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U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
OFFICE OF OCEANOGRAPHY AND MARINE ASSESSM
OCEAN ASSESSMENTS DIVISION
HAZARDOUS MATERIALS RESPONSE BRANCH
c/o U.S. Environmental Protection Agency
Waste Management Division - HSL-3
J.F. Kennedy Federal Building
Boston, MA 02203
4 June 1990

Ms. Mary Sanderson
U.S. EPA Waste Management Division
J.F. Kennedy Federal Office Building
Boston, MA 02203

Dear Mary:

The major issue of this correspondence is to comment on the selection of alternatives that have been proposed for remediating the portion of the contaminated sediments that will eventually be treated. In addition, some discussion on a "hybrid" remedy is included.

As I discussed previously (letter dated 14 May 1990), there is some concern at the New Bedford Harbor site that the selection of the target clean-up levels (TCL) are higher than might be justified if the available economic analyses were pursued further. I have received a very rough estimate of the economic value of the fisheries that might remain closed for some time to come. In summary, the approximate 100-year value of the recreational fishery lost due to PCB contamination for a projected is 50 million dollars while the commercial loss is about 10 million dollars. This 60 million dollar total should be considered when determining the TCL.

In discriminating among the alternatives, it is really weighing the risks against the costs that is important. Each of the alternative offer some advantages and disadvantages, discussed below. By and large, most of these factors were discussed in the FS as the alternatives were evaluated. I have attempted to identify those that seem particularly relevant to NOAA's concerns with the threat to natural resources.

1. No action. This alternative offers only the advantage of lower costs.

2. Capping. This is also one of the lower cost options and costs are probably its major advantage. Because of the cost factor, it could also be considered an advantage that the areas that would actually be "treated" with this option might be greater than with the others because it will be more likely that the capping will be done conservatively, i.e., covering more bottom. Another advantage is that if cap failure occurs (see below), it would be relatively simple, in principal, to correct the failure *if* that can be accomplished by adding more cap material. In reality, it may be more difficult to achieve repair, at least in some areas, e.g., within a navigable waterway where further reductions in bottom depth would disrupt boat traffic. Another advantage of capping over the other action alternatives is that it should result in less permanent habitat changes because no shoreline facilities would be required. Finally, more creation of intertidal and shallow subtidal environments through capping may be looked upon as both an advantage or disadvantage depending upon the specific species of interest.

There are a number of disadvantage of capping. The technology is untried over the long-term, although the theoretical considerations indicate that as long as the cap is not physically disturbed, it should be effective indefinitely. The larger issue issue is whether in fact that cap could be kept intact for the foreseeable future (hundreds of years?) and, related to that issue, whether the cap could even be placed to form an effective barrier. Given that New Bedford Harbor is a working port, and subject to major storms, the possibility of construction or other port-related activities, or storms, disturbing the cap is high. The risks of cap failure are compounded by the fact that if the failure were massive, or as noted above, in restricted areas, correcting the problem may require the use of one of the other alternatives, but under conditions that may be difficult and more costly, if for no other reason than that a larger volume of sediment might now be contaminated. Finally, because the cap would be submerged, it may be difficult to monitor the cap integrity effectively.

3. Confined Disposal. As proposed in the FS, confined disposal would be in nearshore bermed facilities. The advantages of confined disposal include lower costs than treatment and the use of well established technology. The latter is important because the disposal facilities can be constructed using established guidelines to provide good assurance that long-term stability will be achieved. Compared to capped sediments, the nearshore sites would be easy to monitor and repair if needed. Another facet of nearshore confined disposal that is attractive for this site is that the contaminated sediments could be removed from these facilities in the future if more cost-effective treatment technology became available (e.g., I recently heard that a firm in Montana has a fungi that is very effective in destroying PCBs in soils).

The major disadvantages of CDFs are that the PCBs are not changed in any way and that nearshore land (potential habitat) will have to be permanently used for the confinement. As with capping, in an urban area and near the coast, there is always the possibility that human activity or natural events may disrupt the CDF, releasing the PCBs. As noted above, this risk is at least partially ameliorated by the ability to construct secure CDFs and to monitor them easily. Permanent assignment of the land to CDF use may become an increasing problem in the future as general urban development continues, but it is possible that the CDFs could be constructed in locations and in ways that could provide secondary benefits. For example, in Puget Sound, one constructed and one proposed nearshore facilities isolate contaminated sediments while creating new intertidal/shallow subtidal land from what had previously been strictly subtidal habitat. In many port areas, this construction is important because much of the original intertidal areas have been dredged or filled to create deeper-water areas around piers. In addition, it seem conceivable that the CDFs could be constructed to allow at least minimal other uses, e.g., as parking space or pier aprons, after consolidation is completed. Finally, the confined in-water disposal sites (confined aquatic disposal, CAD) that are presently included in this alternative are less attractive than nearshore sites because the CAD sites are more difficult to monitor and may be more difficult to access if needed. In the shallow waters of the harbor, the latter may not be a major concern.

4. Solidification. Solidification offers the advantages of CDFs but decreases the risks of failure by providing additional reductions in the rate of migration of the PCBs from the contaminated sediments. This procedure would reduce the likelihood that any circumstances would occur that would result in the release of PCBs from the confined deposits. The structural quality of the solidified masses might make the CDFs with solidified material more attractive for some alternative uses that could reduce the likelihood that the contaminated material would be disturbed.

The solidification alternative is more costly than simple confined disposal and would suffer the same losses of land use. In addition, solidification would not destroy the PCBs themselves, and it would be less likely that an alternative treatment technology could be used on the solidified masses of contaminated sediments. Finally, there is conflicting evidence regarding the short- and long-term effectiveness of solidification in reducing the mobility of organic compounds in general, although the testing done for the FS at the New Bedford indicated that the procedures that may be used did substantially reduce (but not eliminate) PCBs migration.

5. Solvent Extraction. Solvent extraction is one of the two treatment technologies that were evaluated that offers the hope of actually destroying the PCBs (the extracted PCBs would be incinerated). As a result of this destruction, this alternative is substantially more protective the any of the former ones. Solvent extraction also does not have the risk of forming dioxins that are associated with incineration.

Unfortunately this alternative is expensive and has never been performed at the scale proposed for this project. It cannot be considered a well-established technique for which all possible consequences have been identified and addressed. Some of the concerns that can be raised include whether the technique can be scaled-up to work cost-effectively with all of the types of sediments that would be encountered, to what extent residual TEA in the sediments may pose a problem, and whether other contaminates, specifically the metals of concern would become more mobile than they were in the original sediments (the alternative proposed that the treated sediments be solidified if the release of metals is too high). It would be expected that TEA would be particularly stable in the environment, but I did not research the toxicity of this compound, its environmental characteristic, nor the toxicity of possible degradation products. It could be conjectured that while the PCB levels would be reduced in the sediments, the remaining residues may be more mobile because of the treatment (which may reduce the concentrations of other organic constituents that act to bind the PCBs) and because of residual TEA. The treated sediments would be placed in CDFs, and therefore the disadvantages of CDFs, discussed above, would apply. This alternative has additional environmental impacts associated with the burning of the PCBs, energy use for the treatment process and distilling/treating used solvent, and none-sediment-associated solvent losses (spills) at the treatment facility or during transport.

6. Incineration. Incineration provides the greatest assurance that the PCBs in the sediments that are treated would be destroyed, therefore this procedure is the lowest risk/most protective of all of the alternative that were considered. The greatest advantage of this alternative is this assurance that the PCBs would be eliminated. The procedure and effects of incineration of the sediments are reasonably well established so that consequences can be anticipated and addressed.

This is the most costly of the alternatives, estimated to be near four times the costs of the simple CDF alternative (Alternative 3). These costs may make it difficult to justify the use of incineration for the contaminated sediments from the estuary and outer harbor areas. It is known that many of the metals are likely to be more mobile in the incinerated sediments and the alternative proposed that the treated sediments be solidified if the release of metals is too high. Incomplete combustion of the PCBs could lead to the formation of more toxic substances, including polychlorinated dibenzodioxins. The treated sediments would be placed in CDFs as with the preceding action alternatives, creating the same problems (except that the sediments would not be contaminated with PCBs). Incineration has additional environmental costs associated with fossil fuel burning

SUMMARY

Trying to rank these alternative as to which would be "best" from NOAA's perspective is a difficult exercise and ultimately will depend on subjective observations rather than objective criteria. As noted above, it could be argued that, if performed correctly, all of the action alternatives should result in comparable reductions in the concentrations of PCBs exposed in the surface sediments. All of the action alternatives would result in similar temporary destruction of the contaminated areas of the harbor, through capping or dredging. Alternatives 3 through 6 would have comparable land use restrictions for CDFs.

If money were no problem, either Alternatives 5 or 6 would provide the greatest assurance that PCBs in the treated sediments would pose not threat under any circumstances in the future. Again, if money were no problem, incineration would probably have a slight edge because it is a known technology, but secondary environmental impacts, such as energy use, fossil fuel burning, etc., may be more substantial for incineration. These secondary environmental impacts were not evaluated in the FS.

Alternative 3, placing untreated sediments in CDFs, is attractive because it is a lower cost approach and hence it is more likely that greater volumes of sediments could be included (i.e., lowering the sediment TCL). Because the sediments in properly designed CDFs would be relatively readily accessible, this alternative would be an even more attractive approach if it could be considered to be an interim solution, recognizing that the present technology for destroying PCBs is poor and that future developments may lead to much more cost-effective approaches. The contaminated sediments in the CDFs should be easy to monitor and control. Because money does appear to be an issue, Alternative 3 is the one that I personally favor, primarily because it can be "undone" when and if better treatments become available. I realize this may be wishful thinking on my part. In addition, a lower TCL can be considered in the future if new technologies become available (e.g., bioremediation) whereas this may be more difficult if capping is selected.

Solidification, Alternative 4, by itself does not seem to offer the substantial increase in assurance against future PCB releases over simple confined disposal needed to justify the much greater costs of that alternative over Alternative 3.

Alternative 2, capping, is attractive only if its lower costs could be used to justify the treatment of much larger areas of contaminated sediments than now proposed (i.e., using a lower TCL for sediments). This alternative has the potential of creating more problems of even greater quantities of contaminated sediments and would be difficult to monitor.

For all of Alternatives 3 through 6, some additional thought should be given to the design and location of the CDFs that would be associated with those alternatives. As noted above, it may be possible to use the material to construct useful habitat in some areas that may mitigate some of resources losses that have accompanied development in the harbor.

In selecting the TCL, some consideration should be given to nearshore intertidal and shallow subtidal environments. Here, juvenile species are more abundant, relative to deeper locales, thus a lower TCL should be considered; for example a 1 ppm PCB level nearshore and 10 ppm elsewhere. As noted in the FS and my 14 May letter, the 10 ppm sediment level is not protective of the marine natural resources. By reducing the sediment PCB level nearshore it may be possible to better protect the more sensitive juveniles.

Although the decision on wetlands is a most difficult one, NOAA does not believe the data, as of yet, supports the no-action conclusion. As stated in my 14 May letter "Although the damage to the salt marsh wetlands due to remediation at a target level of 1 or 10 ppm are

discussed on pages 4-25 and 7-53 to 54, no discussion is given on what the impacts to the biota that utilize these marshes might be. The decision reached that the "benefits obtained by remediation of the wetlands are outweighed by the adverse environmental impacts associated with . . . dredging", is not supported by any such evidence. Are we certain that such resident and seasonal biota are now not being injured by such PCB levels? Are we certain that a salt marsh restoration program might not be a better long-term solution? I believe further discussion and/or monitoring is warranted here."

I look forward to discussing at the monthly meeting to be held 5 June 1990. Any comments you might have would be appreciated.

Sincerely,

Kenneth Finkelstein