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REPLY TO
ATTENTION OF

CENED-PD-L

New Bedford
17.07
63765

April 8, 1991

MEMORANDUM FOR THE RECORD

SUBJECT: New Bedford Harbor Superfund Site - Technical Impracticality of Attaining a 1 ppm Residual PCB Concentration

DREDGING

The critical factors associated with attaining the 1ppm residual PCB concentration through dredging are:

a) the dredge's ability to remove the contaminated sediments without extensive overdredging, and
b) the availability of disposal facilities to contain the sediments removed from the harbor.

Dredge Operation: Sediment sampling performed to date has characterized the contamination in 12 inch horizons in the estuary and 6 inch horizons in the lower harbor and bay. From this information it appears that PCB contamination above 1 ppm is restricted for the most part to the top 24 inches of sediment in the estuary and top 12 inches in the lower harbor and bay. Only isolated areas appear to contain PCBs at levels above 1 ppm at depths greater than these. The dredging procedures developed during the pilot study require the dredge to remove sediment in one foot lifts followed by a final cleanup pass. Varying bottom elevations and the inherent variability of dredge operations make it impossible to obtain a completely accurate dredge cut and a variability of at least 6 inches should be accounted for. Given these conditions, it will be necessary to remove 30 inches of sediment from the estuary and 12 inches of sediment from the lower harbor. Three passes of the dredge would be required in the estuary and two passes in the lower harbor. Sediment quantities associated with obtaining the 1 ppm residual level in areas north of the hurricane barrier are shown in the following table.

	Surface Area	Depth	Quantity
Estuary	187 acres	30"	737,000cy
Lower Harbor	981 acres	12"	1,550,000cy
Totals			2, 287,000cy

Areas seaward of the hurricane barrier are also contaminated with PCB levels exceeding 1 ppm. Two locations of particular concern have been identified by NOAA. These are a 30 acre area located immediately south of the hurricane barrier and the 100 acre area around the sewage outfall. Sediment quantities associated with attempting to obtain the 1ppm residual level in these areas are estimated at 350,000 cubic yards.

The volume of sediment removed while attaining the 1 ppm residual PCB level in areas north of the hurricane barrier is compared with other remedial alternatives in the following table.

1 ppm Action Level	2,287,000cy
10 ppm Action Level	926,000cy
50 ppm Action Level	300,000cy

Disposal: The increased volumes of sediment that would be removed while attempting to attain the 1 ppm residual PCB level would significantly increase the number and size of disposal facilities needed to contain the material. These requirements significantly increase the impacts to the community and the overall cost of the remedial action. The Feasibility Study proposed 10 facilities to contain the 900,000 cy of material that would be removed if an alternative with a 10 ppm action level was implemented. These 10 sites included islands constructed within the harbor due to the lack of shoreline sites. The construction of this number of facilities has a significant impact on the community in terms of future development potential, asthetics, and institutional controls needed to insure the integrity of the sites over time. Island creation would require extensive evaluations and may not be possible due to impacts on navigation as well as the harbor's hydraulic regime. Implementing an alternative with a 1 ppm action level would increase the quantity of material removed from the harbor by a factor of 2.5 which would exceed the capacity of identified disposal facilities. Options for disposing of this additional material would include off site (land) sites which have yet to be identified, open water sites, or with the construction of more extensive island facilities.

Costs: I have derived the following cost increases required to attain the 1 ppm residual level by using the estimate contained in the Feasibility Study for Alternative EST-3d and LHB-3d:

Dredging	$ 13 million
Water Treatment/Dewatering	$ 93 million

Disposal (adequate sites not identified)

(The estimated costs for Alternative EST-3d are $9.65 per cubic yard for dredging and $68.13 per cubic yard of sediment dredged for water treatment/dewatering. The estimates shown above were derived by applying these unit prices to the estimated 1,360,000 cubic yards in additional material that would be removed. Costs for disposal would exceed those for the 10 ppm alternatives. Implementation is impractical even at a 10 ppm action level due to the number of disposal facilities that would be required. At 1 ppm, adequate disposal facilities are essentially nonexistent.)

SUMMARY: It would be possible to dredge the harbor to the extent that a 1 ppm residual PCB level could be attained; however, this would result in a significant increase in the volume of sediment removed from the harbor. The need for extensive facilities to contain the dredged sediments is the factor which makes any alternative requiring a 1 ppm residual level impracticle. Project costs would significantly increase over alternatives with residual PCB levels of 10 ppm or greater.

CAPPING

Placing a cap of clean sediment over contaminated areas would likely result in a residual PCB level of 1 ppm or less. To achieve this residual level over the entire site would require that all areas north of the hurricane barrier be capped along with numerous areas seaward of the barrier. Critical factors associated with installing a cap throughout the site are:

a) the impact the cap will have on the physical characteristics of the estuary portion of the site,
b) the long term monitoring/maintenance requirements to insure that the integrity of the cap is maintained,
c) the impact the cap will have on commercial activities in the harbor (no maintenance dredging in channels, no improvement dredging, institutional controls).

Physical Impacts: Cap placement techniques are discussed in detail within the Feasibility Study. A cap thickness of 3 feet is proposed to prevent migration of contaminants through the cap, movement of organisms through the cap (bioturbation), and to account for the variability of the placement process. This 3 foot cap has a significant impact on the physical characteristics of the estuary portion of the site. Some areas that are currently intertidal will become upland and approximately 97 acres of subtidal area will become intertidal. Figure 7-9 from the FS is attached and illustrates these impacts. Water depths in the lower harbor are greater and therefore the installation of a cap would have less impact on the physical characteristics of this area. This portion of the site is an active harbor however, and reducing depths by

approximately three feet could significantly impact navigation. To maintain the integrity of the cap, dredging work to maintain channel depths or to deepen and expand channels, anchorages and berthing areas would have to be prohibited. These impacts on commercial activities in the harbor are likely to be sufficient to make capping unfeasible in this portion of the site.

Monitoring/Maintenance Requirements: Long term monitoring and maintenance requirements would include hydrographic surveys, sediment cores and periodic efforts to replenish the cap. The present worth cost of the O&M and monitoring was estimated at $8.2 million for alternative EST-2 and $8.4 million for alternative LHB-2. There would also be a need to implement institutional controls to prevent future development and activities in areas that would compromise the cap.

Cost: In developing a cost for an alternative with a 1 ppm PCB action level the assumption was made that the capping of the majority of the lower harbor is unfeasible due to the impact on commercial/recreational navigation. These areas would be dredged. The cost estimates for alternatives EST-2 and LHB-2 were taken from the Feasibility Study and the cost was developed for dredging the remaining areas north of the hurricane barrier and for capping "selected" areas seaward of the hurricane barrier.

Capping/Dredging Alternative
1 ppm PCB Action Level

Area	Remedial Action	Cost
Upper Estuary	Capping	$26,400,000(1)
Lower Harbor	Capping	$23,900,000(2)
Lower Harbor	Dredging	$95,000,000(3)
Bay	Capping	$5,000,000(4)
	Direct Cost	$150,300,000
	Indirect Costs (40%) (5)	60,120,000
	Subtotal	$210,420,000
	20% contingency	42,084,000
	Total	$252,504,000

(1) Direct cost for capping estuary - Alternative EST-2
(2) Direct cost for capping lower harbor - Alternative LHB-2
(3) Assumes that 700 acres of the lower harbor will be dredged to a depth of 12 inches (1,103,407 cy).
dredging: 1,103,407 x $9.65 per cy = $10,647,881
water treatment/dewatering: 1,103,407 x $68.13 = $75,175,119
5 CDFs needed - approximately $10,000,000
(4) Capping of 30 acres just south of hurricane barrier and 100 acre area around the

outfall.
(5) Estimated from cost estimate contained in Feasibility Study.

Summary

While feasible to carry out, capping has a significant impact on the physical features of the area capped. In the lower harbor capping would not be feasible due to its impact on navigation and commercial activities along the waterfront. In the upper estuary large areas become intertidal. Long term operation and maintenance requirements would be associated with capping along with institutional controls to restrict activity in the capped area. A site wide alternative with a 1 ppm action level which included both capping and dredging would cost approximately $250 million

Alternatives that have a 1 ppm action level that would be carried out through either dredging, capping or a combination result in long term impacts to the community (extensive CDFs, altered physical features, extensive operation and maintenance) and significantly increase project cost over alternatives with PCB action levels of 10 ppm or greater.

Mark J. Otis
New Bedford Project Manager

AL ZONES DUE TO 22" CAP
NAL INTERTIDAL ZONES DUE TO 34" CAP
MENTS)

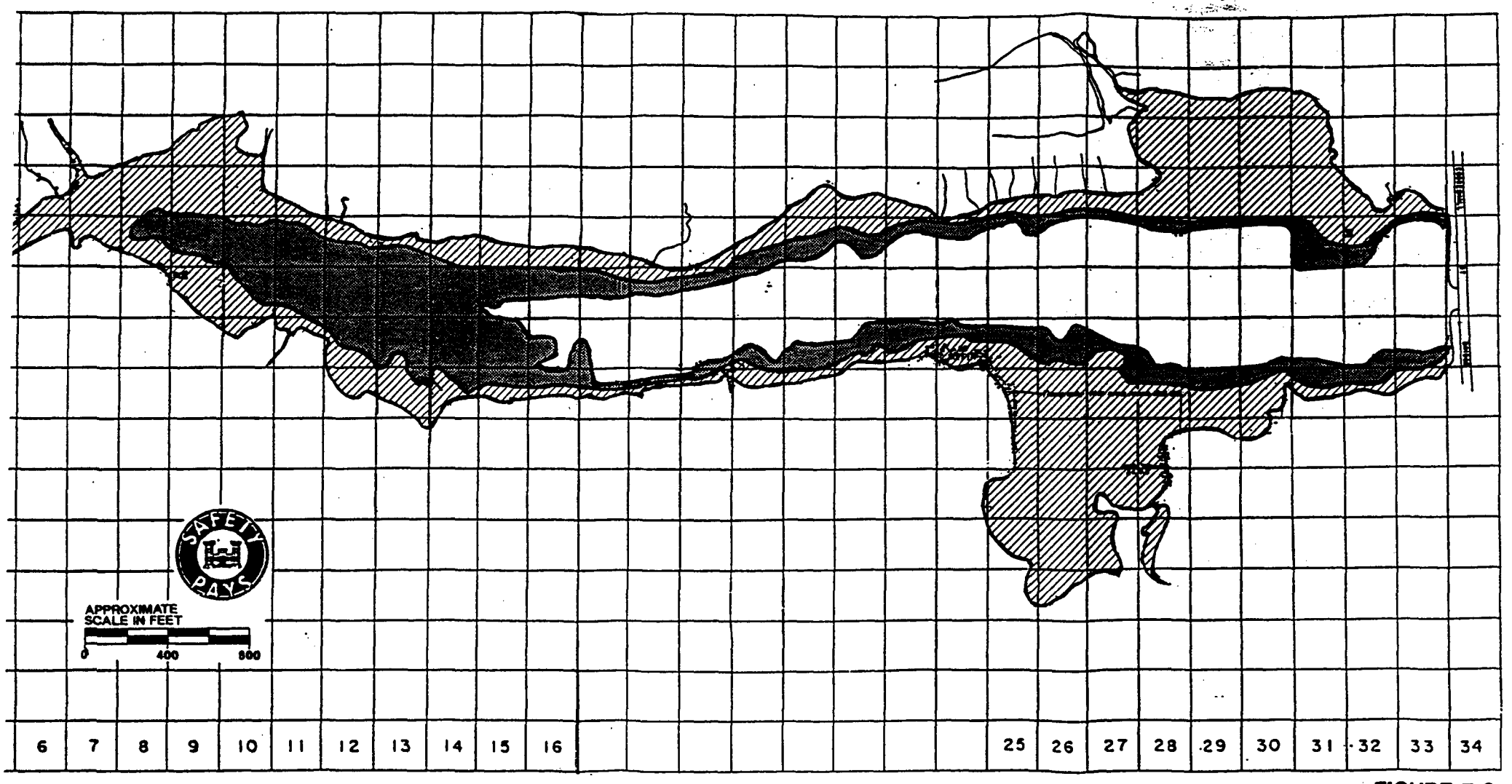

FIGURE 7-9
CAPPING IMPACTS TO ESTUARY
ESTUARY AND LOWER HARBOR AND BAY
FEASIBILITY STUDY
NEW BEDFORD HARBOR