GE
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USA

April 27, 2007

Ms. Susan Svirsky
U.S. Environmental Protection Agency
c/o Weston Solutions, Inc.
10 Lyman Street
Pittsfield, MA 01201

**Re: GE-Pittsfield/Housatonic River Site
Rest of River (GECD850)
Dispute Resolution on Certain Conditions and Directives in EPA's "Conditional Approval" Letter for GE's Corrective Measures Study Proposal**

Dear Ms. Svirsky:

Pursuant to Special Condition II.N.1 of the Reissued RCRA Corrective Action Permit (the Permit) issued by U.S. Environmental Protection Agency (EPA) to the General Electric Company (GE) on July 18, 2000, GE hereby notifies EPA of GE's objections to certain conditions and directives set forth in EPA's April 13, 2007 letter relating to GE's February 2007 Corrective Measures Study (CMS) Proposal for the "Rest of River" portion of the Housatonic River. That letter stated that it was providing "conditional approval" of the CMS Proposal. At the same time, it set forth numerous conditions and directives relating to the performance of the CMS, including a requirement for submission of additional information and work plans.

By this notice, GE is invoking dispute resolution under Special Condition II.N.1 of the Permit with respect to certain of the conditions and directives in EPA's letter. Those specific conditions and directives, as well as GE's objections to them, the bases for GE's position, and the positions that GE believes should be adopted, are set forth in the attached Statement of Position. However, as also noted in that Statement, GE expressly reserves all of its rights to contest these or any of the other conditions and directives in EPA's April 13, 2007 letter – including its right, pursuant to Special Condition II.N.5 of the Permit, to raise any of its objections in a challenge to EPA's modification of the Permit to select corrective measures for the Rest of River, as well as any other rights that GE has under the Permit, the CD, or applicable law to raise such objections in the future.

As you know, the first stage of dispute resolution under the Permit involves discussions between the parties to attempt to resolve the disputes. GE looks forward to having those discussions with EPA in an effort to reach agreement on the disputed issues.

Very truly yours,

Andrew T. Silfer, P.E.
GE Project Coordinator

Attachment

cc: Dean Tagliaferro, EPA
Timothy Conway, EPA
Holly Inglis, EPA
Rose Howell, EPA (without attachment)
Susan Steenstrup, MDEP
Anna Symington, MDEP
Jane Rothchild, MDEP
Thomas Angus, MDEP
Dale Young, MA EOEA
Susan Peterson, CDEP
Michael Carroll, GE
Jane Gardner, GE
Roderic McLaren, GE
Kevin Mooney, GE
James Bieke, Goodwin Procter
Samuel Gutter, Sidley Austin

GENERAL ELECTRIC'S STATEMENT OF POSITION ON OBJECTIONS TO CERTAIN CONDITIONS AND DIRECTIVES IN EPA'S CONDITIONAL APPROVAL OF GE'S CORRECTIVE MEASURES STUDY PROPOSAL

April 27, 2007

INTRODUCTION

A. General

On February 27, 2007, the General Electric Company (GE) submitted to the U.S. Environmental Protection Agency (EPA) a Corrective Measures Study Proposal (CMS Proposal) pursuant to Special Condition II.E of the Reissued Resource Conservation and Recovery Act (RCRA) Corrective Action Permit that was issued by EPA to GE on July 18, 2000 (the Permit) as part of the comprehensive settlement embodied in the Consent Decree (CD) for the GE Pittsfield/Housatonic River Site. That Permit applies to releases of polychlorinated biphenyls (PCBs) and other hazardous constituents that have migrated from the GE facility in Pittsfield to the "Rest of River" area (as defined in the Permit and the CD).

On April 13, 2007, EPA sent GE a letter stating that EPA was providing "conditional approval" of the CMS Proposal, but also directing GE to take specified actions and adopt certain positions in the CMS, including to develop and submit, within 30 days, a supplement to the CMS Proposal (the Supplement) containing specified items for separate review and approval by EPA.

Pursuant to Special Condition II.N.1 of the Permit, GE is invoking dispute resolution on certain conditions and directives contained in EPA's conditional approval letter on the CMS Proposal, as detailed below. For the reasons set forth in this Statement of Position, EPA must reconsider those requirements. EPA has imposed conditions that are inconsistent with the express terms of the Permit and/or are not supported by the data, reasonable assumptions or analysis, and prior EPA positions.

At this time, GE is invoking dispute resolution only as to the specific conditions and directives identified in this Statement of Position. GE expressly reserves all of its arguments and all its rights to contest these or any of the other conditions and directives in EPA's April 13, 2007 letter – including its right, pursuant to Special Condition II.N.5 of the Permit, to raise any of its objections in a challenge to EPA's modification of the Permit to select corrective measures for the Rest of River, as well as any other rights that GE has under the Permit, the CD, or applicable law to raise such objections in the future.

B. Background

Under the Permit, the CMS Proposal was required to be submitted to EPA following the Agency's approval, under Special Condition II.D of the Permit, of the Interim Media Protection Goals (IMPG) Proposal submitted by GE pursuant to Special Condition II.C of the Permit, and following EPA's determination that the peer review process on EPA's fate, transport and bioaccumulation model of PCBs in the Housatonic River system has been completed and the model provided to GE. GE submitted the IMPG Proposal to EPA on September 5, 2005. On December 9, 2005, EPA disapproved the IMPG Proposal due to certain purported "deficiencies" identified by EPA. Thereafter, on January 23, 2006, GE invoked dispute resolution on EPA's disapproval of the IMPG Proposal, but proposed to stay the dispute pending certain events under Special Condition II.J of the Permit. On January 25, 2006, EPA sent a letter to GE agreeing to the terms of the proposed stay. GE revised and resubmitted the IMPG Proposal on March 9, 2006, and EPA approved the revised IMPG Proposal on April 3, 2006.

On November 29, 2006, EPA notified GE of EPA's determination that the peer review process on validation of EPA's model had been completed, and provided the model input and output files to GE. As a result, pursuant to the schedule set forth in Attachment B of the Permit, the CMS Proposal was due on February 27, 2007, and was submitted by that date.

C. The CMS Proposal and EPA's Conditional Approval

In accordance with Special Condition II.E of the Permit, the CMS Proposal identified the corrective measures that GE proposed to study in the CMS, and provided a justification for the selection of the corrective measures proposed for study and a description of the methodology proposed to be used in evaluating the corrective measure alternatives.

On April 13, 2007, EPA issued a letter to GE "conditionally approving" GE's CMS Proposal. EPA predicated its approval on 88 separate "conditions" set out in the letter, and directed GE to submit a Supplement within 30 days for EPA review and approval to address a number of those conditions, including work plans for additional activities not proposed in the CMS Proposal. As noted above, GE is invoking dispute resolution at this time only with respect to seven of the conditions and directives in EPA's letter, while reserving its rights under the Permit, the CD, and applicable law to raise any objections that GE may have to any of the conditions and directives set forth in that letter.

GE POSITION

1. EPA's Directive To Eliminate Two Types of Impacts from the Evaluation of Long-Term Adverse Impacts of Remedial Alternatives Is Contrary to the Permit.

In Condition # 77 of its April 13, 2007 letter, EPA directed GE to eliminate from the evaluation of potential long-term adverse impacts of the remedial alternatives in the CMS two types of potential impacts: (a) any adverse impacts on biota and their habitat, including impacts that might disrupt local populations or impair the sustainability of local populations; and (b) any long-term impacts on the natural environment and aesthetics, including consideration of the uses of the area for recreational or other activities. EPA's directive is contrary to the express terms of the Permit. In addition, EPA's directive is inconsistent with EPA guidance on evaluating remedial alternatives at contaminated sediment sites.

Special Condition II.G of the Permit sets out the general standards and decision factors to be used in the CMS for evaluating and comparing remedial alternatives for the Rest of River. In particular, Special Condition II.G.2.a(3) requires that the CMS evaluate the potential long-term adverse impacts of remedial alternatives on human health or the environment, as follows:

> a. Long-Term Reliability and Effectiveness:
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> * * *
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> (3) ***Any potential long-term adverse impacts*** of each alternative or combination of alternatives on human health or the environment, ***including (but not limited to)*** potential exposure routes and potentially affected populations, any impacts of dewatering and human health or the environment, any

> impacts on wetlands or other environmentally sensitive areas, and any measures that may be employed to mitigate such impacts. [Emphasis added.]

By its clear terms, this criterion requires GE to address, in the CMS, "any" potential long-term adverse impacts. While the Permit lists certain impacts to be considered, it is plain that those listed are only ***examples*** of the long-term adverse impacts that should be considered in the CMS, because the phrase "including (but not limited to)" demonstrates that the list is non-exclusive.[1]

Consistent with the plain meaning of the Permit, the CMS Proposal described several potential long-term adverse impacts of remediation that would be evaluated in the CMS:

> (a) any potential exposure routes resulting from implementation of the alternative and the resulting potentially affected populations; (b) any impacts of dewatering, treatment, and disposal facilities on human health or the environment; (c) any adverse impacts on biota and their habitat, including impacts that might disrupt local populations or impair the sustainability of local populations; (d) any long-term impacts on the natural environment and aesthetics, including consideration of the uses of the area for recreational or other activities; (e) any adverse impacts on wetlands or other environmentally sensitive areas resulting from implementation of the alternative; and (f) potentially available measures that may be employed to mitigate such impacts.

CMS Proposal (p. 5-41). As shown by this quotation, GE included all of the factors listed as examples in the Permit and proposed, in addition, to consider potential long-term impacts on biota and their habitat and on the natural environment and aesthetics, as described in items (c) and (d).

EPA's direction to excise items (c) and (d) is without support. The Agency cites no authority or basis for its change; EPA simply directs GE to disregard the two criteria. Moreover, EPA's direction is illogical. If, in fact, a remedial alternative ***would*** result in long-term adverse

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[1] *See St. Paul Mercury Ins. Co. v. Lexington Ins. Co.*, 78 F.3d 202, 206-07 (5th Cir. 1996) (the term "including" in a contract does not mean an exclusion of any nonlisted items but is read expansively to allow additional terms that fall within the general description found before the term "including"); *In re New Seabury Co. Limited Partnership*, 450 F.3d 24, 37 (1st Cir. 2006) (citing *St. Paul Mercury Ins. Co. v. Lexington Ins. Co.*); *Cooper Distrib. Co. v. Amana Refrigeration, Inc.*, 63 F.3d 262, 280 (3d Cir.1995) (by inserting "including, but not limited to" language in their contract, the parties, in effect, "unambiguously stated that the list was not exhaustive"); *Gismondi v. United Technologies Corp.*, 408 F.3d 295, 300 (6th Cir. 2005) (rejecting the interpretation of "including [but not limited to]" as exclusive, rather than inclusive, as "irrational"); Midwest Gas Users Ass'n v. F.E.R.C., 833 F.2d 341, 346 (D.C. Cir. 1987) ("including, but not limited to" contract language to be interpreted broadly); Rest. 2d Contracts § 202(3)(a), 203(e).

impacts on biota, their habitat, the natural environment, and/or aesthetics, that is plainly a consideration that the decision-maker should take into account.

Of course, it is premature at this stage to conclude which, if any, remedial alternatives may present these types of long-term adverse impacts. However, EPA may not arbitrarily preclude consideration of those potential effects.

It should also be noted that EPA's *Contaminated Sediment Remediation Guidance for Hazardous Waste Sites* (EPA, 2005a) generally supports the consideration of site-specific long-term adverse impacts of remedial alternatives on habitat. EPA noted therein that while the Agency's 1991 supplement to its risk assessment guidance addresses only human health risks, "it does note that remedial actions, by their nature, can alter or destroy aquatic and terrestrial habitat, and advises that this potential for destruction or alteration of habitat and subsequent consequences be evaluated and considered during the selection and implementation of a remedial alternative. . . . The short-term and long-term risks to human health and the environment that may be introduced by implementing each of the remedial alternatives should be estimated and considered in the remedy selection process. Generally, the types, magnitude, and time frames of risk associated with each alternative is extremely site specific" (EPA, 2005, p. 2-14).

2. EPA Erred in Directing GE To Use a Ratio of 5:1 To Convert Modeled Whole-Body Fish PCB Concentrations to Fillet PCB Concentrations.

As required by the Permit, the CMS Proposal stated that GE will use EPA's PCB fate, transport, and bioaccumulation model to estimate the future sediment, surface water, and fish tissue PCB concentrations resulting from the various remedial alternatives for addressing sediments. For fish tissue, the EPA model predicts whole-body fish tissue concentrations. However, since the IMPGs for human consumption of fish apply only to the fillets, the model-predicted whole-body concentrations need to be converted to fillet concentrations.

To estimate fillet PCB concentrations, GE developed a conversion factor equal to the ratio of whole-body to fillet PCB concentrations. To determine the most appropriate conversion factor, GE reviewed the available datasets for largemouth bass – one consisting of data collected by

EPA in 1998 and one consisting of data collected by GE in 2002. In both cases, fillets and offal were analyzed separately, and the results were then combined to reconstruct whole-body PCB concentrations. As noted in the CMS Proposal (p. 5-29, n. 31), there is considerable uncertainty in the comparison of the reconstructed whole-body and fillet PCB concentrations in the EPA dataset. As discussed further below, this uncertainty stems from the unrealistically low lipid levels in some of the EPA fillet samples and the high variability in the reported relationships between whole-body and fillet concentrations when that dataset is combined with the GE dataset. As a result, GE developed a conversion factor using only the 2002 GE dataset. Specifically, based on a regression analysis of the reconstructed whole-body versus fillet concentrations from that dataset, GE proposed a conversion factor of 1.7 (i.e., a ratio of 1.7 in whole-body concentration to 1 in fillet concentration). GE further noted that this value is similar to that obtained in other systems (Amrhein et al., 1999).

In Condition # 72 of its conditional approval letter, EPA stated that GE should not have excluded the EPA dataset. EPA stated that its analysis of the combined EPA and GE dataset, "excluding a small number of data points with questionable lipid results," indicates a "representative ratio" for largemouth bass of approximately 5. EPA asserted further that this value is consistent with other published studies (Burman and Rygwelski, 2006; RETEC, 2002), whereas the results of Amrhein et al. (1999) are not. EPA then directed GE to use a ratio of 5:1 to convert modeled whole-body largemouth bass PCB concentrations to fillet concentrations for comparison with the IMPGs for human fish consumption.

This EPA directive is unjustified for a number of reasons. First, it was reasonable for GE to exclude the EPA dataset from its calculation of a conversion factor. As previously discussed in the EPA-approved *RCRA Facility Investigation Report* (RFI Report) (BBL and QEA, 2003, Appendix D, Section D.3), the EPA dataset contains a number of fillet samples with extremely low lipid levels – in some cases, lower than can reasonably be expected based on fish physiology. Since the accumulation of PCBs in fish tissue is highly dependent on the lipid content of the fish (i.e., fatter fish have higher PCBs), the low fillet lipid levels in the EPA dataset led to lower reported PCB concentrations in the fillets. In fact, the RFI Report noted that the wet-weight PCB concentrations in fillets in the 1998 EPA dataset for Reaches 5 and 6 were 2.5 to 10 times lower than those in the 2002 GE dataset.

While EPA stated that its analysis excluded a small number of data points with questionable lipid results, the fillet lipid values in the overall EPA dataset appear to be anomalously low. This is indicated by a comparison of the fillet data with the offal and whole-body data in the two datasets. In the offal samples and the reconstructed whole-body data for the fish from Reaches 5 and 6, both the lipid contents and the PCB concentrations were very similar between the EPA and GE data sets. It was only in the fillets that the lipid levels and PCB concentrations were disparate – i.e., far lower in the EPA dataset. Moreover, the EPA data do not show a proportional relationship between the lipid levels in the fillets and those in the offal, unlike the GE data, which do show such a relationship (see Figure 1, top panel). The same is true for the wet-weight PCB concentrations in the two datasets (see Figure 1, bottom panel). These comparisons indicate that the low lipid values in the EPA dataset are suspect and may be a sampling artifact. This creates considerable uncertainty in calculating whole-body to fillet ratios from the combined EPA-GE dataset. If the PCB concentrations in the EPA fillet samples are biased low due to unrealistically low lipid contents, then the resulting whole-body to fillet PCB ratio will be biased high. In these circumstances, it was appropriate to rely on the values in the GE dataset in calculating a whole-body to fillet conversion factor.

In addition, because of the low lipid values in the EPA dataset, the ratios of whole-body to fillet concentrations in the combined EPA-GE dataset are so variable and uncertain that they cannot support selecting any particular ratio from the range of values in the combined dataset as “representative.”[2] As a result, it was arbitrary for EPA to simply select a ratio of 5:1 from that dataset and call it “representative.”

Similar considerations apply to EPA’s reliance on the literature to support that ratio. The whole-body to fillet ratios reported in the literature for other sites and various fish species fall into a very wide range, varying from 1 to 25, as shown in Table 1. Given this wide range and

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[2] An additional indication of the uncertainty in selecting an average or “representative” ratio from the combined dataset is provided by the fact that, due to the distribution of the data, the value of the average ratio depends strongly on whether one calculates the average of whole body to fillet (WB/F) concentrations or the average of the fillet to whole body (F/WB) concentrations. As an example, using all largemouth bass fillet and whole-body matched EPA and GE data together (excluding those fillet samples having lipid contents below 0.3%), the average value of WB/F PCB concentrations was 6.1, whereas the average value of F/WB was 0.41. The inverse of the ratio of F/WB is 2.4, a factor of 2.5 different from the average of WB/F. Thus, the selection of an average or “representative” ratio includes significant uncertainty due to how the ratio is calculated.

the distribution of these ratios, there is no basis for asserting that a ratio of 5 is "consistent" with these data but that the value of 1.7 is not. In fact, the median of the values in Table 1 is 2.0, which is much closer to the GE value of 1.7 than to the EPA value of 5. In any case, these literature values are too variable to support selecting any particular value, and indicate that the whole-body to fillet ratios are highly site- and species-specific. Again, in these circumstances, it was reasonable for GE to rely on the site-specific GE largemouth bass dataset, and it was unjustified for EPA to direct GE not to do so.

To the extent that reference to other sites is appropriate, it is more relevant to look at the whole-body to fillet ratios that EPA has used for bass at other sites. In that regard, the ratio used for largemouth bass at the Hudson River is 2.5 (TAMS, 2000), and that used at the Lower Grasse River for smallmouth bass is also 2.5 (Alcoa, 2001). These values are closer to the ratio proposed by GE than that specified by EPA.

3. The Lower-Bound Estimates of Zero Required by EPA for Backfill Material and for Mixing During Cap/Backfill Installation Are Unrealistic and Unsupportable.

In Condition # 65 of its conditional approval letter, EPA directed GE to conduct model simulations in the CMS using not only the values specified by GE for the model input parameters, but also alternative values for some parameters, to take account of the uncertainty surrounding such values. In subsequent conditions in its letter, EPA specified some of those alternative values. EPA also stated that it would specify alternative values for other parameters in response to GE's Model Input Addendum, which was submitted to EPA on April 16, 2007, to describe a number of inputs that were discussed more generally in the CMS Proposal.

GE currently disputes two of the alternative input parameters specified in EPA's letter – those for backfill material and for mixing during placement of backfill or caps. GE reserves the right to dispute any other alternative values specified by EPA in its response to the Model Input Addendum.

Estimated PCBs in Backfill Material

In the CMS Proposal, to represent the concentration of PCBs in materials used for backfill, GE proposed to use a value of 0.021 mg/kg, which represents one-half of the average detection limit from sampling of certain backfill sources used in remediation projects in non-River areas subject to the CD, and is the PCB concentration used for backfill in remedial evaluations for such areas. In Condition # 67 of its letter, EPA directed GE to also use a concentration of 0 mg/kg for backfill. That directive is unwarranted. GE anticipates using backfill with no detected concentrations of PCBs. That does not mean, however, that the backfill in fact contains no PCBs. For example, PCBs could be present from atmospheric or background sources. For such reasons, it is commonly accepted practice to use a concentration of one-half the analytical detection limit to represent non-detected compounds.

Indeed, in the *Statement of Work for Removal Actions Outside the River* (SOW), which is part of the CD, EPA and GE agreed that, to represent the PCB concentration in backfill material used for remediation of other areas of the CD Site, GE would use concentrations determined through sampling or, if non-detect, a value representing one-half the typical laboratory detection limit (SOW, Attachment E, pp. 10-11). Similarly, in the *Removal Action Work Plan for the Upper ½-Mile Reach*, which is also part of the CD, GE used one-half the detection limit to represent non-detect sample results in calculating the post-remediation spatial average PCB concentration in the top foot of sediments in that reach (see p. C-2). In short, GE has used this approach, with EPA approval, in ***all*** the remediation projects that have been conducted under the CD. There is no justification for EPA to depart from this precedent and direct GE to take a different approach in evaluating remedial alternatives for the Rest of River.

Estimated PCBs in Engineered Caps and Backfill Installed Through the Water

Condition # 69 of EPA's letter addressed GE's proposal for determining the initial post-remediation PCB concentration in the engineered cap or backfill material that is placed in the river through the water, either after dredging or without any prior removal. The CMS Proposal explained that the post-remediation concentration for such placed cap/backfill material will be based upon values that reflect the likelihood of mixing between the disturbed native sediment and the cap/backfill material during such activities. EPA directed GE not to assume such mixing during the placement of engineered caps or backfill, noting that GE had assumed no such mixing during the placement of thin-layer caps.

That directive is also unrealistic. As explained in the CMS Proposal, the reason why GE proposed this assumption for thin-layer capping is not that no mixing will occur, but that the model itself includes mixing processes in the bioavailable zone, which will serve to mix the thin-layer cap material with the native sediments. That is not true for the placement of engineered cap or backfill material through the water, because the thickness of that material in the simulated remedial alternatives will be much greater than the depth of the bioavailable zone in the model. During such placement, some mixing will inevitably occur and the resulting PCB concentration in the cap/backfill material needs to be specified as an input to the model.

While information on PCB concentrations in cap/backfill material placed under similar circumstances is limited, the available data indicate that some mixing occurs during such placement. For example, as discussed in detail in the Model Input Addendum, data from the Grasse River in New York indicate that a test of shallow dredging followed by capping resulted in a reduction efficiency of approximately 99 percent (i.e., a 99 percent reduction in the PCB concentration in the cap material relative to post-dredging, pre-capping concentrations), indicating that some limited mixing occurred (Alcoa, 2006).

EPA asserts that GE's preliminary work in capping Silver Lake sediments shows that proper placement of cap/backfill material (e.g., in thin lifts) can result in little to no mixing. However, that experience does not support EPA's position. The placement of a cap in a lake environment is different from installing a cap through the water in the flowing environment of a river, since the latter is a more dynamic environment in which the hydrodynamic forces in the river make it implausible that no mixing will occur. The Silver Lake pilot study is thus not directly relevant to installation of an engineered cap in the Rest of River, at least in the river channel.

For these reasons, it was unrealistic and unsupportable for EPA to direct GE to assume that no mixing with the underlying sediments will occur when cap or backfill material is placed through the water.

4. EPA's Directive To Increase Sediment Removal Depths to a Minimum of 2 to 3 Feet for All Alternatives Is Unnecessary and Unjustified.

The CMS Proposal identified eight sediment remediation alternatives for detailed evaluation in the CMS. For those alternatives involving sediment removal, the proposed depths of removal ranged from 1.5 feet to 3.5 feet in the channel and impoundments (1 foot in backwaters) or the depth to which PCBs have been detected at concentrations above 1 mg/kg. In Condition # 21 of its April 13, 2007 letter, EPA directed that, in general, GE should increase the depths of removal for all alternatives to a minimum of 2 to 3 feet, noting that the depth of removal "shall not be limited to the bare minimum required for engineering considerations, but must include a safety factor."

This increase in the depth of sediment removal is arbitrary and unnecessary. In the sediment remediation alternatives identified for the channel and impoundments, the proposed sediment removals to a depth of 2 feet or less are based on the approach of capping those areas to isolate the underlying sediments. Sediment removal is proposed in these areas prior to placement of the cap to provide compensatory flood storage capacity and/or to support future river uses. As a result, the depth of removal for these areas was based on an assessment of the depth necessary to accommodate the cap, and thus corresponds to the thickness of the cap.

The minimum thickness of the engineered caps proposed in the CMS Proposal for these areas ranged from 1.5 to 2 feet. This thickness was based on: (a) an isolation layer thickness of 12 inches; and (b) an armor stone layer of 6 to 12 inches to protect the isolation layer against erosive forces in the river. The 12-inch thickness for the isolation layer is consistent with the isolation layer thickness used for the Upper ½ Mile Reach Removal Action by agreement of the parties in the CD.

To determine an appropriate depth for the armor stone layer, GE estimated peak water current velocities using hydrodynamic calculations for storm events that occurred between 1980 and 1999. Estimated cross-sectional average velocities ranged from < 1 to approximately 6 feet per second (ft/s). The range of calculated velocities was then split into two categories, ≤ 3 ft/sec and 3 to 6 ft sec, to represent the maximum velocity anticipated in any particular area. Further, in order to account for increased water velocities anticipated at the outside of channel meanders and bends, the average channel velocity was multiplied by a factor of 1.3 (USACE, 1991). A widely accepted equation (Ishbash, 1935) was then applied to estimate the average armor stone size (i.e., D_{50}) necessary for resistance to flow-induced scour or the prediction of the incipient motion of bed materials based on the maximum anticipated water velocities. This calculation resulted in D_{50} values of 1.2 and 4.8 inches for the low- and high-velocity areas, respectively. The minimum allowable armor layer thickness is equivalent to the maximum stone size (D_{100}) (USACE, 1991). D_{100} can be calculated as 2 to 2.5 times D_{50} (NRCS, 1997). Conservatively using 2.5 times D_{50}, the estimated armor layer thicknesses are 3 and 12 inches for the low- and high- velocity areas. For constructability purposes, the 3-inch armor stone layer was conservatively increased to 6 inches.

Combining the 12-inch isolation layer and an armor stone layer of 6 or 12 inches, as necessary to provide scour protection, resulted in a total cap thickness of 18 to 24 inches, depending on the average maximum velocities of particular areas of the river. The sediment removal depths proposed for those areas under alternatives relying on engineered capping were thus proposed to correspond to the estimated cap thicknesses for those areas. Based on this engineering analysis, those removal depths are sufficient to accommodate the thickness of the caps. That analysis is already conservative; and there is no justification (and EPA offers none) to increase the removal depths as a “safety factor.”

With respect to the backwaters, the alternatives involving removals less than 2 feet (SED 6 and SED 7) included removal of sediments greater than specified PCB concentrations (10 mg/kg or 50 mg/kg) in the top foot, followed by capping or backfilling of those areas, and use of thin-layer capping in other areas with PCBs above 1 mg/kg. This proposal was based on the ground that, due to the very low-energy environment in the backwaters, there is no need for an armor layer, and thus a one-foot isolation layer for caps or a one-foot layer of backfill, depending on PCB concentrations, is sufficient. Again, given this analysis, there is no basis for requiring an increase in the depth of removal of the sediments with PCB concentrations exceeding the specified levels to accommodate the caps or backfill.

5. EPA's Directive To Increase Floodplain Soil Removal Depths to 3 Feet in Certain High-Use Areas Is Unnecessary and Unjustified.

The CMS Proposal identified seven initial floodplain remediation alternatives for detailed evaluation in the CMS, with the potential for adjustments to some of these alternatives based on comparison of the resulting average PCB concentrations to the applicable human health-based IMPGs, and with the potential for additional remediation to achieve levels considered protective for ecological receptors. All of these alternatives focus on the top foot of floodplain soil, since, given current and reasonably anticipated uses in the floodplain, that increment represents the reasonable maximum depth of soil to which human and ecological receptors would most likely be exposed. Nonetheless, in Condition # 24 of its April 13, 2007 letter, EPA directed that, for the floodplain alternatives involving soil removal (FP 3 through FR 7), GE must increase the depth of removal in certain "heavily used" areas identified in the CMS Proposal to three feet.

This increase in the depth of floodplain soil removal is unnecessary and unwarranted. EPA guidance indicates that remediation should be designed to achieve levels that are protective for current and "reasonably anticipated" future uses, based on "realistic assumptions" (EPA, 1995, p. 4). The "heavily used" areas identified in the CMS Proposal consist of certain recreational areas in the floodplain such as trails, access points, and known recreational areas (see CMS Proposal, p. 5-46). Although these areas are frequently used, it is not "reasonably anticipated" or "realistic" to expect that people would be digging soil in these areas to depths below one foot. These are recreational areas used for walking, parking, river access such as canoe launching, sporting activities, and the like. There is no evidence or reason to expect that people engaged in these activities would be digging holes, let alone excavating below the top foot.[3]

As an additional precaution, even if future excavations were anticipated in some areas, GE specified in the CMS Proposal that all the floodplain alternatives will include the use of institutional controls, including deed restrictions and Conditional Solutions, as necessary to

[3] In fact, in some of these areas (e.g., Exposure Area 40), although portions of the area may be considered "heavily used," other portions have been identified by EPA itself in its Human Health Risk Assessment as having "difficult access" (see, e.g., EPA, 2005b, Vol. IIIB, Figure 5-40).

address reasonably anticipated future uses that would not be addressed by the alternatives, including activities involving exposure to soil deeper than one foot (CMS Proposal, p. 5-44). EPA guidance provides for the use of institutional controls for such purposes (e.g., EPA, 2000). Moreover, the CMS Proposal specifically described the use of such controls for the floodplain. These include the use of legal deed restrictions, such as the Grants of Environmental Restrictions and Easements (EREs) that are prescribed in the CD for other parts of the GE-Pittsfield/Housatonic River Site, which can impose specific restrictions on future excavations. Indeed, the Commonwealth of Massachusetts, which owns a majority of the identified "heavily used" areas (through the Massachusetts Division of Fisheries and Wildlife), has agreed in the CD (Paragraph 62.b) that it will "not unreasonably withhold consent" to the placement of an ERE on Commonwealth-owned property at the Site.

In addition, for private non-residential properties where an ERE cannot be obtained, the CMS Proposal proposed the use of Conditional Solutions, as described in the CD for other areas of the Site, and EPA's conditional approval letter approved that proposal (see Condition # 55). A Conditional Solution requires GE to agree to conduct additional remediation in the future where necessary to accommodate future uses and activities by the property owner, provided that the property owner obtains any necessary governmental approvals for such futures uses and activities and provides documented evidence of a commitment to such uses and activities. The future activities covered by a Conditional Solution include excavations.

Given that (a) digging below one foot is not reasonably anticipated in the heavily used recreational floodplain areas and (b) EREs and/or Conditional Solutions can be used as an additional precaution to address such digging where necessary, EPA's directive to increase the depth of soil removal in those areas to three feet is neither necessary nor justified.

6. EPA Erred in Directing GE To Eliminate Use of EPA's Wood Frog Population Model in the CMS.

As noted above, GE explained in the CMS Proposal that, for each of the basic floodplain remedial alternatives based on human health considerations, GE will also evaluate the need for and scope of additional remediation to achieve protective levels for ecological receptors. In assessing the need for such additional remediation to protect local amphibian populations, GE proposed to use EPA's wood frog population model, with certain modifications, to evaluate and compare the effects of remedial alternatives on the amphibian population of the Primary Study Area (PSA) from the Confluence of the East and West Branches to Woods Pond Dam. In Condition # 13 of its April 13, 2007 letter, EPA directed GE not to use the wood frog model for this purpose, stating that the "wood frog population model is not appropriate for evaluating risks to the amphibian community as a whole." As discussed below, this directive is inappropriate and inconsistent with EPA's guidance and its own approach to assessing risks to amphibians in the Rest of River area.

As stated in EPA guidance, and as recognized in EPA's comments on the CMS Proposal (Condition # 8), the overall objective for ecologically based response actions is to "reduce ecological risks to levels that will result in the recovery and maintenance of healthy local populations and communities of biota" (EPA, 1999, p. 3). Given this focus on local populations and communities, rather than individual organisms, GE proposed an approach in the CMS Proposal to evaluate and compare the impacts of floodplain remedial alternatives on the local amphibian population. To make such an evaluation, GE proposed to use EPA's own wood frog population model, as described in EPA's Ecological Risk Assessment (ERA) (EPA, 2004, Vol. 5, Appendix A, Attachment E.4). That model was used in the ERA to evaluate the effects of PCB exposure on the long-term sustainability of the wood frog population in the PSA. Specifically, EPA used this model to demonstrate that the presence of PCBs in vernal pool sediments in the PSA increased the probability of wood frog population extinction by increasing the risk of metamorph malformations, which were assumed to result in mortality or sterility. This model thus provides a tool for assessing the effects of different remedial alternatives on the sustainability of the local wood frog population.

GE recognized that this EPA model was developed only for wood frogs and for the vernal pools in the PSA that were identified in the ERA as having suitable breeding habitat for wood frogs. However, GE observed that the ERA had based its development of sediment effects thresholds for all amphibians on data for wood frogs and had noted that those thresholds are protective for all amphibian species (see EPA, 2004, Vol. 1, p. 4-67; Vol. 5, p. E-144); and it observed further that the IMPGs for amphibians were likewise based on wood frog effects data.[4] As a result, GE proposed a procedure for extending the wood frog population model to all vernal pools in the PSA, based on the concept that since the wood frog data were used to set protective levels for all amphibians, the wood frog model can likewise be used to estimate effects on the overall amphibian population in the PSA (see CMS Proposal, Appendix C, p. C-8).

EPA's directive to eliminate use of the wood frog model from the CMS ignores this rationale, is inconsistent with EPA's use of the wood frog data to assess risks to amphibians, and unjustifiably deprives GE of a tool for assessing the impacts of remedial alternatives on the local amphibian populations. In evaluating risks to amphibians in the Housatonic River floodplain, EPA's ERA considered information on various types of amphibians. The stated goal of this assessment "was to determine the maximum concentration of tPCBs at which the resident amphibian populations are protected" – i.e., the "maximum acceptable threshold concentration (MATC)" for amphibians (EPA, 2004, Vol. 1, p. 4-66). In developing a sediment MATC for amphibians, EPA based that MATC solely on data from its site-specific wood frog study, and noted that that MATC "is believed to provide adequate protection for other amphibian species" (EPA, 2004, Vol. 1, p. 4-67; see also Vol. 5, p. E-144).[5] EPA then quantitatively assessed the risks to amphibians in different areas by comparing PCB concentrations in those areas to this wood frog-based MATC (EPA, 2004, Vol. 5, pp. E-146 – E-148). In addition, to further support its conclusion of risks to the local amphibian population, the ERA relied on the results from EPA's wood frog population model, which uses the same effects data used to establish the MATC (EPA, Vol. 5, pp, E-133 – E-140 & Attachment E).

Similarly, in the revised IMPG Proposal, GE noted that wood frogs were being considered as a representative species for amphibians; and consistent with the ERA and EPA's directions, GE

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[4] As noted in GE's comments on the ERA, GE does not agree with EPA's interpretations or conclusions relating to the wood frog study data, and believes that the resulting IMPGs for amphibians are overly conservative.

[5] In its December 9, 2005 comments on GE's initial IMPG Proposal, EPA reiterated that the purpose of the amphibian MATC "is to be protective of all species of amphibians," and that "[t]he wood frog effects endpoints from which the sediment MATC was derived are meant to serve as surrogate endpoints for the many amphibian species within the Housatonic River floodplain . . . ."

developed a range of IMPGs for amphibians generally (3.27 to 5.6 mg/kg in sediments) based on data for wood frogs (revised IMPG Proposal, pp. 46, 54-55). EPA approved that proposal.

With this background, it was entirely reasonable for GE to propose use of EPA's wood frog model to evaluate the effects of remedial alternatives both on the local wood frog population in the PSA and on the broader amphibian population in the PSA. That approach is consistent with proper focus of ecologically based remediation efforts on local populations of the biota in question. Moreover, GE's proposed procedure for extrapolating the model to all vernal pools in the PSA is justified on the ground that since the wood frogs effects data were used as a surrogate for assessing risks to all amphibian species, the risk of extinction of the PSA wood frog population, as demonstrated by the EPA model, can be used as a surrogate to estimate such effects on the overall PSA amphibian population.[6] The relationships used in the EPA model to relate PCB exposure to impaired larval and metamorph development are based on the same data used by EPA in the ERA to develop the MATC for amphibians, which constitutes the low end of the IMPG range. Since the MATC and the IMPGs developed from the wood frog data are considered by EPA to be protective of other amphibian species in the PSA floodplain, the underlying exposure-response data should also be considered appropriate for evaluating the risk of terminal extinction for these additional amphibian species. By the same reasoning, vital rates and other life history characteristics incorporated in the EPA model are assumed to be representative of other amphibian species utilizing the floodplain.

In addition, one of the modifications that GE made to the model for use in evaluating remedial alternatives was to adjust the model inputs to account for the impacts of temporary habitat destruction caused by remediation. This modification allows the model to be used to reflect not only the assumed impacts of PCBs, but also the impacts of active remediation on the amphibians' habitat. This is consistent with the Permit's requirement to take account of the short-term impacts of remedial alternatives on the environment (Special Condition II.G.2.d).

[6] EPA's Condition # 13 also directs GE to evaluate reduction in risks to amphibians in backwater habitats as well as in vernal pools. The same procedure described in the CMS Proposal for extending the model to all vernal pools in the PSA floodplain can also be adapted to extend the model to backwater areas.

In short, EPA's directive to drop the use of the model eliminates the method proposed by GE to take account of the overall impacts of remedial alternatives, both beneficial and adverse, on the local amphibian population in accordance with EPA guidance and the Permit. EPA's rationale for doing so is not justified. It has used, and directed GE to use, effects data on wood frogs as a surrogate for effects on other amphibian species and thus to support threshold effects concentrations deemed to be protective of all amphibians. However, it has refused to let GE use EPA's own wood frog population model, which is based on the same effects data, as a surrogate to evaluate and compare the population-level impacts of remedial alternatives on all amphibians in the floodplain.

7. EPA Is Entitled to Additional Time To Submit the CMS Report.

Attachment B to the Permit provides that the CMS Report is due within 180 days of EPA's approval, conditional approval, or modification of the CMS Proposal, "or pursuant to an alternative schedule in the approved, conditionally approved or modified CMS Proposal." EPA's "conditional approval" letter states that the letter "initiates GE's requirement to submit the [CMS] Report within 180 days" (p. 19).

In its April 13, 2007 letter, EPA directed GE to conduct more work than was described in the CMS Proposal, and in fact to submit work plans for additional work that will affect the conduct and timing of the CMS. In these circumstances, GE believes that it was inconsistent with the Permit for EPA to start the 180-day clock until after GE submits, and EPA approves, the additional work plans and analyses that EPA has required GE to provide in the Supplement. Rather, GE believes that EPA had an obligation to provide an "alternative schedule" for conducting the CMS or to direct GE to propose such an alternative schedule for EPA's consideration and approval.

GE is evaluating the time needed to complete the CMS and will request a specific extension from EPA. GE is raising this issue in this proceeding to establish the need for some additional time to conduct the CMS, and to preserve GE's position while considering the specific length of time that GE will need to complete the CMS.

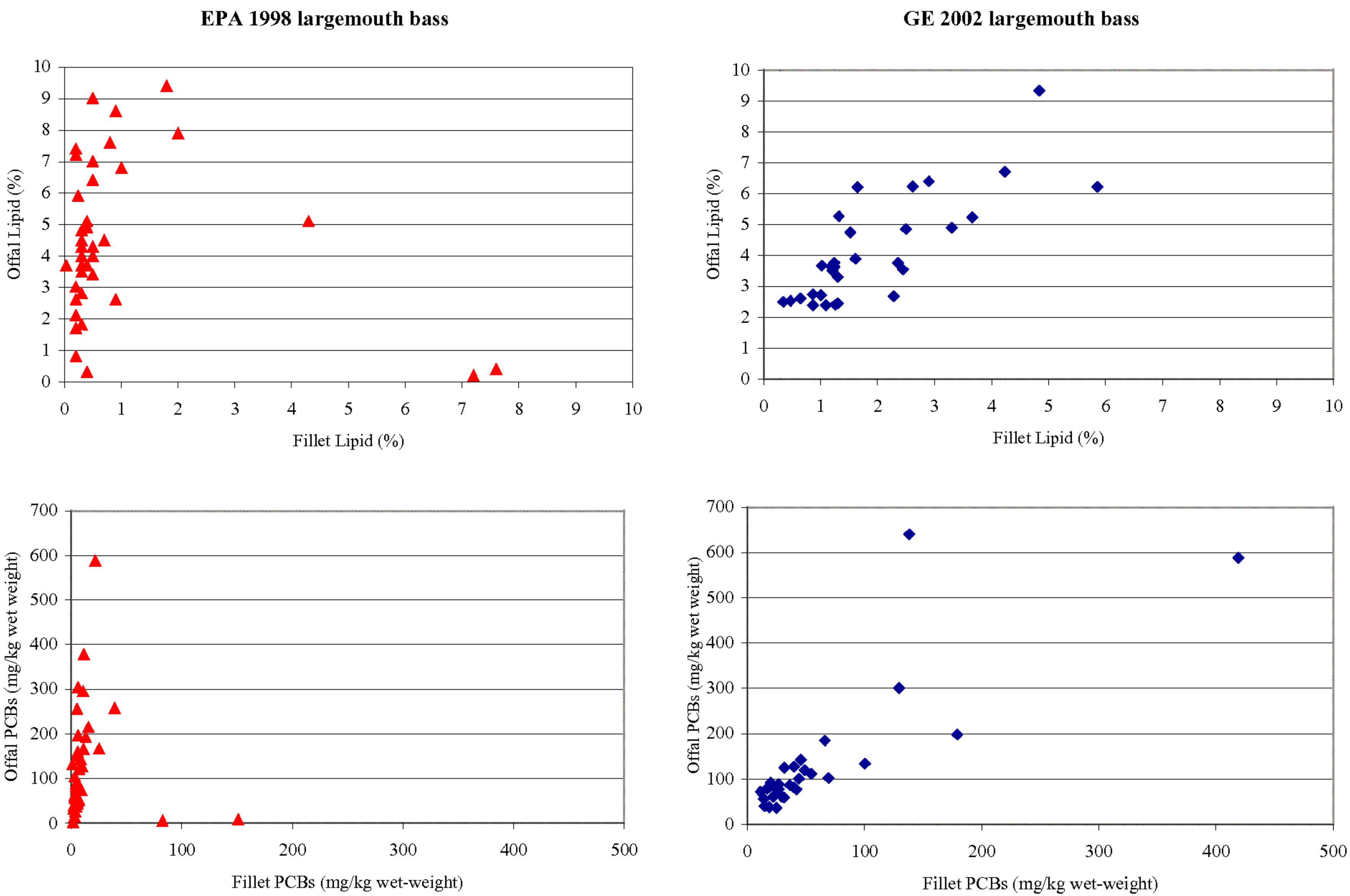

Figure 1. Comparisons of lipid content and PCB concentrations of largemouth bass fillet and offal samples from the 1998 EPA and 2002 GE sampling programs.

Notes: Figure reproduced from Figure D.3-3 of the RFI Report (BBL and QEA, 2003).
EPA data from Reaches 5, 6, and 8. GE data from Reaches 5B and 6.

Table 1. Average Values for the Relationship Between Fillet and Whole Body PCB Concentrations

Source	Species	Collection Location	Whole Body/Fillet mg PCB/kg wet
Amrhein 1999	Coho salmon	Lake Michigan	1.7
Amrhein 1999	Rainbow trout	Lake Michigan	1.5
Bevelheimer et al. 1997	Largemouth bass	Sites in TN and OH	2.3
Bevelheimer et al. 1997	Spotted bass	Sites in TN and OH	5.8
Bevelheimer et al. 1997	Channel and blue catfish	Sites in TN and OH	1.6
Lieb et al. 1974	Rainbow trout	Laboratory-dosed	2.9
Burman and Rygwelski 2006	Lake trout	Great Lakes	1.5
Niimi and Oliver 1983	Rainbow trout	Laboratory-dosed	2.8
Rottiers et al. 1982(1)	Salmon	Unknown	1.6
Parkerton et al. 1993	Channel catfish	Lake Erie	1.7
Parkerton et al. 1993	Drum	Lake Erie	3.1
Parkerton et al. 1993	Yellow perch	Lake Erie	25.0
Parkerton et al. 1993	Coho salmon	Lake Erie	1.1
Parkerton et al. 1993	Walleye adult	Lake Erie	11.1

Notes

Only studies in which paired fillet and carcass samples from the same individual were collected are included.

All values reported in RETEC 2002 were included here, except for Lower Fox River data, which do not represent matched fillets and offal from the same fish. Bevelheimer (1997) values recalculated from original source.

Burman and Rygwelski 2006. Values from Fox River excluded; these do not represent matched fillet and offal from the same fish. Lake trout value from Michigan Dept. of Environmental Quality. Original source not consulted. All other values presented in Burman and Rygwelski (2006) are included herein.

Rottiers et al. 1982(1): Referenced by Stow and Carpenter (1994). Original source not consulted.

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