to the Berkshires. Mr. Luckerman's vigorous commitment to protect human health and the environment became increasingly inconvenient to his higher ups at Region 1 and in Washington, DC and he left the Agency. Recently Massachusetts DEP let go of some of its most competent regulators. Then Susan Svirsky, EPA Rest of River Project Manager, who did a remarkable job of cataloguing the environmental impacts of a wide spectrum of species in the river system opted to leave at a most crucial moment.

Sadly, there is a pattern to this two-phase process. The first is the information-gathering phase when environmental science is at the fore. Then there's the second phase when the accumulated science is subject to negotiation. This is when the most rigorous defenders of science disappear and their more politically-minded colleagues prevail.

HRI believes that the Commonwealth of Massachusetts has been affected by pressure from GE. For example, Mr. Robert Durand, the highly influential former head of Massachusetts Executive Office of Environmental Affairs (EOEA) is currently doing work for GE. (http://www.durandanastas.com/clients/).

According to environmental journalist Eric Goldscheider, "As the top lawyer with the Massachusetts Department of Environmental Protection, Ralph Child led his agency's charge against GE during the negotiations that culminated last October in the cleanup agreement now awaiting approval by a federal judge. Then in January, he left his state post to work for Mintz Levin, a Boston law firm that represents GE and had defended the corporation against criminal allegations that the company hid documents relating to PCB contamination in Pittsfield. Many of the negotiating sessions over the Pittsfield agreement took place in the Boston office of Mintz Levin." (http://www.eric-goldscheider.com/id68.html)

Accordingly, HRI is not surprised that the Commonwealth and its DEP, which now suffers from the absence of its most talented researchers and influenced by the political and economic power of GE has adopted GE's unscientific and impossible to prove refrain that a rigorous remediation of the Rest of River will destroy the river, not save it.

Commenting on the CMS, the Commonwealth states: "After extensive review of the remedial alternatives presented to date, **the Commonwealth has concluded 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 Concern (ACEC)** ... Our proposed approach is to remove PCBs when needed to protect human health, or when compelling goals may be achieved without causing ecological harm. This means that our approach leans away from performing intrusive work in the name of meeting purported ecological goals; **because 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."** (Commonwealth of Massachusetts CMS Comments, January 31, 2011, Page 1, Emphasis added). (http://www.mass.gov/eea/docs/dep/cleanup/sites/housatonic-comments-corrective-measures-study.pdf)

The Commonwealth's proposal is quite similar to GE's. Remove 286,000 cy of sediment from Woods Pond, refrain from any bank or river excavation and stabilization because "this work is not necessary to meet the human health goals identified by the EPA (due to the low concentrations of PCBs) and will inevitably cause severe and long-lasting destruction of the Housatonic River ecosystem and state-listed rare species, which far outweighs any environmental benefits from PCB removal.

"In the floodplain, focus on locations totaling 57 acres where there are significant PCB concentrations. **Avoid excavation in the highly sensitive rare species habitats and use institutional controls to address public health risk. In the less sensitive areas in this location, a combination of institutional controls, site-wide averaging and carefully targeted excavation should be used to address the risk.**" (Commonwealth of Massachusetts CMS Comments, January 31, 2011, Page 2, Emphasis added).

But GE's and the Commonwealth's position contradicts the obvious success of the previous 2 Mile remediation and restoration, a success DEP captured, even celebrated in two visits to the site. Here are some DEP photographs from 2008 and 2011:

"Pittsfield-Housatonic River-071008- 013: Photograph of the remediation and restoration from a July 10, 2008 site visit to the General Electric (GE) - Housatonic River PCB site in Pittsfield, Massachusetts."(https://www.flickr.com/photos/massdep/4128221525/in/set-72157622738262035 - from DEP's July 2008 Flickr album: https://www.flickr.com/photos/massdep/albums/72157622738262035/with/4128991138/)

DEP returned in June 2011.

(https://www.flickr.com/photos/massdep/albums/72157626931128058)
(https://www.flickr.com/photos/massdep/5818607591/in/album-72157626931128058/)

DEP describes this photo: "Photograph of the remediation and restoration ... **The vernal pool, river and surrounding floodplains had been contaminated with PCBs but now have been remediated and restored.**" (Emphasis added.) Given the Commonwealth's CMS Comments, you might have imagined this caption to read "The vernal pool was remediated but suffered 'severe and long-lasting destruction' in the process."

Yes, you can see the remnants of the bank stabilization measures EPA employed, but clearly the River has healed more quickly than most might have imagined. So while the Commonwealth and GE insist a thorough cleanup will endanger vernal pools, and destroy the habitats of sensitive species, these concerns are contradicted by the marked and easily observable success of the remediation and rehabilitation of the first 2 Miles of the River. Vernal pools that were remediated were successfully restored and now flourish.

In 2012 and 2013 the EPA took a series of photos of the Mile and ½ section: (https://www.epa.gov/ge-housatonic/housatonic-river-112-mile-ge-pittsfieldhousatonic-river-site - Photos). Here's a picture of the River south of Lyman Street taken in June, 2012:

And another photo a year later:

While GE and the Commonwealth both contend that a rigorous cleanup will irrevocably destroy the Housatonic River ecosystem, such a claim is unsupported by recent experience and is designed, instead, to frighten the public and unduly influence the remedy selection process.

But beyond photographic and visual evidence, the U.S. Army Corps of Engineers in its 2007 "Post-Remediation Sediment Sampling Report 1.5-Mile Reach Removal Action" conclusively demonstrated that EPA not only successfully reduced PCB levels in the 1.5 Mile Reach from 1,534 parts per million to less than 2 parts per million but successfully restored the sensitive areas of the River: "The sediments collected in remediated and restored areas of the 1.5 Mile Reach have total PCB concentrations ranging from non-detect … to 1.9 ppm with an average total PCB concentration of 0.17 ppm." (Page 4) (http://citeseerx.ist.psu.edu/viewdoc/download;jsessionid=5465D2FC6A792B7C735E165B35AC29A4?doi=10.1.1.642.6250&rep=rep1&type=pdf)

The Army Corps also inventoried the health of benthic macroinvertebrates and aquatic organisms, typically insects of the river bottom. Having documented the health of benthic macroinvertebrates in 2000 before EPA began the cleanup, they had a clear before and after comparison: "**A substantial decrease in tissue PCB concentrations, a reduction of more than 99 percent between the 2000 and 2007 collections, is evident and indicates the effects of the remediation, which was also reflected in the sediment**

PCB concentrations." (Post-Remediation Aquatic Community Assessment 1 1⁄2 Mile Removal Reach, Page 6, Emphasis added).

"Fish diversity may increase some in the future as woody debris and aquatic vegetation become more prevalent. **The abundance and diversity of fish species identified appears to indicate good water and habitat quality**." (Page 9, Emphasis added). (http://citeseerx.ist.psu.edu/viewdoc/download;jsessionid=5465D2FC6A792B7C735E165B35AC29A4?doi=10.1.1.642.6250&rep=rep1&type=pdf)

A dispassionate examination of GE's and EPA's record remediating and restoring the 2 Miles of the River clearly supports the conclusion that a more thorough option like SED 8/FP 7 could successfully be accomplished, best protecting human health and the environment by remediating, then effectively restoring the Rest of River.

On April 7, 2011, Region 1 invited Keith Bowers of Biohabitats, Inc. to speak as part of its 3-day MiniWorkshops on The Rest of River. Mr. Bowers highlighted a series of highly successful restoration projects at a variety of challenging sites: the restored stream and wetland/floodplain habitats and restored native plant communities and instream habitat to support a trout fishery at the Loring AFB site; the Provo River site in Salt Lake City, "a multiple-thread channel with complex floodplain features, oxbows, side channels and floodplain wetlands" which was restored (Page 259); the Nine Mile Run site in Pittsburgh, PA, "a large, urban channel with adjacent contaminated soils" where there was "channel stabilization, in stream aquatic habitat enhancement, floodplain reconnection and wetland creation" (Page 261); and the North Gray River Restoration in Maryland which restored "complex riparian wetlands/bogs and vernal pools ... Restored stream and wetland/floodplain habitats ... Restored native plant communities ... Restored habitat to support RT&E species." ("Ecological Restoration: Perspectives and Applications for the Housatonic River," Page 261)

Mr. Bowers noted that "Some fear that disrupting these natural processes will result in irreparable harm to the ecosystem. **However, analysis of historical documents and maps of the River reveals a history of alterations in the River associated with a number of human activities.** An altered river channel is inherently unstable due to factors such as the increase in channel gradient and stream power associated with a shortened stream length if the river is straightened ... **Active ecological restoration can accelerate the full recovery not only of past human impacts, but also of impacts caused by remediation, often in a few decades.**

Mr. Bowers then showed a photo compilation of the Newell Street section of the River: "As shown in the photographs below and as observed, not only was there a recovery following the river channelization efforts in the 1940's, but a decade after remediation in 1999, significant vegetative growth and recovery again occurred at Newell Street with active restoration."

1940

1999

2009

(Page 222, Emphasis added).
(https://semspub.epa.gov/work/01/508641.pdf)

There are multiple, diverse, challenging restoration projects successfully completed in different parts of the country. All of these belie the contention of the Commonwealth and GE and now regrettably EPA that a sensitive and competent complete river remediation project is impossible. Instead, they definitively demonstrate that remediation coupled with a rigorous restoration component can save a river not destroy it. For example: (http://www.biohabitats.com/projects/kingman-lake-wetland-restoration/ and (http://www.biohabitats.com/projects/nine-mile-run-aquatic-ecosystem-restoration/)

In our comments, HRI offered several substantive responses to the CMS. HRI wrote: "The CMS does nothing to address PCB levels in the Connecticut portion of the river. The CMS simply indicates that time will heal this contamination wound by covering or washing the PCBs." (HRI Comments on Housatonic River Corrective Measures Study, Dr. Peter deFur, January 19, 2011, Page 3)

HRI noted: "the CMS states that PCB levels are decreasing as proof that MNR will work to clean the river. In the same explanation, GE indicates that inputs of PCBs to the river are being reduced by actions taken in Pittsfield. This explanation is neither satisfactory nor entirely correct. Unless GE intends to completely eliminate all PCB inputs to the Housatonic River from storm water, leaching, and site sources (which should be done), then the Pittsfield plant will continue PCB inputs to the river for the foreseeable future ... **There is no evidence in the literature or in government reports that natural recovery is a highly effective, long term means of cleaning up PCBs in a fast flowing cold-water river such as the Housatonic River.**" (Page 4, Emphasis added).

HRI expressed our opposition to the contention by both GE and the Commonwealth that "institutional controls" like signage, newspaper ads, etc. is an appropriate alternative to removal of PCBs.

Most importantly, HRI stressed the pressing need to remove as many PCBs from the environment as possible: "ATSDR (2010) says that the average adult has between 0.9 and 1.5 parts per billion (ppb) in our blood. Research indicates that more is worse, but that even the level now commonly found in the average person increases risk of disease. In the end, there is no safe level of PCBs. This is why it is so important to reduce PCB

exposure to the greatest degree possible without excessive disruption of life style." (HRI Comments, Appendix A, Page 17).

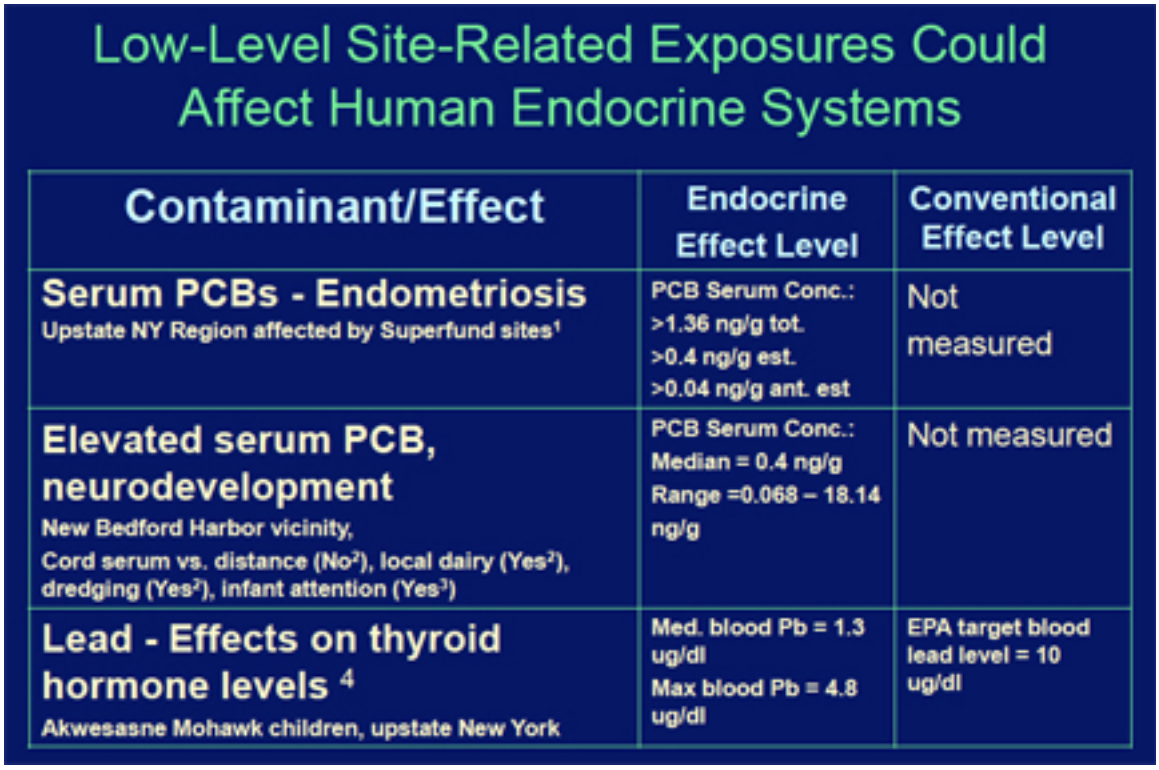
HRI expressed our particular concern that GE, EPA and the Commonwealth have inadequately accounted for the effect of volatilized PCBs in the Housatonic River ecosystem: "PCBs have the ability to volatize and release into the air. Biphenyls with 0–1 chlorine atom remain in the atmosphere, those with 1–4 chlorines gradually migrate toward polar latitudes in a series of volatilization/deposition cycles, those with 4–8 chlorines remain in mid-latitudes, and those with 8–9 chlorines remain close to the source of contamination (Wania and Mackay 1996). PCBs enter the atmosphere from volatilization from both soil and water surfaces (Hansen 1999). Vapor-phase PCBs accumulate in the aerial parts of terrestrial vegetation and food crops by vapor-to-plant transfer (Bohm et al. 1999, ATSDR 2000). This can explain why local food and home gardens may be a significant source of PCB exposure." (HRI Comments, Appendix A, Pages 22-23).

"**Though PCBs in sediment are common sources of exposure for fish, they can also influence atmospheric concentrations of PCBs.** Martinez et al (2010) quantified the release of PCBs from Indiana Harbor and Ship Canal to Lake Michigan and the atmosphere. It was determined that 4 ± 0.05 kg of total PCBs were released from the sediment to the water and 7 ± 0.1 kg of total PCBs were volatilized from the water to the air annually (Martinez et al. 2010) ... (HRI Comments, Appendix A, Page 18, Emphasis added).
(https://d10k7k7mywg42z.cloudfront.net/assets/4d3843d4dabe9d135c00008f/final_comments_cms_11911.pdf)

In support of our comments, please note in 2000 the World Health Organization (WHO) declared that: "The universal distribution of PCBs throughout the world, suggests that PCBs are transported in air ... **The ability of PCBs to co-distil, volatilize from landfills into the atmosphere (adsorption to aerosols with a particle size of < 0.05–20 µm), and resist degradation at low incinerating temperatures, makes atmospheric transport the primary mode of global distribution. In a study in the USA, 92% of the PCBs detected were in the vapour phase.**"
(Chapter 5.10 Polychlorinated biphenyls (PCBs), Air Quality Guidelines – Second Edition © WHO Regional Office for Europe, Copenhagen, Denmark, 2000, Page 1, Emphasis added).
(http://www.euro.who.int/__data/assets/pdf_file/0016/123064/AQG2ndEd_5_10PCBs.PDF)

Similarly, Nancy Bettinger of DEP's Office of Research and Standards in a slide presentation entitled "Do Waste Site Risk Assessments Adequately Address Endocrine Disruption Effects?" reports: "Endocrine disrupting chemicals found at waste sites can have effects at environmentally relevant concentrations. Endocrine effects have been reported at concentrations that are: lower than risk-based concentrations conventionally derived for site management, and/or consistent with ambient air exposures not normally assessed at waste sites." Bettinger cited several examples where "Low-level site-related

exposures could affect human endocrine systems:



Low-Level Site-Related Exposures Could Affect Human Endocrine Systems

Contaminant/Effect	Endocrine Effect Level	Conventional Effect Level
Serum PCBs - Endometriosis Upstate NY Region affected by Superfund sites[1]	PCB Serum Conc.: >1.36 ng/g tot. >0.4 ng/g est. >0.04 ng/g ant. est	Not measured
Elevated serum PCB, neurodevelopment New Bedford Harbor vicinity, Cord serum vs. distance (No[2]), local dairy (Yes[2]), dredging (Yes[2]), infant attention (Yes[3])	PCB Serum Conc.: Median = 0.4 ng/g Range =0.068 – 18.14 ng/g	Not measured
Lead - Effects on thyroid hormone levels [4] Akwesasne Mohawk children, upstate New York	Med. blood Pb = 1.3 ug/dl Max blood Pb = 4.8 ug/dl	EPA target blood lead level = 10 ug/dl

(http://www.astswmo.org/Files/Meetings/2008/2008Annual_Meeting/Presentations/CERCLA Brownfields/Bettinger-Endocrine-FINAL.pdf)

HRI concluded in its CMS Comments: "Given the ability of PCBs to volatilize, people living or working around contaminated sites can inhale in low doses of PCBs ... There is a growing body of evidence that supports the claim that people who live in the vicinity of contaminated sites have a higher PCB concentration in their tissues than the general population ... When compared to the general public, people living in the vicinity of a PCB- contaminated site are subject to a higher risk of PCB exposure and associated health effects. **This risk increases because PCBs impact the community's air, gardens, and local food systems. In these communities, historical PCB institutional controls, like fish advisories, will not be sufficient to protect human and ecological health.**" (HRI Comments, Appendix A, Page 24, Emphasis added).

In October 2011, EPA's National Remedy Review Board (NRRB) made note of the significant dispute between DEP and Region 1 "concerning the interpretation and application of some of the criteria for remedy selection. Particularly noteworthy are the differences in perspectives on the balancing of short-term and potential long-term environmental impacts from remedy implementation and the reduction of long-term risks predicted to be achieved by a protective remedy. The presentation by the Commonwealth indicated that it sees the impacts to Commonwealth-listed species resulting from the need to control stream meandering as a long-term impact **whereas the Region contends that habitat restoration and other impact reduction measures will be effective in meeting**

the requirements of the Commonwealth's endangered species law and therefore any impacts will be only short-term.

"The Commonwealth's presentation also indicated that it believes the long-term ecological risks (e.g. adverse effects to mink and wood duck) were acceptable when balanced against the impacts of remediation on habitat loss. **Alternately, EPA sees these long-term ecological risks as requiring remediation to meet the threshold criteria for selecting a remedy that is protective. The Boards recommend that the Region consolidate the discussion on the documented ecological impacts at the site and compare them to the Agency's requirements under the CERCLA and the RCRA Permit to select a remedy protective of all identified receptors (assessment endpoints). This consolidated presentation will allow for a direct comparison of short-term and long-term risks and impacts and how these risks are balanced, justified and consistent with remedy selection criteria in any decision documents.**

"The Boards note that **CERLA and the RCRA Permit identify protectiveness of human health and the environment as a threshold criteria that all remedies must achieve.** Furthermore the NCP states that the use of **institutional controls should supplement (not substitute for) active response measures (e.g. ICs should not substitute for active response measures as the sole remedy unless such active measures are determined to be not practicable)**." (The National Remedy Review Board's October 20, 2011 Recommendations for the Housatonic River, Rest of River Site, Page 4, Emphasis added).

Additionally, HRI echoes the concern of the NRRB that both the Commonwealth's and EPA's proposed remedies "**would leave large quantities of PCBs in floodplain soils. In the future, EPA may determine that leaving this remaining waste on site is not protective of human health and the environment.** Therefore the Boards recommend that the Region consider including a contingency remedy (e.g. pursuing other response actions in an adaptive framework) in the decision documents that would describe a cleanup approach resulting in more risk reduction through additional floodplain soil source removal or other active remediation alternatives." (NRRB October 20, 2011 Recommendations, Page 5, Emphasis added).
(http://semspub.epa.gov/work/01/75001064.pdf).

Unfortunately, HRI and the public were excluded from these critical conversations. As a result of these negotiations the EPA has moved closer to the Commonwealth's position, and in the process closer to GE's position, even contradicting some of its own prior analysis. For example, Region 1 compromised its commitment to, and advocacy of, the efficacy of restoration, abandoning its view, as the NRRB noted: "that habitat restoration and other impact reduction measures will be effective in meeting the requirements of the Commonwealth's endangered species law and therefore any impacts will be only short-term."

Instead Region 1 in its Remedy abstains from the appropriate remediation of some sensitive areas in favor of the unscientific, unproven Monitored Natural Recovery. Rather

than fully remove the threat to human health and the environment, EPA relies upon institutional controls in some sections of the riverbank and in maintaining fish and waterfowl advisories.

This is revealed in the following selections from EPA's June 2014 "Statement of Basis for EPA's Proposed Remedial (RA) for the Housatonic River 'Rest of River":
"Consistent with actions at other contaminated sediment sites, this Proposed Remedial Action relies on a combination of cleanup approaches that apply to specific "reaches" of the river, as described below:
• Removing and capping PCB-contaminated sediment in some reaches in the Housatonic River.
• **Monitoring natural recovery in some reaches in the Housatonic River**.
• Removing PCB-contaminated soil **from some areas in the 10-year floodplain** adjacent to the river, including vernal pools, and restoring affected areas.
• Stabilizing PCB-contaminated erodible river banks that are a source of PCBs that could be transported downstream, focusing on the use of bioengineering techniques in restoring any disturbed banks.
• Transporting and disposing of all excavated contaminated soil and sediment off-site at existing licensed facilities approved to receive such soil and sediment.
• **Placing restrictions (Institutional Controls) on eating fish, waterfowl, and other biota where PCB tissue concentrations pose an unacceptable risk** unless/until such consumption advisories are no longer needed, as well as restricting other activities that could potentially expose remaining contamination ...

"The cost of the Proposed Remedial Action is estimated at $613 million and will take approximately 13 years to implement." (GE-Housatonic River, Statement of Basis for EPA's Proposed Remedial (RA) for the Housatonic River 'Rest of River', 06-01-2014, SDS#558621, Page 2, Emphasis added.)

"EPA's preferred alternative or Proposed Remedial Action is Combination Alternative 9 (SED9/FP4 MOD with TD1).
Combination Alternative 9 requires excavation and capping/restoration of sediment, river banks and floodplain soil **in certain areas** to protect human health and the environment **while seeking to avoid, minimize or mitigate unacceptable impacts to state-listed species and their habitats and the Area of Critical Environmental Concern ("ACEC").** The Proposed Remedial Action also includes disposal of all excavated contaminated soil and sediment off-site at existing licensed facilities approved to receive such soil and sediment, with a preference to maximize transport via rail. The proposed Performance Standards and corrective measures required to implement this cleanup are outlined in the Draft Permit. EPA's Proposed Remedial Action was developed in consultation with MassDEP, MassDFG, and CT DEEP." (GE-Housatonic River, Statement of Basis, Page 4, Emphasis added).

EPA writes: "The Draft Permit includes the Performance Standards and corrective measures necessary to meet the Performance Standards to address unacceptable risks to human health and the environment, and reduce the potential for downstream transport of

PCBs, **while minimizing adverse impacts to state-listed species and their habitats and being sensitive to the characteristics of the Rest of River and related biodiversity which formed the basis of the ACEC designation in a portion of the study area. Also based on this analysis, certain areas in the river and floodplain will be left undisturbed, including a large part of Reach 5B …** The Proposed Cleanup Plan provides for the isolation of PCB contaminated sediments to reduce the risk to human health and the environment. **Any remaining contamination will be monitored over the long term to evaluate the continued effectiveness of the remedy."**

Additionally, while EPA acknowledges that "PCBs detected in Housatonic River floodplain soil, sediment, and biota show little degradation over time in any media." (GE-Housatonic River, Statement of Basis, Page 13) it nevertheless decides that "**certain areas in the river and floodplain will be left undisturbed, including a large part of Reach 5B**." (GE-Housatonic River, Statement of Basis, Page 11, Emphasis added). (https://semspub.epa.gov/work/01/558621.pdf)

The NRRB wrote: "In the future, EPA may determine that leaving this remaining waste on site is not protective of human health and the environment." We ask the EAB to intervene and speed up this timetable. Otherwise we will be left with a partial regime of Monitored Natural Recovery for sections of the Rest of River.

Mike Palermo of Mike Palermo Consulting participated in Region 1's MiniWorkshops. He noted: "**The major disadvantages of MNR are that contaminated sediment is left in the aquatic environment for the long time it takes natural processes to reduce risks, and there is the potential for future disruption of buried contaminants by storms, floods, or other events. Therefore, a rigorous evaluation of the likelihood of these events occurring must be a component in selecting MNR.**"
("Remediation Technologies and Techniques," Page 219, Emphasis added).
(https://semspub.epa.gov/work/01/508641.pdf)

Ed Garland of HDR/HydroQual in his "PCB Transport and Fate Processes in the Housatonic River" presentation to the MiniWorkshops noted that "**EPA learned that some riverbanks upstream of Woods Pond are not stable and are eroding. When banks erode, they put PCBs back into the water and the sediment bed. Riverbanks account for nearly half of all PCBs entering the River. The data show that the River floodplain is heavily contaminated with PCBs because when floods occur, PCBs move onto the floodplain. The data also show that PCBs are present throughout the riverbed at concentrations that vary widely over very short distances (i.e. feet). This means that PCB contamination is extensive and that there are no hotspots (small areas that are large PCB sources.)**" (Page 153)

He stated: "Sediment transport is very active, so **PCBs deeper in the riverbed are not always permanently buried. Like riverbanks, the riverbed is subject to erosion and deposition.** Sediment eroded from the bed carries PCBs into River water where it is transported downstream. Similarly, sediment that settles brings PCBs back to the bed where they may be picked up and transported downstream at a later time. Several feet of

erosion can occur over time, re-exposing PCBs once located deep in the bed."

"Natural recovery of the River depends on how fast cleaner sediments accumulate on the riverbed and bury PCBs. **However, relatively little sediment accumulates on the bed because long-term sediment erosion and deposition rates in the River are roughly equal over time. This means the rate of natural recovery in the River is slow.** Even in areas like Woods Pond, sedimentation rates are low. **On average, it takes 4-6 years to accumulate one inch of sediment in the Pond.** About 90% of the PCBs entering Woods Pond end up going over the dam and travel downstream, meaning that only 10% of the PCBs are retained in the Pond." (Page 154, Emphasis added.)

As for the issue of downstream transport, and the question "Does Woods Pond trap PCBs?" Garland noted: "For Woods Pond: Sedimentation is slow: 0.4 –0.6 cm/yr (Cs-137 data) **… PCBs: only 9-13% trap efficiency. Approximately 90% of PCBs leave Woods Pond.**" (Page 180.) Garland concludes: **"Rate of natural recovery is slow - despite 2-mile cleanup, no appreciable decrease in PCBs in Woods Pond."** (Page 181, Emphasis added).
(https://semspub.epa.gov/work/01/508641.pdf)

Mark Velleux, Ph.D, HDR|HydroQual noted in his "Why Use Models for the Housatonic River?" presentation at the MiniWorkshops that: "PCB concentrations in the River can potentially change over time…Importantly, monitoring data and modeling results document that there are no hotspots (small areas that have much higher PCBs levels relative to other areas) in the first 10 1/2 miles of Rest of River. **The results also show that the River is not cleaning itself fast enough to significantly reduce risks in the foreseeable future.** PCBs from riverbanks and the riverbed continue to move downstream and can be deposited on the floodplain. The riverbanks in Rest of River account for nearly half the PCBs going into the River." (Page 160, Emphasis added)
(https://semspub.epa.gov/work/01/508641.pdf)

Based on Garland's and Velleux's analysis, HRI believes there are incontrovertible and unnecessary risks to human health and the environment incurred by leaving significant levels of PCB contamination in this ever-changing river system. PCBs are continually moving from riverbanks and the bottom of the River. Any contamination that is left will remain a continuing threat. These risks are in no way mitigated by relying on an inefficient and ineffective Monitored Natural Recovery regime as any part of EPA's remediation strategy.

On April 11, 2011, Susan Svirsky, EPA Rest of River Project Manager at the time, noted: **"PCBs in the Housatonic River and floodplain are posing a risk to humans and are harming many species of wildlife. These risks and harm will continue as the PCBs are not going away or being buried in the foreseeable future (>250 years)."**
("Environmentally Sensible Remediation Concepts," Page 225, Emphasis added).
(https://semspub.epa.gov/work/01/508641.pdf)

EPA and GE might make a more reasonable case for Monitored Natural Recovery if there wasn't already a clear track record of effective large-scale remediation and successful restorative of the sensitive habitats of the Two Mile section of the River. Thanks to EPA's experience and the testimony of EPA consultants like Keith Bowers, we know, that however challenging restoration may prove in the Rest of River, there is significant experience in river restoration in similar and successful projects throughout the country.

EPA continues: "Based on information currently available, EPA believes the Proposed Remedial Action meets the General Standards for Corrective Measures and **provides the best balance of tradeoffs among the other alternatives with respect to the relevant criteria.** EPA also expects the Proposed Remedial Action to **(1) control the sources of releases so as to reduce or eliminate, to the maximum extent practicable, further releases that may pose a threat to human health and the environment;** (2) attain the Performance Standards; (3) comply with applicable standards for management of wastes; and (4) be protective of human health and the environment; (5) comply with ARARs (or justify a waiver); (6) be cost-effective; **(7) utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and (8) satisfy the preference for treatment as a principal element, or explain why the preference for treatment will not be met."** (GE-Housatonic River, Statement of Basis, Page 11, Emphasis added).

On the one hand, EPA acknowledges that "This stretch of the River (Reaches 5 and 6) is the most contaminated portion of river addressed in this Proposed Remedial Action and is estimated to contain approximately 90% of the mass of PCBs that remain in the river system (river and floodplains) ... [and] eroding contaminated riverbanks are a significant source of PCBs in Reach 5, currently contributing an estimated 45% of the PCB load to the river." (GE-Housatonic River, Statement of Basis, Page 13).

EPA also acknowledges the continuing risk that PCB-contaminated soil will travel throughout the floodplain: "**PCBs contaminated the floodplain by the movement of contaminated sediment onto the floodplain during times of high water. Based upon risk assessments conducted by EPA, PCBs in the Housatonic River sediment, floodplain soil, and biota pose unacceptable risks to both human and ecological populations.**" (GE-Housatonic River, Statement of Basis, Page 14, Emphasis added).

Furthermore, in its discussion of Long-Term Reliability and Effectiveness, EPA notes: "Of these cleanup alternatives, those Combination Alternatives **that remove the most contaminated soil and sediment** (Combination Alternative 6, followed by Combination Alternatives 7 and 9) **provide the best long-term reliability and effectiveness because the magnitude of the residual risk that remains is much lower than those alternatives that leave significantly more contaminated material in place ..."** (GE-Housatonic River, Statement of Basis, Page 30, Emphasis added).

Yet EPA neglects its own significant successes remediating and restoring the vernal pools and sensitive habitats of the first 2 Miles. EPA writes: "**However, Combination Alternatives that fundamentally impact the dynamic, meandering character of the river or require extensive excavation in habitats supporting state-listed species (such as Combinations 6 and 7) may result in reduced longterm effectiveness because of potential long-term adverse effect on the environment.** As a result, Combination 9, which includes more excavation than most alternatives, but also provides the most measures and procedures to preserve and protect the river's sensitive ecosystem, including its array of state-listed species habitats, **provides the best balance in terms of reducing residual risk and minimizing long-term ecological impacts.**" (GE-Housatonic River, Statement of Basis, Pages 30-31, Emphasis added).

Oddly, EPA almost immediately makes the very claim HRI is pressing: that a well-planned, rigorous and sensitive restoration plan can mitigate the short-term dislocation and disruption of sensitive habitats. To use EPA's own language: "reducing residual risk and minimizing long-term ecological impacts."

EPA notes: "**All active alternatives would require restoration and compliance with relevant ARARs to mitigate the impacts of the remediation. Restoration is expected to be effective and reliable, returning habitats to their pre-remediation state for all active alternatives on a timeframe appropriate for the type of habitat being restored (e.g. a floodplain forest will take longer than an emergent wetland**)." (GE-Housatonic River, Statement of Basis, Page 31, Emphasis added).

Again, let us reiterate. We know from the successful restoration of the Housatonic and work done in river systems across the country that we can successfully restore sensitive habitats and in the long term recreate safe habitats for wildlife.

The ATSDR MADPH Health Assessments for the General Electric Site note: "**In Reach 5, from the confluence to the headwaters of Woods Pond, the surface sediment PCB concentrations averaged 19.30 mg/kg.** Surface sediment PCB levels did not appear to be higher downstream of the Pittsfield Municipal Waste Water Treatment Plant discharge in Reach 5 than upstream of the Pittsfield Municipal Waste Water Treatment Plant discharge in Reach 5**. In Woods Pond, Reach 6, the first major impoundment of the Housatonic River south of GE, the average sediment PCB concentrations (39.13 mg/kg) are nearly double those in Reach 5. Downstream of Woods Pond Dam to the headwaters of Rising Pond, Reach 7, the average concentrations of PCBs in the sediments were lower (6.63 mg/kg).** Average PCB sediment concentrations were lower still in Reach 8, Rising Pond (4.15 mg/kg), (Page 13, Emphasis added). (http://www.atsdr.cdc.gov/HAC/pha/GESite-HousatonicRiver/G.E. Housatonic River SiteFinalPHA082508.doc.pdf)

Laura Vandenberg et al reviewed the scientific literature on the low dose effects of endocrine and hormone-disrupting chemicals like PCBs, noting that "studies show that hormonally active agents may still induce significant biological effects even at extremely low concentrations and that **presently available analytical methods or technologies might be un-able to detect relatively small magnitudes of effects.**" (Page 406) They concluded "Whether low doses of endocrine-disrupting compounds influence human disorders is no longer conjecture, as epidemiological studies show that environmental exposures are associated with human diseases and disabilities" and that "fundamental changes in chemical testing and safety determination are needed to protect human health." (Page 378) ("Hormones and Endocrine-Disrupting Chemicals: Low-Dose Effects and Nonmonotonic Dose Responses," Endocrine Review, 2012 Jun; 33(3): 378–455. Emphasis added.)
(http://press.endocrine.org/doi/pdf/10.1210/er.2011-1050)

Re EPA's decision to leave significant amounts of PCBs in the River, HRI and Peter deFur, Ph.D. have previously stated: "The assertion is based on the notion that leaving contamination in a habitat to leach toxic chemicals for decades is less damaging than removal with restoration of the habitat. EPA provides absolutely no evidence to support this contention and no analysis and no data. The state listed habitats will remain poisoned at levels that are toxic to various insects, snails, crustaceans, amphibians, birds, fish and mammals." (Comments, Housatonic River Initiative, Inc., Reissued Draft RCRA Permit and Statement of Basis for EPA's Proposed Remedial Action for the Housatonic River "Rest of River", Page 62).
(https://semspub.epa.gov/work/01/568476.pdf)

So what we do know is that while there is extensive evidence that we can successfully remove PCB-contaminated sediment and soil from sensitive areas of the River, there is no overwhelming scientific evidence that justifies leaving significant amounts of PCBs in the sediment and river bank soils of Reach 5B. Especially when we know how even low levels of PCBs negatively impact human health and the health of other species. Therefore, this remedy fails to be fully protective of human health and the environment.

While EPA has previously stated it has met the goals of the General Standards for Corrective Measures, specifically "(7) utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and (8) satisfy the preference for treatment as a principal element, or explain why the preference for treatment will not be met", it has, in fact, failed to meet that burden. First, by failing to adequately explain why the preference for treatment will not be met, and barring that, by failing to implement permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Thus the Final Remedy fails to satisfy a key component of CERCLA regulations. (GE-Housatonic River, Statement of Basis, Page 11).

Instead, EPA has opted for landfilling. "Alternative TD 1, disposal in an existing off-site licensed landfill or landfills, would involve the transportation of removed sediment and floodplain soil to commercial solid waste and/or TSCA-licensed landfill(s) for disposal ...

For the preferred sediment/floodplain alternative, the estimated cost of disposal via truck is $308 million and via rail is $287 million." (GE-Housatonic River, Statement of Basis, Page 25.)

Not surprisingly, GE prefers to landfill PCB-contaminated riverbank soil and river sediments on-site in either local in-water Confined Disposal Facility/Facilities (CDF) or local on-site Upland Disposal Facility or Facilities.

EPA notes: "Alternative TD 2, disposition in a local in-water Confined Disposal Facility/Facilities (CDF), would involve the placement of dredged sediments in a CDF or CDFs located within the river or backwater area ... The estimated cost for this alternative ranges from $100 to $510 million, depending on which Combination Alternative it is paired with; with EPA's preferred Combination, this alternative is estimated to cost $317 million.

"Alternative TD 3, disposition in a local on-site Upland Disposal Facility or Facilities, would involve the permanent disposition of removed sediment/soil at an Upland Disposal Facility constructed in close proximity to the River, but outside the 500-year floodplain. The removed sediment and soil would be loaded into trucks at the staging areas, covered, and transported over on-site and local roadways to a nearby Upland Disposal Facility. Three potential locations for an Upland Disposal Facility were identified and evaluated by GE in the CMS. **These sites are located near Woods Pond, Forest Street in Lee, and Rising Pond (referred to, respectively, as the Woods Pond, Forest Street, and Rising Pond Sites).** The potential locations evaluated as part of this alternative are shown in Figure 8. **The estimated cost for this alternative ranges from $36 to $201 million, depending on which Combination Alternative it is paired with; with EPA's preferred Combination, this alternative is estimated to cost $100 million.**" (GE-Housatonic River, Statement of Basis, Page 25, Emphasis added.)

We remind EAB that EPA's decision to require GE to transport contaminated sediments and soils to an off-site disposal facility fails to promote CERCLA's preference for treatment: "**The offsite transport and disposal of hazardous substances or contaminated materials without such treatment should be the least favored alternative remedial action where practicable treatment technologies are available.**" (42 USC 9621(b)) Emphasis added.)

HRI strenuously objects to any remedy/treatment option that moves PCBs from one location to another in Berkshire County. All Berkshire communities adjacent to the River have already paid a significant price for GE's environmentally irresponsible behavior. Asking them to host a PCB-disposal facility is asking them to assume yet another unnecessary burden. It is interesting to note from an environmental justice perspective that all three potential locations GE suggests are communities whose median household income is significantly lower than the Massachusetts median household income of $67,846. Median household income in Lenox, MA is $51,201. Median household income in Lee, MA is $59,019. Median household income in Great Barrington is $52,026. Each

of these communities now face increasing difficulties funding local schools and dealing with rising property taxes.
(https://www.bostonglobe.com/metro/2015/12/18/town-town-look-income-massachusetts/cFBfhWvbzEDp5tWUSfIBVJ/story.html?)

Given the very limited range of treatment options presented in the CMS, HRI would prefer Thermal Desorption, TD5: "The estimated cost for this alternative ranges from $103 million to $1.53 billion, depending on which Combination Alternative it is paired with and how much material is reused; with EPA's preferred Combination Alternative, this alternative is estimated to cost between $515 and $540 million." (GE-Housatonic River, Statement of Basis, Page 25). HRI believes that given the lack of other alternatives, the most rigorous consideration of, and commitment to some of the General Standards for Corrective Measures would support the conclusion that TD5 is the most appropriate treatment/disposal option offered us for the Rest of River remedy.

Similarly, an objective consideration of the criteria governing: "The Reduction of Toxicity, Mobility, or Volume of Wastes" would support the choice of TD5:
"a. If applicable, treatment process used and materials treated;
b. If applicable, amount of hazardous materials destroyed or
treated;
c. If applicable, degree of expected reductions in toxicity,
mobility, or volume;
d. If applicable, degree to which treatment is irreversible; and
e. If applicable, type and quantity of residuals remaining after treatment." (GE-Housatonic River, Statement of Basis, Page 27).

Other EPA regions have successfully employed thermal desorption. An extensive though not comprehensive list of sites that have implemented or planned to implement thermal desorption in the years up to 1997 can be found on pages 7-8 in EPA's Office of Emergency and Remedial Response's January 1997 publication: "Engineering Forum Issue Paper: Thermal Desorption Implementation Issues."
https://clu-in.org/download/remed/tdissue.pdf

John Blanchard, PE and Robert Stamnes, PE note: "Thermal desorption has been selected as the remedy for VOCs or SVOCs in soils at the sites or operable units listed below. Some sites are currently operating, and some are in the design phase." They offer a list of more than 50 sites. "Innovative Treatment Technologies: Annual Status Report (Eighth Edition)," September 1996 (EPA 542-R-96-010)
(http://nepis.epa.gov/Exe/ZyPDF.cgi/10002Y79.PDF?Dockey=10002Y79.PDF):

As EPA notes, "**Thermal desorption has been safely used at many Superfund sites** …Thermal desorption is typically used to clean up soil that is contaminated with VOCs and SVOCs at depths shallow enough to reach through excavation. Thermal desorption may be faster and provide better cleanup than other methods, particularly at sites that have high concentrations of contaminants. A faster cleanup may be important if a contaminated site poses a threat to the community or needs to be cleaned up quickly so

that it can be reused. **Thermal desorption is being used or has been selected for use at over 70 Superfund sites across the country.)** "A Citizens Guide to Thermal Desorption, EPA Office of Solid Waste and Environmental Protection, EPA 542-F-12-020, September 2012," Page 2, Emphasis added).
(https://clu-in.org/download/Citizens/a_citizens_guide_to_thermal_desorption.pdf)

TD5 meets the Implementability standard:
"a. Ability to construct and operate the technology, taking into account any relevant site characteristics;
b. Reliability of the technology;
c. Regulatory and zoning restrictions;
d. Ease of undertaking additional corrective measures if necessary;
e. Ability to monitor effectiveness of remedy;
f. Coordination with other agencies;
g. Availability of suitable on-site or off-site treatment, storage and disposal facilities and specialists; and,
h. Availability of prospective technologies." (GE-Housatonic River, Statement of Basis, Pages 27-28).

Here in Region 1, EPA has already demonstrated that thermal desorption can be effectively implemented at the GE PCB Rose Disposal site (National Priorities List site), in Lanesborough, Massachusetts.

Most recently, the United States (USAID) and the Government of Vietnam have undertaken the large-scale joint remediation of the dioxin-contaminated Danang Airport. According to USAID, "It is expected that over 95 percent of the dioxin will be destroyed through the thermal desorption heating process. Any dioxin that vaporizes will be vacuumed out and captured in a secondary treatment system for liquids and vapors extracted from the pile. The secondary treatment system will ensure that no dioxin or other contaminants are released into the environment." You can view an animation of the In-Pile Thermal Desorption process currently being implemented at Danang here:
https://www.usaid.gov/vietnam/environmental-remediation-process

And you can read more about how and why they chose to utilize Thermal Desorption here:
https://www.usaid.gov/vietnam/environmental-remediation-dioxin-contamination-danang-airport-project-frequently-asked-questions

In its Comparative Analysis of Treatment/Disposition Alternatives, EPA acknowledges that "**TD 1, 3 and 5 would provide high levels of protection to human health and the environment because all excavated contaminated material would either be removed from the site (TD 1), contained in an upland disposal facility (TD 3), or treated to levels safe for off-site disposal or potential reuse (TD5).**" (GE-Housatonic River, Statement of Basis, Page 35, Emphasis added).

HRI would argue that the added long-term benefit of destroying PCB-contamination rather than changing its location outweighs the other alternatives.

As for Control of Sources of Releases, EPA notes: "Under TD 4 and **TD 5, the potential for the PCB-contaminated sediment and soil to be released within the river or onto the floodplain during treatment operations would be minimal as long as these facilities are properly operated and maintained.**" (GE-Housatonic River, Statement of Basis, Page 36. Emphasis added).

But as EPA notes in its "Technology Alternatives for the Remediation of PCB Contaminated Soils and Sediments": **Landfill disposal of PCB contaminated soil and sediment does not provide waste reduction or destruction, only containment.** Persistent substances like PCB wastes will remain in landfills for long periods of time with little degradation. " (Page 11, Emphasis added) (http://nepis.epa.gov/Adobe/PDF/P100GJNO.pdf).

HRI would argue that while placement of contaminated materials either at on-site or off-site landfills would simply transfer the risk of release from one location in Berkshire County to another, or from Berkshire County to another community in the United States, TD5 or bioremediation would overwhelmingly reduce these risks by significantly and permanently reducing the volume of contaminated material.

EPA writes in its discussion of Short-Term Effectiveness: "TD 2 through TD 5 could cause permanent loss of habitat and loss or displacement of wildlife in the area depending upon where the disposal or treatment facility is located. TD 1 would have fewer impacts on the environment than the other alternatives." (GE-Housatonic River, Statement of Basis, Pages 37-38).

HRI suggests that if TD5 is adopted, EPA could surely create an appropriate restoration plan to undo these short-term effects once treatment has been completed. GE has already purchased or has lease agreements for parcels along the Rest of River for its proposed landfills in Lenox, Lee, and Housatonic, Massachusetts. Surely the temporary use of these spaces - followed by restoration - would be better for the habitat that a permanent PCB landfill.

As for Implementability, EPA notes: "TD 4 and 5 would require access to large areas for the construction and operation of a treatment facility. Locating such a facility would require coordination with state and local agencies. Other access and zoning issues may also be present. Since state and local officials have expressed a strong preference for off-site disposal, these alternatives may encounter significant opposition, thus rendering these alternatives difficult to implement." (GE-Housatonic River, Statement of Basis, Page 38).

HRI has been educating local public officials and the public at large about the issues involved with treatment and alternative remedial technologies vs. landfilling for several decades. We believe that EPA overstates the potential of opposition to TD5 especially when the alternative is landfilling without treatment.

While state, even federal officials have failed to educate the public about CERCLA's preference for both established treatment technologies like Thermal Desorption and alternative technologies like Bioremediation, HRI believes that because of our advocacy there is significant public support for a more permanent solution to our PCB problem.

As for location, a Thermal Desorption unit could be placed on the property GE has already leased or purchased for its intended Upland Disposal Facilities. Please see Attachment A Petition of Concerned Citizens supporting the treatment of PCBs rather than landfilling them.

EPA declares: "Regarding the ease of undertaking additional corrective measures, if necessary, if additional wastes were generated as part of future actions, it is likely that the facilities constructed under TD 2 through TD 5 would no longer be available for additional treatment and/or disposal." (GE-Housatonic River, Statement of Basis, Page 38). HRI believes EPA exaggerates this problem. Maxymillian Technologies, Inc., of Pittsfield, Massachusetts successfully used its Mobile Thermal Desorption System (TDS) to remediate contaminated PCB soil at the GE Rose Site in Lanesborough, MA. It is housed in Berkshire County and most likely available for future actions. There are other vendors as well with mobile units to address a contingency like this.

As for Cost, according to "Table 7 Cost Summary for Treatment/Disposition Alternatives," EPA estimates that depending on the potential range of volumes removed under the sediment and floodplain alternatives, from 191,000 cy to 2.9 million cy, the costs for TD5 would range from $103 million to $1,450 million (with reuse) to $106 million to $1,530 million (without reuse.) (GE-Housatonic River, Statement of Basis, Page 39).

EPA's 1996 guide "The Role of Cost in the Superfund Remedy Selection Process" makes the following points: "The NCP states that the overall goal of the remedy selection process is 'to select remedies that are protective of human health and the environment, that maintain protection over time, and that minimize untreated waste. (40 CFR 300.430(a)(1)(i)).' This goal reflects CERCLA's emphasis on treatment as the preferred method of protection. However, recognizing that CERCLA tempers its emphasis on permanent solutions and treatment through the addition of the qualifier 'to the maximum extent practicable,' and also contains the co-equal mandate for remedies to be cost-effective, the NCP goes on to state that, in general, 'EPA expects to use treatment to address the principal threats posed by a site, wherever practicable.'

"Principal threats for which treatment is most likely to be appropriate include liquids, **areas contaminated with high concentrations of toxic compounds**, and highly mobile materials (40 CFR 300.430(a)(1)(iii)(A))."
(see "A Guide to Principal Threat and Low Level Threat Wastes," Publication 9380.3-06FS, November 1991, Page 2, Emphasis added)."
(https://semspub.epa.gov/work/11/174446.pdf

HRI suggests that given the financial health of GE, it is not unreasonable to require the company to do whatever it takes to remove from the Rest of the River as much PCB contamination as is technically possible.

According to Forbes Magazine, GE's revenue for 2013 was $146 billion. (Forbes, January 17, 2014.)
http://www.forbes.com/sites/maggiemcgrath/2014/01/17/ge-profit-rises-20-boosted-by-oil-and-gas/ - 560517ab435a)

According to Morningstar.com, GE CEO Mr. Jeffrey Immelt's compensation for 2014 was $37,250,774 and for 2015, $32,973,947. For its top five executives in 2014, GE's compensation package totaled $119,701,545 and in 2015 it was $104,953,553. (http://insiders.morningstar.com/trading/executive-compensation.action?t=GE).

Finally, according to the UK Guardian "Boston-based conglomerate General Electric, which Oxfam said has received $28bn in taxpayer backing, was second with $119bn stored in 118 tax haven subsidiaries**."**
(http://www.theguardian.com/world/2016/apr/14/us-corporations-14-trillion-hidden-tax-havens-oxfam)

As EPA notes: "Innovative technologies should be considered if they offer the potential for comparable or superior treatment performance, fewer/lesser adverse impacts, or lower costs for similar levels of performance than demonstrated technologies." ("The Role of Cost in the Superfund Remedy Selection Process," Page 3) (https://semspub.epa.gov/work/11/174446.pdf)

If there was ever a site that deserved to shift the cost-effectiveness factor of CERCLA in favor of spending more on treatment rather than less, the Housatonic Rest of River is the place to do so.

In 1990, EPA established the Bioremediation Field Initiative to "seek the development of more cost-effective solutions, such as bioremediation, **to provide more permanent treatment of contaminated sites.**"
(EPA "Bioremediation Field Initiative, EPA/540/F-92/012 June 1993, (Page 1, Emphasis added). (nepis.epa.gov/Exe/ZyPDF.cgi/30006AQE.PDF?Dockey=30006AQE.PDF).

As EPA's "Technology Alternatives for the Remediation of PCB Contaminated Soils and Sediments" notes: "Treatability studies, which can include a combination of bench- and pilot-scale tests, provide data to assess whether the technology can meet the cleanup goals, as well as establish design and operating parameters for optimization of technology performance. Treatability studies may also help identify any matrix interferences or pretreatment requirements and appropriate residual treatment options." (EPA/600/S-13/079, Page 7) (http://nepis.epa.gov/Adobe/PDF/P100GJNO.pdf).

Unfortunately, Region 1 has chosen not to implement the most necessary first step in this process: "**The first step of any bioremediation program is to develop a conceptual site model (CSM) to evaluate the potential for applying bioremediation at a site.** The CSM takes into account the nature and extent of contamination and site characteristics; site hydrogeology, geochemistry and oxidation-reduction conditions; biodegradation potential; contaminant fate and transport; and receptor and exposure pathways.

"**Activities undertaken prior to the implementation of a bioremediation program often involve treatability studies, examination of soil comparability and the structure and function of the microbial community to ensure that undesirable reactions with the contaminants or their degradation products are prevented. The success of a bioremediation application highly depends on characterization and monitoring completed before and during its implementation** (Hazen 2010)." (U.S. EPA Contaminated Site Cleanup Information (CLU-IN) Bioremediation Overview Page 1-2, Emphasis added).
(https://clu-in.org/techfocus/default.focus/sec/Bioremediation/cat/Overview/)

Because Region 1 has chosen not to mandate these all-important rigorous pilot studies during the last two decades, we have never been able to effectively evaluate the widest range of alternative remedial technologies that might work in the Rest of River. Nor compare the potential ability of bioremediation or other alternative technologies to reduce the quantity and toxicity of PCB-contamination with EPA's proposed remedy, nor adequately compare the costs of alternative treatments with the combined costs of dredging and landfilling.

HRI believes Region 1 ought to renew EPA's commitment to use alternative remedial technologies for the Rest of River. As EPA's 2013 Superfund Remedy Report notes: "The EPA evaluated the prevalence of treatment at NPL sites. Of all NPL sites where a remedy has been selected, 73 percent include at least one treatment remedy to address contaminated source, groundwater or both (Figure 3). The EPA's demonstrated preference for treatment is consistent with CERCLA and the NCP." (EPA 542-R-13-016, EPA November 2013 Solid Waste and Emergency Response Fourteenth Edition of its Superfund Remedy Report, Page 5).

During FY 2009-2011, Treatment was selected 40% of the time, while On-Site Containment was selected 28% of the time, Off-Site Disposal was selected 24% of the time, and Monitored Natural Recovery or Enhanced Natural Recovery was only selected 14% of the time. (Page 6, Emphasis added).

The Report continues: "Fifty-six source decision documents for FY 2009 to 2011 address sediment (Table 2). Three-quarters of these decision documents included dredging, or containment/disposal, **while a third selected treatment.** (Page 11, Emphasis added).
(https://clu-in.org/download/remed/asr/14/SRR_14th_2013Nov.pdf)

EPA's "A Citizen's Guide to Bioremediation" notes: "Bioremediation has the advantage of using natural processes to clean up sites. Because it may not require as much

equipment, labor, or energy as some cleanup methods, it can be cheaper. Another advantage is that contaminated soil and groundwater are treated onsite without having to dig, pump, and transport them elsewhere. Because microbes change the harmful chemicals into small amounts of water and gases, few if any waste byproducts are created. **Bioremediation has successfully cleaned up many polluted sites and has been selected or is being used at over 100 Superfund sites across the country.**" (EPA 542-F-12-003 September 2012, Page 2, Emphasis added).
https://www.epa.gov/remedytech/citizens-guide-bioremediation

HRI highlighted the use of phytoremediation and In situ Sediment Ozonation in our October 2014 Comments re EPA's Proposed Remedial Action for the Housatonic River Rest of River: "There are several examples of phytoremediation in the field. In 2015, the Iowa Superfund Research Program will finish a full scale study of employing phytoremediation to remove PCBs from soil and groundwater at a confined disposal facility in East Chicago. A similar test is being conducted on a PCB contaminated wastewater pond in Altavista, Virginia. Several engineering and remediation firms use phytoremediation to remove PCBs including Edenspace, TRC Companies, and EADHA enterprises. (Pages 22-23).

"In situ Sediment Ozonation (ISO) is a new technology developed by the University of Utah in cooperation with the National Oceanic and Atmospheric Administration (NOAA).ISO uses a floating rig equipped with ozone reactors and conveyors to remediate without dredging. Ozone has been shown to react with PCBs by forming more biodegradeable products as well as boost biological activity in sediment or soil (Gomes,Dias-Ferreira, and Ribeiro 2013) … The final report on the technology suggests that the materials to build ISO rigs are readily available in current dredging technology and that contaminated sediment could be treated for as little as fifty dollars a cubic yard. This technology also naturally enhances biological activity and would be a logical choice to increase remediation efficiency of more passive technologies such as bioremediation or phytoremediation. (Page 23)." (http://semspub.epa.gov/work/01/568478.pdf)

Nicolas Kalogerakis offers a review of several successful examples of bioremediation: "Dejonghe et al. ... suggest that for soil ecosystems, the capacity of plant roots as creators of physical and chemical discontinuity should be exploited to enhance the effectiveness of bioaugmentation treatments. In the same paper, they reported many cases of successful bioaugmentation of polluted soils over the last two decades.

Kalogerakis continues: "**Luepromchai et al. [20] reported a very interesting synergistic effect between PCB degrading bacteria (Ralstonia eutrophus and Rhodococcus sp. ACS) and earthworms (Pheretima hawayana) when both added to PCB-contaminated soils. The observed overall PCB (Aroclor 1242) removal was almost triple to that observed when only bacteria or only earthworms were added.**

"Their results suggest that earthworms facilitate PCB bioremediation by enhancing the dispersal of PCB-degrading bacteria in bioaugmented columns, as well as providing environmental conditions that favour the growth and activity of indigenous PCB-

degrading bacteria." (Luepromchai, E., Singer, A,C,, Yang, C.H. and Crowley, D.E. (2002) Interactions of earthworms with indigenous and bioaugmented PCB degrading bacteria. FEMS Microbiology Ecology, 41 (3): 191-197.) ("Bioaugmentation - Is It Really Needed For The Bioremediation of Contaminated Sites?" Page 4, Emphasis added.)
(http://www.srcosmos.gr/srcosmos/showpub.aspx?aa=8113)

Rockne and Reddy state, " ... **microbially-mediated reductive dechlorination of PCBs is an established field, having first been discovered in the mid-1980s.** The activity is catalyzed by bacterial consortia that couple the reduction of chlorines on the PCB to the oxidation of an external electron donor under anaerobic conditions, releasing chloride ions. Although in theory any chlorine position can be dechlorinated, due to enzymatic capability (and possible stearic hindrance) most observed dechlorination activity follows a select group of pathways. The reduction pattern can be influenced by a variety of factors, including chlorine substitution pattern and environmental conditions (Bedard and Haberl 1990).

"It has been found that addition of co-substrates has accelerated PCB dechlorination activity through a stimulation or "priming" of the microbes responsible for PCB reductive dechlorination. **Perhaps one of the more successful applications of this type of biostimulation has been the addition of less toxic polybrominated biphenyls (PBBs) to stimulate PCB dechlorination** (Bedard, Van Dort et al. 1998). It was found that PBBs are readily debrominated at high rates by sediment enrichments that have been previously contaminated with PCBs.

"Once sufficiently dechlorinated, mono- and di-chlorinated biphenyls are known to be aerobically degraded by bacteria such as Burkholderia Str. LB400 (Maltseva, Tsoi et al. 1999) … Because this activity is limited to only mono-and di-chlorobiphenyls, researchers have proposed a sequential anaerobic/aerobic treatment process for PCBs (Maltseva, Tsoi et al. 1999; Master, Lai et al.2002).
("Bioremediation of Contaminated Sites," Karl J. Rockne and Krishna R. Reddy, University of Illinois, Chicago, October 2003, (Page 10, Emphasis added.)
(http://krockne.people.uic.edu/proceeding9.pdf).

Rayford B. Payne et al reports: "Bioremediation of sediments contaminated with commercial polychlorinated biphenyls (PCBs) is potentially achievable by the sequential activity of anaerobic halorespiration to convert higher chlorinated congeners to less chlorinated congeners that are susceptible to aerobic respiratory degradation. The efficacy of bioaugmentation with anaerobic halorespiring Dehalobium chlorocoercia DF1 and aerobic Burkholderia xenovorans LB400 added concurrently with granulated activated carbon (GAC) as a delivery system was determined in 2 L laboratory mesocosms containing weathered Aroclor-contaminated sediment from Baltimore Harbor, MD, USA.

"The greatest effect was seen in the mesocosm bioaugmented with both DF1 and LB400 together, **which resulted in an 80% decrease by mass of PCBs, from 8 to <2 mg/kg after 120 days … These results suggest that an in situ treatment employing the**

simultaneous application of anaerobic and aerobic microorganisms could be an effective and environmentally sustainable strategy to reduce PCBs levels in contaminated sediment."
(Remediation of Polychlorinated Biphenyl Impacted Sediment by Concurrent Bioaugmentation with Anaerobic Halorespiring and Aerobic Degrading Bacteria, Environ. Sci. Technol., 2013, 47 (8), pp 3807–3815 DOI: 10.1021/es304372t, Emphasis added.)
(http://pubs.acs.org/doi/abs/10.1021/es304372t).

Barbara Hesselgrave reports: "The process developed by Kevin Sowers, Ph.D …Harold May, Ph.D., at Medical University of South Carolina, and Upal Ghosh, PhD … narrowed down to a group of microorganisms known as halorespiring bacteria that in effect "breathe" the PCBs much as we breathe oxygen.

"**We knew that we can't control the oxygen—the lower part of the sediment will be anaerobic and the upper part aerobic. However, benthic organisms such as worms that occur naturally in the sediment continually mix the anaerobic and aerobic regions of the sediment so that both processes can occur together. The worms also performed as a transport system to get the bacteria to their destination.**" (Page 21, Emphasis added).

"Funded by a grant from EPA, Ghosh has now developed a delivery system made of activated charcoal pellets ... **SediMite is an agglomerate made up of active carbon, clay, and sand, and makes it convenient to apply the material to sediments in large scale** ... **First, the PCBs are absorbed by the activated charcoal, which removes them from the food chain. Next, the microorganisms, which Ghosh says are "effectively riding on the activated carbon backbone of the SediMite pellets," degrade those absorbed PCBs.**

"Small studies led to the team testing the bioremediation process on PCB-contaminated sediments in freshwater wetlands, an estuarine harbor, and a river. When they used gas chromatography and PCR analysis to measure results**, they found a 70–80% PCB reduction in just three to six months.** This success in such a short time led to the launch of phase 2 tests, including a four-month study in the "6-acre petri dish"—the watershed drainage creek leading to the Potomac River on Marine Corps Base Quantico near Richmond, VA ... The Quantico test project began in May 2015, and after four months researchers retrieved sediment core samples for analysis in mid-October. By early November the preliminary results from analysis were in and "**demonstrate the bioremediation definitely has an effect on PCB levels in the field**," says Sowers.

"**We observed 25% and 36% reduction of PCB levels in the two treated plots. This is only four months after treatment**," he says. "In contrast, there was no change in PCB levels in both the untreated plot and the plot treated with SediMite and not bioamendment."
(Barbara Hesselgrave, "The PCB Challenge: Is there a better way to clean contaminated sediments?" Stormwater, March/April 2016 Pages 22-23, Emphasis added).

(http://foresternetwork.com/stormwater-magazine/sw-water/sw-stormwater-management/the-pcb-challenge/).

"In Germany the micro-biological treatment of contaminated soils is the technique of treatment applied most frequently in remediating contaminated sites."
("Manual For Biological Remediation Techniques," International Centre for Soil and Contaminated Sites, Dessau - 2006, Page 1, Emphasis added).
http://www.umweltbundesamt.de/sites/default/files/medien/publikation/long/3065.pdf,

HRI believes the work of BioTech Restorations deserves consideration. As Peter DeFur stated in HRI's 2014 Comments: "BioTech specializes in the bioremediation of chlorinated contaminants including PCBs through application of a proprietary protein "factor" which stimulates the indigenous microbial population and enhances their ability to degrade PCBs. While previously demonstrated in soils, dredged sediment could also be treated in this manner. Some of BioTech's successful remediation projects include the cleanup of the former New England Log Homes factory site in Great Barrington, Massachusetts and the Hercules Chemical Plant in Brunswick, Georgia." Combined Non-Government Organization Public Comments on Proposed Remedial Action (RA) 08/18/2014 - 10/27/2014," Page 39.
https://semspub.epa.gov/work/01/568478.pdf,

According to Mickey Friedman's article about the bioremediation at New England Log Homes "During a March 2011 meeting, the Massachusetts Department of Environmental Protection (DEP) stated "dioxins are everywhere on the site. Six different soil samples taken on September 15, 2014 at 100 Bridge Street found dioxin levels of 1,100, 1,400, 3,900, 470, 3,600, and 23,000 ppt at depths of 0-18 inches. On August 14, 2015, DEP noted "the average concentration is 1,172 parts per trillion (ppt), while the state standard is 20 ppt."
http://www.redcrownews.com/2016/09/parts-trillion/

Chris Young writes: "… Biotech's July 2014 treatment of the NELH site was successful in significantly reducing the site's pollutants … Our treatments are different because we treat the soil bacteria not the soil. Dioxin and other persistent pollutants including PCBs, impair the soil bacteria's ability to produce the enzymes necessary to first dechlorinate the dioxin and utilize the residual constituents as a carbon food source. In preliminary bench studies on soil collected from the NELH site, product formulations achieved near 100% destruction of TCDD, TCDF and all of the dioxin isomers. Simply put, long before we mobilized to the field, we'd proven our treatments were a viable solution for the cleanup of the site …
"The odor problem was more easily addressed than the problem of reduced efficacy we knew would result from not being able to cultivate the treated and saturated soil for more than a month. In the anaerobic condition, the bacteria consume both the soil amendments and the treatment product and generate odor without the benefit of concurrently producing the enzymes necessary to reduce the site's pollutants. We didn't know how much of the treatment might have been lost, so we tested the soil …

“Across the site, the treatment reduced the dioxin levels by an average of more than 30%. In the most highly contaminated soils, Biotech’s treatment reduced the dioxin levels by more than 50%. It’s worthy to note that these pollutant reductions were achieved in a reduced treatment window of a few months and, under less than optimal field conditions.”
http://www.redcrownews.com/2016/09/parts-trillion/ - comments

HRI believes Region 1 needs to expand its consideration of both established treatment technologies like Thermal Desorption and alternative remedial technologies like Bioremediation for the Rest of River. To reiterate, EPA's November 2013 Superfund Remedy Reports concludes: "**The EPA’s analysis of remedy selection from FY 2009 to 2011 and a comparison to earlier data shows that the Superfund remedial program continues to select treatment at nearly 75 percent of Superfund sites over the life of the program.** The Superfund program also continues to address complex sites involving multiple media. In addition, the data show that multiple technologies are selected to address the same medium, with each technology targeted at a portion of the medium or a particular contaminant. In some cases, the technologies are employed at the same time, while others are employed in series." (EPA Superfund Remedy Report, November 2013, Page 19, Emphasis added).
(https://clu-in.org/download/remed/asr/14/SRR_14th_2013Nov.pdf)

If our past experience is any guide, we anticipate that with the extensive appeals process that EPA and GE are apt to engage in, there is time to begin this process now.

Please see the Fact Sheet HRI submitted with its comments providing examples of sites that have successfully dealt with PCB remediation in a more thorough manner than the Rest of River remedy.
(HRI Factsheet 11-13-15, Page 2.)
(https://semspub.epa.gov/src/collection/SC31186.)

Most recently, Region 2 announced “**a plan to remove 3.5 million cubic yards of toxic sediment from the lower eight miles of the Passaic River in New Jersey**, followed by capping that entire stretch of river bottom. The sediment in the Passaic River is severely contaminated with dioxin, PCBs, heavy metals, pesticides and other contaminants from more than a century of industrial activity ... **The cleanup is estimated to cost $1.38 billion**." (Emphasis added.)
(https://yosemite.epa.gov/opa/admpress.nsf/0/DB3D10F149C262CC85257F6C005EE7F1)

A removal of more than three times the total of toxic sediments than the Region 1’s Rest of River Remedy is requiring of GE, in an area not as large as the Rest of River.

A few words about GE's "Dispute of EPA's Intended Final Decision Selecting Rest of River Remedy Submission of GE's Statement of Position." GE states: "As EPA has repeatedly admitted, out-of-state disposal will be no more protective of human health or the environment than on-site disposal in a secure, state-of-the-art facility, but it will cost

about a quarter of a billion dollars more. In the face of this substantial cost difference, which EPA also admits, EPA asserts that on-site disposal would be difficult to implement. It is incontrovertible that on-site disposal is EPA's "presumptive remedy" for the disposal of PCB contaminated sediment and soil, which it has approved and implemented at many other sites across the United States, including in Pittsfield and other locations in Massachusetts." (Pages 1-2)
(https://semspub.epa.gov/work/01/586218.pdf)

Why should the citizens of Berkshire County assume the burden of hosting one or more extensive PCB landfills when the technology exists to significantly reduce the volume of these wastes by treatment. As you can see from the more than twenty-six hundred people who have signed the "Treat PCBs, Don't Dump Them" petition, the Berkshire County community, while opposed to GE's plan for landfilling PCB-contaminated soil in Berkshire County is ready to endorse a Final Remedy that calls for a rigorous treatment option. (See Attachment: Petition).

Before we leave the issue of landfilling, a few comments about the inherent limitations of the technology itself. The "Laboratory Study of Interface Characteristics of Landfill Liners" by Faisal Hj Ali et al, notes: "Some recent landfill failures have indicated failures taking place along low friction angle zone between subsoil and geosynthetic or geosynthetic layers, clay liners, landfill cover slopes in static stage or under seismic condition." (Page 2)

"The failures through liner system beneath the waste mass are common, due to multiple layer components consisting of clay, soil and geosynthetic materials. Double-lined system can consist of as many as 6 to 10 individual components. As such the interfaces resistance of the individual components against shear stress could be low and cause potential failure plane." (Page 3)
(http://nexusec.com/conference_paper/Laboratory Study of Interface Characterictics of Landfill Liners.pdf)

In addition, Martine Vrijheid's "Health Effects of Residence Near Hazardous Waste Landfill Sites: A Review of Epidemiologic Literature" notes: "**Increases in risk of adverse health effects (low birth weight, birth defects, certain types of cancers) have been reported near individual landfill sites** and in some multisite studies, and although biases and confounding factors cannot be excluded as explanations for these findings, **they may indicate real risks associated with residence near certain landfill sites**." (Page 101, Emphasis added).

"Geschwind et al. *(61)* investigated the risk of congenital malformations in the vicinity of 590 hazardous waste sites in New York State. A 12% increase in congenital malformations was found for people living within 1 mile of a site. For malformations of the nervous system, musculoskeletal system, and integument (skin, hair, and nails), higher risks were found. Some associations between specific malformation types and types of waste were evaluated and found to be significant." (Page 109)

"**A number of studies have suggested a relationship between residential proximity to landfill sites and adverse pregnancy outcomes. An increase in infants with low birth weights has been the most consistent finding in single-site studies** *(I 1,12,14,26,27).* (Page 111, Emphasis added).
(https://www.epa.gov/sites/production/files/2014-03/documents/health_effects_of_residence_near_hazardous_waste_landfill_sites_3v.pdf)

GE's "Dispute of EPA's Intended Final Decision Selecting Rest of River Remedy Submission of GE's Statement of Position" states: "In January 2011, the Commonwealth submitted comments to EPA on the RCMS, concluding that 'none of the current combinations of alternatives [which included alternatives far less disruptive than EPA's intended Rest of River Remedial Action] achieve the remediation goals without causing irreparable harm to this unique, diverse and vital ecosystem that has been designated by the Commonwealth as an [ACEC],' and 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 EOE EA 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.)*." (Page 10)
(https://semspub.epa.gov/work/01/586218.pdf)

HRI consultant Peter DeFur noted: "So much of the contamination is left in place because the EPA was convinced by the state of Massachusetts that the habitats in the floodplain could not be lost, that species of concern were too significant and not replaceable, and that the process of removing the contamination could not possibly provide sufficient restoration …**The plant species listed in the intended permit are shown on this sheet and all but one can be cultured and replanted after remediation in a restoration effort.** Note that the vernal pools in the first 2 miles of the river remediation were successfully restored ...

Species Included in Core Area 1 Delineation

Common Name	Scientific Name	Cultivator(s)
Bristly Buttercup	*Ranunculus pensylvanicus*	Prairie Moon Nursery
Bur Oak	*Quercus macrocarpa*	Weston Nurseries; Bigelow Nurseries, Inc; Sylvan Nursery, Inc; Champlain Valley Native Plant Restoration Nursery
Crooked-stem Aster	*Symphyotrichum prenanthoides*	Prairie Nursery
Gray's Sedge	*Carex grayi*	Tripple Brook Farms; Project Native; New Moon Nursery; Prairie Nursery
Hairy Wild Rye	*Elymus villosus*	Project Native; Prairie Moon Nursery
Intermediate Spike Sedge	*Eleocharis intermedia*	St. Williams Nursery & Ecology Centre, Florida Hill Nursery
Narrow Leaved Spring Beauty	*Claytonia virginica*	Garden in the Woods; Nasami Farms
Tuckerman's Sedge	*Carex tuckermanii*	TBA
Wapato	*Sagittaria cuneata*	Fern Hill Nursery and Botanical Sanctuary; Prairie Moon Nursery

* High-terrace floodplain forest and Red Maple-Black Ash-Hemlock-Bur Oak swamp natural communities are also included in Core Area 1.

Environmental Stewardship Concepts, LLC *November 2015*

(HRI Factsheet 11-13-15, Page 1.) (https://semspub.epa.gov/src/collection/SC31186.)

CONCLUSION

In the United States' Reply Memorandum in Support of Motion to Enter Consent Decree, Civil Action Nos. 99-30225, 99-30226, 99-30227-MAP, EPA argued "the Court should enter the Decree because it is fair, reasonable, consistent with the statutory objectives, and in the public interest." (Page 2) (https://semspub.epa.gov/work/01/9243.pdf)

We ask the EAB to apply these standards to Region 1's Final Remedy. With these standards in mind, HRI believes the EAB should order EPA to choose the remedy most protective of public health and the environment, SED8/FP7. HRI believes the combined pressure of GE and the Commonwealth of Massachusetts has caused EPA to allow political influence to trump science. Region 2's far more comprehensive and thorough recent decision for the Passaic River will require the removal of 3.5 million cubic yards of toxic sediment from an eight mile section of the river. Region 1, rather than requiring the removal of 2,252,00 cy that SED8/FP7 requires is ordering only the removal of 890,000 cy.

We ask the EAB to affirm the recommendations of the NRRB, reminding Region 1 of its previous position: "**that habitat restoration and other impact reduction measures will be effective in meeting the requirements of the Commonwealth's endangered species law and therefore any impacts will be only short-term.**"

Re-emphasizing NRRB's concern that Region 1's endorsement of Institutional Controls is far less protective than removal coupled with comprehensive restoration: "The Boards note that **CERLA and the RCRA Permit identify protectiveness of human health and the environment as a threshold criteria that all remedies must achieve.** "Furthermore the NCP states that the use of **institutional controls should supplement (not substitute for) active response measures (e.g. ICs should not substitute for active response measures as the sole remedy unless such active measures are determined to be not practicable)**." (The National Remedy Review Board's October 20, 2011 Recommendations for the Housatonic River, Rest of River Site, Page 4, Emphasis added.).

At the least, HRI asks EAB to order Region 1, as CERCLA mandates, to "conduct an assessment of permanent solutions and alternative treatment technologies or resource recovery technologies that, in whole or in part, will result in a permanent and significant decrease in the toxicity, mobility, or volume" of the PCBs in the Rest of River.

We ask EAB to require Region 1 to implement the CERCLA imperatives for a thorough and rigorous appraisal of permanent solutions and alternative treatment technologies for Rest of River.

Should those pilot projects fail to substantially meet EPA's cleanup standards, we respectfully ask EAB to order EPA to institute Treatment/Disposal Option, TD5 as a critical part of the Final Remedy.

HRI and the public have lived with Region 1's unfortunate decision to choose landfilling at Hill 78 and Building 71 OPCA opposite an elementary school in Pittsfield, Massachusetts rather than treatment for the 2 Miles of the River. It is that decision that GE is relying upon as one of the primary reasons for its appeal. This time, we ask that the Environmental Appeals Board to ensure that Region 1 opts for treatment over landfilling in Berkshire County.

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ATTACHMENT: A SHORT HISTORY OF HRI
ATTACHMENT: PETITION