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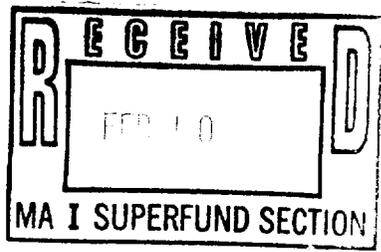
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February 3, 1997



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Re: Proposed Phase II Cleanup Plan for Upper and Lower New Bedford Harbor (November 1996)

Dear Mr. Dickerson:

We are pleased to submit these comments on behalf of General Electric Company ("GE") to the United States Environmental Protection Agency's ("EPA") November 1996 "Proposed Cleanup Plan, Upper & Lower New Bedford Harbor" ("Plan").

GE's comments are directed to two significant aspects of the Plan. First, the Plan does not present in a clear and straightforward manner enough information to allow one to assess whether the \$116 million proposed remedy will actually reduce risk to human health or the environment materially faster than would naturally occur or would occur using alternative remedial approaches. The Plan appears to equate the removal of PCBs from the Harbor with a reduction in risk to human health or the environment, but it fails to demonstrate that dredging on the scale proposed will actually achieve risk-based goals materially faster than taking no action or following some other remedial course. Removing contaminated sediments is not necessarily equivalent to risk reduction, and the significant costs and intrusive nature of remedial dredging cannot be justified if the project will not significantly advance the course of natural recovery and attain conditions that are protective of human health and the environment. Second, the brevity of the Plan and its many unsupported conclusions about the likely effectiveness of the proposed remedy suggest that the Agency has not considered adequately either the technical challenges

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involved in remedial dredging or the viability of capping the contaminated sediments. We address each of these issues in turn.<sup>1</sup>

I. The Plan Fails to Present Sufficient Information Showing that the Proposed Remedy Will Reduce Risk to Protective Levels Materially Faster Other Alternatives, Including No Action

The Plan does not candidly and straightforwardly set out the basic elements by which any remedial course of action should be judged and justified. The Plan identifies four problems that the proposed remedy is intended to address (1) unacceptable levels of PCBs in fish and shellfish, (2) the impaired ecological health of the Harbor and its biota, (3) export of PCBs from the Upper to the Lower Harbor, and (4) direct contact with exposed contaminated sediments. Plan at 5. These problems essentially boil down to concerns about protection of human health and the environment, as they should under Superfund. There is a clear analytical framework for addressing the effectiveness of remedial alternatives at contaminated sediment Superfund sites which can be applied here:

1. What is the level of the contaminant in sediment, water column and aquatic biota that will protect human health and other biota?
2. When and at what cost will the various remedial alternatives, including no action or natural recovery, reach these protective concentrations?
3. What are the adverse or detrimental effects associated with each remedial alternative?
4. After weighing the estimates for each remedial alternative provided by the answers to the second and third questions, is there a remedial alternative that one is confident will achieve its predicted result that is materially more beneficial and cost-effective than no action or natural recovery?

The proposal to spend \$116 million requires that these basic questions be answered with some care and precision. If answered, one should be able to determine the effectiveness of the various remedial alternatives in addressing the four problems EPA has identified at the Site. The Plan, however, does not set out clearly whether the proposed remedy or any of the other alternatives

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<sup>1</sup> Our comments are addressed to the eighteen page Plan. We initially thought this was only a synopsis of a larger plan, but on inquiry were informed that this was the Plan. If this information was incorrect, we would appreciate receiving a copy of the Plan or other document that lays out the basis for the Agency's remedial proposal.

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will actually fix these problems, nor does it allow one to apply the analytical framework to determine the appropriateness of moving forward with the proposed remedy for New Bedford Harbor. Indeed, the Plan indicates that the proposed remedy will get closer to but ultimately will not attain PCB levels in sediment, water and biota that are protective of human health or the environment. If the remedial objectives are not reached, it is not evident what the benefit of the proposed remedy will be.

The first question in the analytical framework is directed at the central objective of the remedy. In the case of New Bedford Harbor, what level of PCBs in sediment, water column and aquatic biota will be protective of human health and the environment? This needs to be directly and forthrightly expressed. It is not.

Let us focus on human health as an example. The Plan gives a site specific fish tissue criteria of 0.02 ppm, which is said to differ from the 2 ppm FDA tolerance level because the FDA concentration "is based on national patterns of seafood consumption, whereas the Site specific fish tissue criteria . . . is based on local consumption rates which are more frequent than the national average." Plan at 14. The Plan does not make clear whether the objective is 2 ppm or 0.02 ppm. One would normally assume that the site specific criteria would be the objective, but the statements of what the proposed remedy may achieve are stated in terms of the FDA level: "Computer modeling does suggest . . . that PCB levels in many commercially important species would be well below the FDA criteria of 2 ppm at the 10 year mark" (Plan at 5), and "Although the FDA tolerance level may not be achieved at the ten year mark for all biota in all portions of the Site with a 10 ppm and/or 50 ppm TCL . . ." Plan at 14.

One needs to know what the remedial objective is in order to make judgments about the remedial alternatives. Although GE does not necessarily agree that either the FDA tolerance level or the site specific criteria is an appropriate cleanup goal for the Site, the Plan needs to set out the Agency's views clearly. If EPA does not think that 2 ppm PCBs in fish is protective, it should say so and set out the basis for its opinion. If the Agency thinks that 2 ppm is protective, it should explain why a site specific criteria two orders of magnitude more stringent is not applicable. If EPA is not using either figure as a remedial objective, but is aiming to achieve some variation of restricted fish consumption, that should be plainly stated, and the rationale behind it spelled out.

The importance of clarity with regard to the remedial health protection objective is underscored when the second question is addressed: when and at what cost will the health protective level in fish be met? The Agency seems to have considerable doubt that the objective will be met, as reflected in the statements quoted above and confirmed by the proposal to waive the FDA tolerance level as an ARAR. Plan at 4. The FDA ARAR would not be waived if it could be met. If the remedy may not meet 2 ppm, it clearly will not meet 0.02 ppm.

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This poses very blunt questions. Will this \$116 million remedy protect human health? If so, how and to what extent? Will it result in an opening of the fishery and the lobster beds in the Harbor? What degree of confidence does EPA have in its answers to those questions? If it is the Agency's opinion that human health is protected at 1x ppm in fish tissue, and the proposed remedy reduces levels in the fish tissue from 10x to 2x, it seems apparent that the remedy should be rejected as failing to meet its objective. Yet, EPA apparently believes that even if that objective is not attained, the remedy will be worthwhile. See Plan at 14 ("Although the FDA tolerance level will not be achieved . . . water quality will significantly improve and a corresponding reduction in the PCB biota levels is expected"). Spending \$1 or \$100 million to approach but not attain an objective is not cost-effective because it is not effective; it is arbitrary, capricious and a waste of money. The analysis becomes more complex if one concludes there is a five or ten percent likelihood of reaching the remedial objective. The degree of confidence in the success of the remedy needs to be analyzed and weighed openly. The Plan is flawed because it does not permit one to discern what EPA predicts will actually be achieved in terms of human health protection and what the Agency's level of confidence in these predictions is.<sup>2</sup> It is essential to rational judgment that this be set out clearly and its basis explained. It is equally essential that the preferred remedial alternative be compared other remedial alternatives, including no action or natural recovery. For instance, if clean sediment is covering PCB contaminated sediment, it may well be that over twenty or thirty years equal benefits would be derived from either course.

The adverse effects of the various remedial alternatives are also laid out so cryptically and without explanatory support that sound judgment as to this issue is not possible.

Finally, it is not possible to reach an informed and rational judgment as to the final question which compares the alternatives because, as we have shown, the basis for making the comparison is lacking. Equally important, the Plan does not allow one to determine whether any of the remedial alternatives will fix the four problems identified on page 5 of the Plan. EPA is fully capable of doing the sort of analysis needed at the Site. We draw your attention to work the Agency did in examining the Buffalo River in New York under the Great Lakes National Program Office's Assessment and Remediation of Contaminated Sediments Program: Comparative Human Health and Wildlife Risk Assessment: Buffalo River, New York, Area of Concern, EPA 905-R-95-008 (May 1995). It is not apparent from the Plan, however, that EPA has conducted this sort of careful analysis at New Bedford Harbor. If it has done that work, the Plan does not present it

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<sup>2</sup> It does not appear that the environmental protective level will be achieved in light of the Plan's statement at page 18 that "the TCL choice essentially comes down to 10 versus 50 ppm PCBs. EPA recognizes that the ecological risk assessment concludes that a TCL range of 0.1 to 1 ppm PCBs is appropriate to protect the marine ecosystem." This suggests that the proposed remedy will not achieve either human health or environmental protection.

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candidly or straightforwardly to the public and effectively makes intelligent comment on the basis of the Plan impossible.

Indeed, the Plan appears to adopt the fallacious proposition that mass removal of PCBs is, in and of itself, an attainable objective which justifies the expenditure of \$116 million. Mass removal that does not attain the risk reduction goals of human health and/or environmental protection is not rationally justified. This important point deserves some further explication. Mass removal of contaminants sounds like a sensible and beneficial objective, but, as the limited data presented in the Plan itself indicate, this premise is mistaken. Evidence at a number of sites shows that there is no necessary or clear causal relationship between the mass of PCBs removed and reduction in risk to human health or the environment, typically measured by fish contaminant levels. While counterintuitive, this conclusion makes sense in light of the dynamics of bioaccumulative contaminants, such as PCBs, in aquatic systems.

- At many sites, sediments were contaminated years ago as a result of long abandoned waste handling practices. As a result, most of the PCBs are now found in depositional areas because PCBs initially deposited in non-depositional areas have eroded. In these depositional areas, however, more recently deposited, cleaner sediments have buried the older, more contaminated sediments.
- The PCBs found in aquatic organisms are typically derived from the surficial sediment, not from the deeper portions where the bulk of PCBs are likely found.
- Although fine grained sediments in depositional areas may contain a greater proportion of PCBs on a mass basis than coarse grained sediments in non-depositional areas, bioavailability is not necessarily related to the mass of PCBs present. For PCBs, bioavailability in surface sediments is largely controlled by the amount of organic carbon in the sediments; the higher the organic carbon level, the less bioavailable the PCBs. As a general rule, although finer grained sediments have higher levels of contamination than coarser sediments, they also have higher levels of organic carbon than coarser sediments. The relative bioavailability of PCBs in depositional (fine grained) and non-depositional (coarse grained) areas, therefore, are generally comparable.
- In light of their bioaccumulative nature, PCB concentrations in surficial sediment and/or a water column must be at consistently low levels in order to achieve protective concentrations of PCBs in the tissue of edible fish. There are immense practical difficulties in reducing sediment and water column concentrations that low.

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As a result, it does not follow that a program designed to remove the mass of PCBs will effectively reduce PCB levels in biota or attain risk reduction goals. Although difficult to discern from the Plan, the New Bedford dredging program appears to be aimed at fine-grained sediments where more of the PCBs are present, but will probably leave in place the coarse-grained sediments, where PCB levels are lower but may be equally bioavailable. The difficulty and adverse effects of attempting to reach low PCB concentrations in the sediment and water column are recognized in the discussion and rejection of a remedy that would achieve a 1 ppm target cleanup level ("TCL"), which makes it plain that the connection between the mass removal of PCBs selected in the Plan and the attainment of protection of human health and the environment is dubious at best.

In short, attaining protection of human health and the environment -- "risk reduction" -- is the appropriate objective for EPA's remedy, not mass reduction and removal. It is essential that the objective of the remedial action for the New Bedford Harbor be clearly defined in terms of benefit to human health or biota and that alternative remedies be measured against that objective. It is inappropriate to use mass removal of PCBs as a proxy for protection of human health or the environment.

When the gloss of "mass removal" is taken away, it is not clear what benefits EPA hopes to obtain through the proposed remedy. Indeed, the chart on pages 10 and 11 of the Plan presents a misleading picture of the likely benefits of the various remedial alternatives. For example, while the chart indicates that dredging will protect human health or the environment, the text of the Plan makes it clear that protective levels may never be reached. The chart also indicates that "no action" will not protect human health or the environment, but the Plan does not present sufficient information to allow one to conclude that the dredging remedy will be more protective than no action.

The only measure of success for a proposed remedy of this size, scope, complexity and cost will be PCB concentrations in water and aquatic biota after completion of the project. The Plan, however, does not discuss whether and how EPA intends to determine whether the proposed remedy will meet the cleanup goals -- lower levels of PCBs in sediment water and fish -- or test whether true remedial objective are met -- concentrations of PCBs in fish which are protective of human health or the environment. EPA, itself, has recognized that on projects of this size and expense, monitoring is essential to assess the success of its proposed remedy:

The remediation of Superfund sites can be very expensive. Therefore, it is important to assess the effectiveness of the remediation process and to document the environmental benefit gained for the money spent. One method for accomplishing this is to monitor the site before and after remediation. . . . First, specific

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environmental goals must be clearly articulated and understood prior to designing an effective monitoring program. Second, the monitoring program should provide the information necessary for managers and/or scientists to make site-specific assessments of whether or not the goals were attained. Finally, the experimental design should be both statistically rigorous to allow for quantitative assessments and flexible enough to accommodate changes over time.

New Bedford Harbor Long-Term Monitoring Assessment Report: Baseline Sampling, EPA 600/R-96/097 (Oct. 1996) at 1. EPA must clarify how it intends to measure the success of the remedy and whether it intends, as it should at this site, to establish a rigorous and detailed monitoring program.

The Plan also does not set out whether or how EPA will determine that the TCLs have been achieved. Is the Agency simply intending to remove sediment to a pre-determined depth, or will it take verification samples to determine that the TCLs have been achieved and, if not, proceed with another dredging pass? Given the size, scope and complexity of the proposed remedial plan, EPA should rely on verification sampling because it is the only way the Agency can have any assurance that the TCLs have been met.

Finally, the Plan does not discuss or present any evidence to show whether the proposed \$116 million dredging remedy will actually reduce risk faster than other alternatives, including "no action." The Plan simply states that computer modeling "suggests that PCB levels in the water column will drop to levels at or below EPA's chronic water quality standard of 0.03 ug/l . . . for marine life approximately 10 years after remediation to the cleanup levels proposed herein." Plan at 5. Similarly, the modeling apparently "suggests" that many, but not all, "commercially important" aquatic species will be at or below the 2 ppm FDA criteria 10 years after completing the remedy. Id. Given that the remedy is expected to take at least eight years to complete, it will be at least 18 years before the remedy may have achieved these results. The Plan, however, does not state how long it would take to reach these same levels in water and seafood if other alternatives were chosen or no action were taken. Moreover, by repeatedly using the phrase "computer modeling suggests," EPA does not appear to have much confidence in its computer modeling and thus cannot state with any assurance that its proposed remedy will reach these levels. A thorough comparative analysis is necessary to justify the proposed \$116 million investment.

The Buffalo River study is a good example of the comparative analysis required at this site. Moreover, it demonstrates that using mass removal by dredging as a proxy for true risk reduction does not withstand close scrutiny in many cases. In that study, EPA's modelers

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compared PCB levels in water and biota after 10 years under various remedial alternatives, including remedial dredging. The modeling compared half a dozen remedial alternatives and concluded that:

Sediment remediation **will not** have a significant impact on reducing water column contaminant exposure. Environmental or full dredging of bottom sediments will not alleviate water column concentrations for the five chemicals examined. Also, the potential to exacerbate the water column problem still exists with these dredging options by exposing higher contaminated sediments in deeper layers.

Comparative Human Health and Wildlife Risk Assessment: Buffalo River, New York, Area of Concern at 3-8 (emphasis in original). In fact, the modeling showed that after ten years, PCB concentrations in carp would be virtually the same under any of the alternatives considered, including no action.

To justify a remedial decision on a rational basis, EPA must conduct a similar analysis at New Bedford; without such an analysis, it is impossible to assess whether EPA's proposed remedy is justified. When such an analysis is complete, the public deserves to have it candidly presented. The Plan does not do this. The Plan also does not discuss whether EPA intends to implement a long-term monitoring plan to determine the success of its proposal or whether the Agency will use verification sampling to assess the attainment of the TCLs. All these issues must be presented to provide EPA with the benefits of open, robust and intelligent review.

II. The Plan Does Not Adequately Consider the Technical Difficulty of Remedial Dredging and Overstates the Problems of Remedial Capping

Not only is EPA's justification for the dredging remedy insufficient, its faith in the likely success of this remedy is unwarranted. Experience at this and other sites shows that remedial dredging projects are difficult to perform, typically cost more than projected, and do not usually attain their TCLs when the concentration numbers are low. Casting aside these failures, the Plan simply assumes that dredging the Harbor sediments is both technically feasible and will be able to achieve the proposed TCLs. Although the proposed project is four times larger than the largest conducted to date (Bayou Bonfouca, LA) and at least 14 times larger than the largest PCB remedial dredging program to date (Waukegan Harbor, IL), EPA has not presented any data to show that the project it is proposing will actually succeed in meeting the goals the Agency has set.

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The Plan includes several statements suggesting that EPA has not carefully considered the technical challenges and complexities posed by a remedial dredging project of the size proposed. For example, the Plan summarily concludes that of all the alternatives considered, remedial dredging to the TCLs strikes the "best balance between implementability, protectiveness and cost. Moreover, from an operational or short-term effectiveness standpoint, all of the proposed remedy's main features (dredging, CDF disposal, and water treatment) are proven technologies for applications of this type." Plan at 18 (emphasis added). There is no analysis or data in the Plan, however, supporting these conclusions, and the limited data that do exist suggest that remedial dredging is not a technology that has been proven to be successful. The Plan also suggests that Upper Harbor salt marshes may require dredging, and that such dredging may be conducted "by a less intrusive method such as clamshell bucket." Plan at 6. Not only are clamshell buckets not "less intrusive," it may prove extremely difficult to position standard dredging equipment in these areas. Finally, the Plan glosses over the capacity limitations of the existing wastewater treatment facilities that EPA apparently encountered during the hot spot dredging program; the increased level of dredging proposed in the Plan suggests that EPA may not have adequate capacity for treatment of dredge spoils during the proposed project.

EPA's own experience with remedial dredging projects at this and other sites, in fact, demonstrates that they are typically more expensive than originally estimated and consistently fail to achieve their stated goals of removing contaminants to pre-determined "safe" levels. Although the previous hot-spot dredging in New Bedford was intended to reduce PCB concentrations to established risk-based levels, post-dredging monitoring revealed that the project did not come close to achieving these goals. Indeed, it is not clear, what, if any benefit to human health or the environment resulted from the hot-spot dredging program, which simply resulted in removing a large amount of PCBs from the Harbor. A similar failure to achieve project objectives was experienced in the Grasse River (Massena) in New York. There, the sediment cleanup levels were not met everywhere even after making several dredging passes. In addition, a remedial dredging program in the Saint Lawrence River (Massena), New York, required multiple passes with various dredge equipment and still was not able to attain the target levels in many areas. This dredging occurred in quiescent conditions behind sheet piling which allowed much more aggressive dredging than would occur in the open environmental setting of New Bedford Harbor. EPA's confidence in the feasibility and likely success of the massive remedial dredging project it is proposing, therefore, is belied by its own failed attempts at much smaller remedial dredging projects. In light of the problems identified above, the Plan has likely underestimated projected costs and overestimated the benefits of the proposed program.

The Plan's assumption that remedial dredging is feasible and will successfully reduce levels of contaminants in sediments also appears to have created a bias against using a cap to control the bioavailability of PCBs. In fact, the comparison between dredging and capping remedies in the Plan clearly tilts the table against capping. For example, while dredging in the

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Lower Harbor is apparently limited to 10.5 acres, the capping alternative for the Lower Harbor set out in the Plan encompasses approximately 170 acres (Plan at 8). In addition, while the Plan appears to make the questionable presumption that dredging will meet or exceed human health and environmental protection criteria (Plan at 10-11), the Plan also concludes that the capping alternative will not meet these criteria (Plan at 10), even though capping would likely result in PCB concentrations at the surface far below those EPA hopes to achieve through dredging. Likewise, it is not clear why the proposed remedy, which is expected to take eight years to complete, is deemed to meet or exceed the criteria for short-term effectiveness (Plan at 10-11), while capping, which would probably not take as long to complete, is not (Plan at 10). Finally, the Plan rejects capping on the grounds that it would be difficult to maintain (Plan at 13), but it ignores the possibility of using navigational dredge material as the source of cap material, as was successfully done in a similar environmental setting at the Eagle Harbor Superfund Site in Washington State. In short, the Plan seems to stack the deck against capping, identifying barriers to its success, while ignoring similar or worse problems with respect to the complex and large dredging remedy that the Agency is proposing.

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GE is concerned that EPA has made two fundamental errors in supporting its proposed dredging project. First, the Agency does not appear to have examined with sufficient care and analytical rigor whether the proposed remedy will reduce risk, as measured by PCB levels in aquatic biota, to levels protective of human health and the environment and whether such reduction will be achieved substantially faster than the no action alternative. Instead, faced with sediments contaminated with highly bio-accumulative PCBs and the likely impossibility of taking action to reduce PCB concentrations to levels protective of human health or the environment, the Plan seems to reach for the intuitive, yet fallacious, conclusion that removing a lot of PCBs from the Harbor is by itself beneficial. As we show above, this simplistic solution does not withstand scrutiny. Second, ignoring the Agency's own past experiences with remedial dredging, the Plan appears to assume that remedial dredging is both feasible and will attain the cleanup goals the Agency has established. GE urges EPA to reconsider its mistaken faith in remedial dredging and, before moving ahead with the proposed project, present a supportable and documented conclusion that the substantial costs of the project will actually protect human health and the environment. In light of the size, scope and projected costs of the proposed remedy, if the Agency does proceed, it should conduct verification sampling to determine whether sediment concentrations are at the TCLs and institute a long-term monitoring program to assess whether the cleanup objectives have been achieved.

Very truly yours,



Angus Macbeth  
Thomas G. Echikson