UNITED STATES OF AMERICA

ENVIRONMENTAL PROTECTION AGENCY

BOSTON REGION

In the Matter of:

RE: EPA PROPOSES CLEANUP PLAN FOR THE HOT SPOT AREA OF THE NEW BEDFORD HARBOR SUPERFUND SITE.

PROPOSAL BY AVX CORPORATION.

Room A
Days Inn
500 Hathaway Street
New Beford, Massachusetts

Tuesday
August 22, 1989

The above-entitled matter came on for hearing, pursuant to Notice, at 7:02 p.m.

BEFORE: MERRILL S. HOHMAN, Chairman
Environmental Protection Agency
JFK Federal Building
Boston, MA 02203

Frank Ciavattieri, EPA Remedial Project Manager

Mary Sanderson

Helen Waldorf

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PROCEEDINGS

7:02 P.M.

THE CHAIRMAN: My name is Merrill Hohman. I'm director of the Waste Management Division of the New England Region of the Environmental Protection Agency, located in Boston. As such, one of my responsibilities is the management of the Superfund program in New England.

Before we begin tonight's proceedings, I would like to introduce Mr. Joe Carrera. Mr. Carrera is an English/Portuguese translator. And if anyone in the audience tonight has any problems, or needs any assistance in understanding the proceedings, Mr. Carrera will be available to provide translation service.

Mr. Carrera, would you like to say a few words before we proceed?

MR. CARRERA: Yes. (Sentence in Portuguese).

THE CHAIRMAN: Thank you. I'll serve as chairman of tonight's meeting.

As you no doubt observed, the proceedings tonight are being recorded, and a transcript will be prepared and made part of the administrative record for the New Bedford Harbor Superfund site.

Let me begin by introducing the persons that are sitting up front with me here. First, on my immediate left, is Frank Ciavattieri, who is the current EPA Remedial

Project Manager for New Bedford.

To his left is Mary Sanderson who, effective October 1, will begin serving as the Remedial Project Manager for the New Bedford site.

Next to Mary is Helen Waldorf, who is acting chief of the State and Federal Sites Branch, in the Massachusetts Department of Environmental Protection, formerly known as DEQE.

Also in the audience we have representatives of Ebasco and E.C. Jordan, who are EPA's consultants on the New Bedford Harbor Project, and the U.S. Army Corps of Engineers, and staff from the State Department of Environmental Protection.

On August 3rd EPA held here a public information meeting, to present a proposed clean up plan for the so-called hot spot area of the New Bedford Harbor Superfund site. The hot spot are is defined as a five acre area of the estuary, containing sediments highly contaminated with PCBs.

At that August 3rd meeting, EPA made a detailed presentation on its preferred alternative for cleaning up the hot spot, as a first step in the overall harbor clean up.

EPA's preferred alternative, to refresh your memory, involves removing the contaminated sediment from the hot

spot area of the estuary, using a cutter head dredge; pumping the dredged material to the primary cell of the existing, confined, disposal facility, located on the cove next to Coughlin Avenue; de-watering the sediment, and permanently destroying the PCBs in the sediment, by burning them in an incinerator.

Ash from the incinerator would be solidified as necessary, to fix any heavy metals. The resulting non-hazardous material would then be temporarily stored in the confined disposal facility, and covered over pending selection of a final plan for overall clean-up of New Bedford Harbor.

On August 4 we began our public comment period on that proposed plan, and on other documents which were used by EPA in making its final decision. This comment period, which was originally scheduled to close on September 1, has been extended to October 2, 1989, to allow the public sufficient time to review EPA's public health risk assessment, which was made available on August 17.

On August 16 we held a formal public hearing, to accept comments on the record of the proposed plan. Diane Reedy, of EPA's community relations staff, does have extra copies of that proposed plan, if anyone needs on.

Diane, do you want to stand up?

Now tonight's session is rather unusual in that it has

been scheduled at the specific request of AVX Corporation, one of the potentially responsible parties for cleaning up the harbor. In response to EPA's proposed plan, AVX has developed its own plan for cleaning up the hot spot and estuary, involving capping contaminated sediments in place. And has asked for an opportunity to present its plan to EPA and to the state.

EPA believes that AVX should be accorded such an opportunity, and that it should be done in a public format. Hence, this session tonight, and the session being on the record.

Now before we begin AVX's presentation, I do have a request for two statements that would be made at this time. And first I would like to call forward Mr. John Bullard, the Mayor of the City of New Bedford, who has a statement he wishes to make on the record.

Mayor?

MAYOR BULLARD: Thanks a lot, Mel, I appreciate the opportunity to speak out of turn.

I wasn't able to attend the first public hearing where you solicited comments on EPA's plan, but I want to give some comments in general about that plan, and also about the one being proposed by AVX.

First of all, I want to express thanks to EPA for your coordination, for your working with the city to solve this

problem. It's a very difficult problem. Sometimes it seems like it's going to take forever to solve it. It's going to have outlasted Frank I know, but I hope not Mary. But you've always shown that you do want to get the problem solved, and I think we are making progress. I think we're getting to a point where the solutions are getting down to final determination. And that gives encouragement to all the citizens of New Bedford.

I also want to thank our community work group under Leon Chadwick's able leadership. Their job is also difficult. And yet this is not a vocation, it's an avocation for them. It's taken them a lot of hours, and I'm sure the fun wore off in the first fifteen minutes or so. And now they've had months and months of going through a lot of highly technical data to do a very important job, which is to represent the average citizen in this process. And I thank Leon and his colleagues on the community work group.

One comment I want to make, and we will make these in writing before your deadline of October 2nd. But one comment I have in general, that does not pertain to either the AVX or the EPA proposal, is a request that EPA consider including the Belville Avenue interceptor in this Superfund site clean-up plan.

This interceptor, as many people know in New Bedford, and some people unfortunately have recurring, immediate,

direct exposure to this problem, is contaminated or compacted with grit, which has accumulated over the years. And the grit has been tested, and been found to contain PCBs, making it a very difficult project to remove.

Every time we get a heavy rainfall, the contaminated grit blocks the water, and it backs up into streets of Belville Avenue. And that is a health danger of immediate significance.

If this were included, by virtue of the PCB contamination, in the Superfund site, I think we can bring more pressure to bear on this problem. It is one that is difficult for the city to do by itself. We have gotten to trust our working relationship with EPA, and we ask your assistance in helping us with this problem.

Regarding the AVX proposal, which I have had an opportunity to see, I urge only that EPA, and our community work group, give it very close consideration. I can't, in my own mind, say whether I think it's preferable or not preferable to EPA's. I don't even know whether it has to necessarily be entirely separate from EPA's solution. But it does seem to me that we have in AVX and the other PRPs, companies that are not out only to fight this process, although I know they have spent more than a few dollars in lawyers, doing that part of it. But AVX and the other PRPs have done more than that. They have tried to help us find a

solution, that we all want to find, which is how to protect the public health, and how to do it at a cost where we can actually realize that protection.

I think that their recommendations are worth consideration, and I urge EPA and our work group not to look at this process as EPA has one plan, and we either vote it up or down, based on comments you get at these hearings. But that EPA has part of a solution, admittedly part of a solution for hot spots, with a big question mark on the rest of the harbor. AVX has another possible solution. And I hope that those who were charged with the awesome responsibility of coming up with a decision on this, look at both of those solutions equally, and see if we can come up with a way to protect people, and do it at a cost that we know can be afforded.

Thank you very much.

THE CHAIRMAN: Thank you, Mr. Mayor. Now I would like to call on Helen Waldorf of the Massachusetts Department of Environmental Protection, who has a statement to make on behalf of that agency.

Ms. Waldorf.

MS. WALDORF: Thank you, Mel.

I see some of the same faces that we saw here a little while ago.

I have a letter here from James Colman, who is the

assistant commissioner in the Bureau of Waste Site Clean-up in my Department of Environmental Protection. He couldn't be here tonight because of illness. Also the deputy regional environmental engineer, because of personal emergency, couldn't be here tonight.

We think this is a very step and part of the Superfund process. So what I have here is a letter that we discussed at great length, based on what we have seen and heard so far about the AVX proposal. So if you will bear with me, hopefully it won't be too boring to listen as I read along. It's dated today, and addressed to Frank Ciavattieri. It's comments on AVX proposed remedial action plan:

"Dear Mr. Ciavattieri:

Last October Malcolm Spaulding of the University of Rhode Island presented AVX's proposed remedial action plan for the New Bedford Harbor Federal Superfund Site. Over the last nine months we met with your staff, AVX, and its consultants several times to discuss this proposal. We also attended a community work group meeting on July 10, where a capping proposal was discussed by AVX and its representatives.

This letter contains our comments on the AVX proposal, and our view of how this proposal should fit into the overall evaluation of alternatives for the New Bedford Harbor site.

The remedial action plan proposed by AVX includes the following:

Construct hydraulic controls at the Coggeshall Street Bridge, and control flows and water levels in the Acushnet Estuary. Cap upper estuary sediments, including the hot spots, with a geo textile fabric, and offsite materials. Use gravel and stone erosion protection for the hot spot area.

AVX presented the advantages of its proposal as no dredging would occur. Cap placement could occur partly in the dry state, using the dam and other hydraulic controls in the estuary economics. And the PRPs have presented this as a comprehensive solution to the New Bedford Harbor contamination.

I would like to emphasize that in reviewing this, or any remedial action proposal, and making a final decision, the standards of Massachusetts General Law, Chapter 21E must be met. To be considered a permanent solution, a final remedial response action must be, and this is quoted directly from the statute: "A measure, or combination of measures, that, at a minimum, will assure the attainment of a level of control of each identified substance of concern at the disposal site, or in the surrounding environment, such that no such substance of concern will present a significant or otherwise unacceptable risk of damage to

health, safety, public welfare, or the environment, during any foreseeable period of time." And that's Section 3AG of Chapter 21E.

From the Commonwealth's point of view, this alternative prepared by AVX, must be subject to an analysis which includes a characterization of a risk of harm to human health and the environment, by comparing currently and reasonably foreseeable exposure, and analysis of total site cancer and non-cancer risks. Total site risk, for example, must be compared with a 1 and 100,000 excess cancer risk level.

Because significant amounts and concentrations of contaminants would be left in place, we believe it will be very difficult to demonstrate that a cap in the hot spot areas will reduce these risks to an acceptable level for any foreseeable period of time. Capping has not been demonstrated by AVX to be consistent with either a permanent or a temporary solution, based on the total risk posed by this disposal site. Using the criteria contained in the CP, the AVX proposal for the hot spot appears to be inconsistent with either temporary or permanent solution for the following reasons:

1. AVX has not demonstrated to the Department's satisfaction that the highly concentrated PCBs will not migrate vertically in solution through the relative

permeable capping material, or horizontally to uncapped areas via diffusion and induced diffusion, in a tidal underwater environment.

The project proponents have failed to demonstrate that the capping proposal would isolate the public from future exposure to significant risk in a relatively short period of time. Diffusion of PCBs into the water column, and absorption of contamination onto capped material, and less contaminated sediments in the uncapped portion of the estuary, and lower harbor and bay, appears to provide a migration pathway which could cause exposure in the future.

2. We have not been persuaded that there have been any institutional controls that make this a permanent solution. To be a temporary solution the alternative must be consistent with a permanent solution, and positive and enterprising steps to develop a permanent solution must be taken. Neither effective institutional controls, nor a proposal for enterprising steps to develop a permanent solution for the disposal site, have been presented in the capping proposal. Because the capping proposal does not appear to meet the standards of permanency set forth in Massachusetts General Law Chapter 21E and the PCP, it is not a "comprehensive solution".

3. If the cap slumps, breaches, or erodes, highly concentrated levels of PCBs will be exposed. Relatively

uncontaminated materials, such as uncapped sediments in the cap material, could be recontaminated. A breach in the cap over the hot spot would present a public health risk of two excess cancer risks in a population of 100 persons. The source is the EPA Risk Assessment and Feasibility Study.

4. The proposed cap in the AVX proposal is 45 centimeters thick. The Commonwealth is not persuaded that a barrier of only one and one half feet of highly permeable material is sufficient to provide a margin of safety for the protection of public health and the environment.

5. The levels of residual contamination left in place in the hot spot are so elevated that there is no demonstrable chance that the process of bio-degradation of PCBs could occur within a foreseeable period of time. The technical information reviewed by the Department to date for this site, and other sites containing PCB contamination, have shown bio-degradation to be effective only on much lower concentrations of contaminants.

6. The reliability of a submerged, or partially submerged, cap placed over contamination of the magnitude found in the hot spot has not been established. Reliability has, however, been shown for capping low level contaminants. Both the Seattle, Duwamish, and the Rotterdam projects were used as an example in the AVX proposal, but they were implemented on relatively low level PCB and pesticide

contaminants.

7. The AVX proposal may require extensive treatment of marine water, river water, and combined sewer overflows, which will accumulate being the bridge during implementation of the capping remedy. The scope of the PRP's proposal, including the quoted cost, did not include the required water treatment to prevent highly concentrated contaminants from being released during the implementation of the proposed remedy. The proposal contains no measures to meet water quality standards, and to treat water.

8. And last point. One drawback of the capping alternative is the possibility of increased contamination during placement. The impact of dumping material on top of highly concentrated PCBs and sediments has not been adequately addressed in the proposal. The cap material will become contaminated by the highly concentrated PCBs in the hot spot, creating a greater volume of contamination to deal with if the remedy fails.

Although we are not persuaded that a capping alternative will comply with state permanency standards, in general we support further evaluation of the AVX proposal. This alternative should be evaluated, alongside other remedial response alternatives, in the CFS for the future operable unit plan for the upper estuary, and the lower harbor and bay portions of the Superfund site.

Thank you for the opportunity to comment on the AVX proposal. I look forward to meeting with you on this subject in the near future.

Signed, James C. Colman, Assistant Commissioner."

So that is more or less our statement at this time, based on what we have heard so far.

Thank you.

THE CHAIRMAN: Thank you, Mrs. Waldorf.

Now what I'm going to do is call upon representatives of AVX to present their plan. I'm going to ask that we allow the to go through their full presentation without any interruptions. Please hold your questions until later on.

Following their presentation the EPA and state people up front, the panel, will ask questions. AVX has agreed that they'll accept and answer questions. Then we also have in the audience EPA's consultants, and some other people from the state DEP. I will call upon them to ask any questions they may have of AVX on its proposal. And then we will open the session up questions from anyone in the audience, that may wish to ask a question.

Now when we get to that point, and I'll try to remind you then, but if you are called upon to ask a question from the audience, would you please identify yourself, your name, and any affiliation you might have with the New Bedford Harbor Project, for identification purposes.

Again, if time becomes a problem later in the evening, I will reserve the right to limit the time allowed for asking questions by any one individual.

Any questions on how we're going to proceed? Okay, if not, let me now introduce Mr. Charles Dill, who is president of AVX Corporation, who is going to open the presentation on behalf of AVX.

I think some of the panel at least are going to go down front, or are you going to sit here?

Mr. Dill.

MR. DILL: Thank you, Mel. Thank all of you for coming out tonight to listen to the AVX proposal, and to sit through the discussion that will ensue.

And thank you, Helen, for your reservations, because I believe we will address many of those, perhaps not all of them tonight.

But I want to say that we, as a company, have not prepared this simply in response to the EPA proposals. Actually, I've been president of AVX for eighteen months, so you know you're not going to hear any expertise or technical statements from me. But we have worked with over a dozen different consulting firms over the last five years, to deal with this issue, which we take very seriously. We have worked with the EPA, and I think the EPA has been cooperative with us, and there's been a lot of dialogue, and

we have evaluated a number of options, including dredging and treatment.

And the proposal you are going to see tonight has been thoroughly reviewed, and will finally be summarized and submitted formally, in writing, shortly.

The proposal will include a full risk assessment, and all of the technical documentation, consulting analysis, expertise that we've been able to muster over the last five years.

We appreciate very much the fact that you are giving it careful consideration, and we understand very much that before our proposal might be accepted, or some variation of our proposal might be accepted, that all the questions that Helen has raised must be answered, and we feel we are prepared to answer them.

I don't know that the two consultants that are here tonight, that are going to talk to you, knew that they were going to go in for the grilling they may be in for. We'll see how they do. We have great confidence in them. We have Weldon Bosworth, the president of Balsam, Inc., who has been the managing consultant I would say, and Leonard Sarapos, who is the vice president of engineering, and I guess I'd call him our project manger, Frank, in this project. And they will take you through this proposal.

I know any of you in this room have been through a

preliminary of this, and we have been quite open in our summaries, and handed them out, and our objective, very candidly, is to have as much discussion, as long as it takes to thoroughly respond to any reservations or concerns that the EPA has, that the State of Massachusetts has, or any of your individually, the community work group of course, and we appreciate the ability to do this in relatively open forum.

I must say that when I started eighteen months ago my impression was more one of litigation and lawyers and lawsuits than focus on remediation, although we had the remediation efforts going, and I think with the EPA's cooperation over the last eighteen months, we've all moved together to focus on finding an effective remediation plan, as opposed to suing each other.

And the lawsuits have not just been between the EPA and the PRPs, but of course all the PRPs have disputes as to who did what to whom and when. And then, of course, we all have insurance companies, and that's a whole other set of things. So this thing could go on forever in (what's the word?) litigious approach. And we, as a management, are trying very hard to find a remediation plan that we hope could be a basis to go down a more constructive approach to fix this harbor.

And with that I think I'll introduce Weldon Bosworth

and Leonard Sarapas. They're going to take the heat, because they have pull this together, I think very effectively, and very thoroughly, and are prepared to answer any questions you have.

Weldon and Leonard, however you want to do it.

MR. SARAPAS: I think I'm going to rearrange this podium a little bit, to make it a littler closer to the equipment that we have. Are we still getting a sound connection?

Where did Helen go? I think we put together a presentation tonight that we hope we're going to answer several of her questions. Some of them are, I think, directly related to a risk assessment that Mel did say we just recently received, and we will be discussing that as the presentation proceeds this evening.

As Charlie was saying, we put together a team about five years ago, we began putting together to team to come up with the solution to solve the problem in New Bedford. The mandate that we had from AVX was to find a solution that was comprehensive in nature, that the group could afford, that would protect human health and the environment. And that's really what we've been trying to do.

As we've reviewed EPA's data we were not sure that capping was receiving full consideration for the upper estuary, and so we included it in our feasibility study. As

we looked at capping as an alternative in the contaminate transport mechanisms present in the New Bedford Harbor, we are going to have a few artists' renderings tonight. We put the first one up to provide a framework for you to look at. This being the upper estuary at low tide, probably a very low tide, because all of these areas are exposed as mud flats right now. We began to believe that capping would be an effective solution for the upper estuary.

Based on that understanding, we began to put together this team of nationally recognized experts. That team includes engineers like myself, some of them with specialized marine engineering experience, a group of transport modelers to help us understand how water and sediment moved in the upper estuary and the rest of the harbor, as well as the contaminates; biologists to help us understand how the natural resources would be affected or improved with different types of remedial approaches; toxicologists, to help us better understand PCB toxicity, as well as the risk assessment aspect; people that are more in tune with bio-degradation, a process that we thought was occurring n New Bedford Harbor. And over the last two to three years we learned is occurring in the harbor.

I know EPA nad DEP also have to work within a framework of requirements, regulatory and statutory requirements. We began that process also. In developing our plan we had to

identify goals which had to be met satisfactorily, and these are the six goals that we identified that relate specifically to the New Bedford Harbor site, which is one of the efforts that we made.

Protection of human health and the environment was the paramount goal that we were trying to achieve.

Secondly, because New Bedford is a very active fishing harbor, a lot of the revenue from New Bedford comes from fishing, we looked at protecting the environmental resources, the fisheries, the commercial fisheries, as well as some of the recreational fisheries.

Third was to minimize site disturbance and contaminant release. The Army Corps of Engineers for years has been studying the impacts of dredging, as well as other experts. And most recently some of EPA's own experts have been looking at the volatilization of contaminants in dredging programs.

Our review of those documents and reports indicated that large scale disturbance of sediments could result in some significant contamination to other parts of the site, or to the air. So one of our objectives was to minimize this disturbance.

As I said earlier, cost-effective entered our criteria. We had to find a solution that people could afford.

Helen talked a little bit about consistency with legal

requirements, in her case the 21E statute. We did look at that also. We understand EPA's approved and selected solution has to comply with these same requirements.

Are you having trouble seeing in the back? Okay. I don't know what else I can do with this set up.

FROM THE AUDIENCE: It's okay.

MR. SARAPAS: We do believe our alternative does comply with all of the regulations and requirements, to the extent that any comparable clean-up action can comply with them.

And finally, we tried to identify a technology, perhaps a series of technologies, that we knew would work. And that's important, because some technologies that are not proven might take years to resolve. One example was, as part of the process, I believe EPA had Critical Fluid Systems, CF Systems, come down and try a technology here in New Bedford. I don't believe it worked that well. One of our objectives then was to try and identify technologies that would work very well.

Tonight's session that we're going to be presenting, before we begin with the questions, it's going to be about two thirty minute sessions. They're a little long, but we have a lot of material. The first session is really about what we're going to do, and how we're going to do it. And the second session (they're both about thirty minutes) will be why this works.

What we thought we'd do though, for some of the people who aren't as familiar with the harbor and the site, is set the stage. This is a copy of a NOAH map. These are also in the hand-outs. if anybody missed hand-outs, I think there are still some. There's three left. We had more attendance tonight than we had anticipated.

I think what you will see here is the upper estuary is relatively shallow. These are low water depths, one, three and two feet. By and large, a relatively shallow estuary, upper estuary, with low dynamics, hydro-dynamics, very low energy system, as compared with this part of the harbor, where you have a shipping channel and turning basins, with depths up to thirty feet.

This part of the harbor, as we all know, is active with commercial and recreational boats and fishers. This part of the harbor or estuary is relatively inactive. They're a very different nature, physically, and in terms of use.

To give you some idea of the size this part, which I'm going to refer to this evening, this part of the site up to the Wood Street Bridge, is called the upper estuary. It's about 190 acres. This part of the site, down to the hurricane barrier, is about 750 acres. The total site is about a thousand acres.

This is a picture of the upper estuary, which shows a little bit more of some of the principal features in the

upper estuary. Of significance are these wetlands along the eastern shore, and Fair Haven and Acushnet. There's about 20 some acres of wetlands. The EPA has conducted studies in these wetlands, and we have also. There are contaminants present in the wetlands. The levels of contaminants are relatively low, as compared to the rest of the site. I believe EPA's findings have been that the wetlands are healthy in nature, and the recommendation of their consultant was to try to save those wetlands. That is one of the concepts that we are going to include in our remedial program, to perhaps perform some remediation in the wetlands, and to remove elevated levels of contaminates, but to try to save those wetlands as a valuable resources, part of the bread basket for the fisheries that exist in Buzzards Bay.

Additionally, this might be a good time to talk a little bit about the hydrodynamics, or maybe we can go back to this other picture real quickly.

Hydrodynamics is a very important aspect. We're going to talk a lot about that in the second half of our presentation. But I'm going to point some landmarks out for you to keep in mind, because landmarks have a lot to do with whether this is going to work, in terms of contaminate transport and effectiveness.

There are a lot of restrictions to flow in the upper

estuary. Starting from here, the Coggeshall Street Bridge is about a sixty foot opening, with the I-95 Street Bridge, a comparable opening. Down to the Route 6 Bridge with Popes Island, a bigger opening. And the Army Corps of Engineers hurricane barrier, which is little over a hundred feet wide.

These structures in combination, serve to reduce the tidal forces in that upper estuary, and that results in relatively low forces to move sediments around, and relatively low velocities of flow.

I think if anyone here has had the chance to review EPA's risk assessment, by and large the risk assessment focuses on PCBs, and the toxicity of PCBs. And so we focused also our consideration of remedial program on PCBs as a central issue.

We are going to go through a series of pictures, which show our understanding of PCB contamination in the upper estuary, sediments as well as the remainder of the harbor. You can see that the majority of the PCBs, if you consider 500 PPM concentration line or isopleth are really present in the upper one third of the upper estuary.

The estimates that we have made, and I believe these are consistent with EPA's estimates, of the whole site, of the whole thousand acre site, about 90 percent of all the PCBs are in the upper estuary. And the vast majority of those are in this portion of the site. It was one of the

reasons that we focused on the upper estuary.

The remainder of the site really, when you get down to here, and this is sixty some acres -- yes, sixty some acres of the estuary, it's relatively low concentrations of PCBs, less than 50 parts per million. And that's the type of trend really that exists for the rest of the harbor area.

This is the next section of the harbor down. If you recall that earlier picture with the bridges, we have the I-195 bridge here. We have a few areas of somewhat over 50 parts per million, but by and large, relatively low concentrations of PCBs. And that trend continues even more so as one goes further out into the harbor. Here we barely get above 10 parts per million, with the exception of one pier. We don't know why that's there, whether that's preferential deposition there. But relatively low concentrations throughout the most active part of the harbor.

And, by the way, this sampling has been done by EPA, some of the data they have released to us. And outside of the harbor, in this study area, we have one limited area by the CDE Plant, one of the CDE discharges, slightly above 50 parts per million. But, again, the vast majority of the area studied by EPA, and the data we have reviewed in this portion of the site, indicate concentrations of less than five parts per million, relatively low levels.

The review of the risk assessment focused again in the upper estuary, and the risks present by both heavy metals and PCBs in the upper estuary.

Helen Waldorf, of the Massachusetts DEP, essentially must have reiterated the last slides I gave. This is essentially the components. These are the pieces of the program we would propose to contain the contaminates in the upper estuary. We are going to go through each of these in some detail, as part of this talk.

Hydraulic controls. Hydraulic controls are going to be of two types. One would be a variable type of dam at the Coggeshall Street Bridge. And we are going to use that to control the tidal flows during the remedial program. Periods where we want to have high water to have boat traffic or barges, we can lock that high water in for a period of a few days, maybe even a week. There may be some time when we want less water, where we're replacing stone for erosion protection, we could use that same dam to keep the water out.

We are also going to have a second component to our use of existing dams on the Acushnet River, to moderate the river flow. Most of the time the Acushnet River is a very small river, it flows from ten to thirty CFS. If you'd stand on the bridge you'd barely see any flow under the bridge. But during storms the flow can be much greater. So

we intend to use pre-existing dams on the Acushnet River to moderate flow into the upper estuary.

Once those controls are in place, the next step would be to put down a geo fabric. And, Helen, the placement of the geo fabric, as we've designed that, should not disturb the sediments. The objective of the geo fabric is to separate the contaminated sediments from the overlying cap. We have worked out methodologies. I don't know if some of the Corps people will be asking us about that tonight. We've worked out methods to place that geo fabric, to keep the contaminated sediments from the overlying clean cap sediments.

The second purpose is to add structural integrity to the cap. The fabric that we are designing and selecting will serve to increase the strength of the cap, and protect any breaching of the cap in the instance that someone might try to dig through it. It's very strong material. It will really resist human breaching.

The next component is placement of a sediment cap 45 centimeters thick. Some of the parts of the upper estuary do have high velocities when the peak storms occur. We will be installing some armored riprap or a geo-wrap, which is a manufactured material, which has very high strength to maintain the integrity of the cap.

We are going to be creating some new intra-tidal zone

in that upper estuary, somewhere in the range of 35 to 40 acres. We are going to be planting part of that, the part that will support it, into new salt marsh. That, we hope, will increase some of the ecological value of the upper estuary, consistent with the value of the fisheries in the harbor and in the bay.

And then finally, to assure the effectiveness of the program, we will initiate a monitoring program.

This picture shows the approximate extent of the cap for the upper estuary. That corresponds to something, if you come out of the CDF, tying in to the Eastern Shore, in a small portion of this part of the cove. It corresponds to locations where PCB concentrations and sediments have been reported at 50 parts per million or greater.

We chose that action level based on a couple of criteria. First, we reviewed recent decisions by EPA in other regions. And one of the most recent decisions was reached for Waukegan Harbor, which is one of the other large NPL Superfund sites recently settled. At that site, and that site has a lot of similarity to the New Bedford Site, at that site OMC, a company of a different nature, but perhaps similar in some philosophy to AVX, had discharged PCBs in the past to the harbor.

The area is a very active fishery. They have salmon and lake trout fisheries in the lake, and so they have a

very similar setting. They have a very active recreational fishery there also.

At that site EPA accepted a 50 part per million clean-up level as being effective to solve the problem at that site.

The second aspect involves the mass of PCBs and the flux of PCBs from the upper estuary. As we talked earlier, over 90 percent of the PCBs on the site are from this bridge to the north, and almost all of that is up in here. And we have extended that cap down to this point, probably capturing somewhere around 87, maybe 88 percent, of all the PCBs in the site, dispersed throughout the site.

Secondly, we are going to be talking about the impact these PCBs have had on the rest of the harbor, in the later part of the show and discussion. This cap should remove about 99 percent of all of the PCBs that are currently discharging from the upper estuary.

So, on those three bases, we felt we had selected an action level which would be successful in significantly reducing the adverse impacts to human health and the environment.

For the people who haven't had a chance to read our hand-out, we thought we would go through this construction sequence, to give you a better handle on how we intend to implement this program, or EPA, should they choose to adopt

it.

The first step, as we discussed earlier, was hydraulic controls. This is where we would install the dam, the variable weir dam, by the Coggeshall Street Bridge. We well look at a picture of that next. It's going to be relatively simple to construct. It can be constructed from the bridge, from one lane of the bridge, without even restricting traffic significantly. It could probably be installed in less than a week.

The other component of hydraulic controls would be to utilize three upstream dams. The City of New Bedford has a large reservoir, which is currently not being controlled. The discharge out of that reservoir is not being controlled. We would work with the City of New Bedford, and implement some controls.

There are two other dams downstream, which we would also include in that control program.

This is a schematic of what that variable weir dam will look like. The opening will have three panels. At the time of construction these two panels will be put in place. The weir dam will be constructed of either timber or driven steel sheet pile. The third opening will have a series of stop logs, and these logs will allow us to let water in and water out. Our modeling team has told us that by removing these three panels we, in essence, will have full

circulation in the upper estuary. We will not affect the flow in the estuary. If we would choose to leave them open we would have no stagnation problem.

But through the use of these panels and these stop logs, we can control the amount of circulation, the tidal forces, as well as the water level.

Once the hydraulic controls are in place we can proceed with installing the geo fabric. The geo fabric has been selected to prevent mixing of these bottom contaminated sediments with the cap that will be placed afterwards.

We've talked with two nationally recognized marine engineers, civil engineers, who build, on a regular basis, structures like that. And with them we've developed an installation procedure for placement of this fabric, which should allow us to place it without creating prop wash from the boats, for the barges that place the fabric, and without disturbing the sediments as we place that fabric down.

When the fabric is down, or as the fabric proceeds to be put down, we will then begin to place a 45 centimeter cap. The thickness of the cap was selected on two bases. First was a review of documents prepared by EPA's own consultants as to what would serve as an effective cap. That expert, in their evaluation, selected 55 centimeters. We reviewed those data, and found through closer examination, that there were sections of cap, or thicknesses

of cap, which were not fully evaluated. In fact, the thickness below that is somewhere around 30 centimeters.

We looked at those, and came up, on our own, with an understanding that 45 centimeters would work. We then have had other people model the effectiveness of this cap, and we will be talking about that in the second part of the how this works, and tell us that the 45 centimeters will serve to contain the contaminates in these estuary sediments.

Parts of the estuary, in particular that northernmost part, near where the Acushnet River enters the estuary, can have some pretty high flows during peak discharges. These flows occur infrequently, probably maybe every 25 to 100 years. But we did recognize that that sand cap would not withstand those flows, that the cap could scour. And so we designed an erosion protection system. That consists of either ripraps, stone of different sizes, based on the magnitude of the velocity, as well as a synthetic material, a geo-web, which is used in other areas of the country, as well as New England, to protect stream beds and drainage ditches with very high flows.

In fact, they are using this right now, this geo-web with stone, in parts of Alaska to repair salmon spawning beds, where they have very, very high run-off periods, but they need a stony surface for the salmon to spawn.

This is generally how we would propose to proceed with

this capping. We'd probably begin the northernmost part of the upper estuary, and begin with our barges in placing the geo-fabric, and as some sections of our geo-fabric are placed, we would then begin placing sediment.

We are looking at two types of sediment sources right now, one on shore, in particular the Tilcon Quarries, which are located right here. And also offshore sources, somewhere in Buzzards Bay.

The means that we have to place the sediment could utilize either source of sediment. At the current time, where the CDF is, as well as the sub station, there are two areas that are suitable for use as a staging area, where we could truck that sediment to a staging area, and in those areas mix or hydrate that sediment with estuary water, and pump that sediment to its place for deposit.

On the discharge line, one of the things that we learned from the Army Corps pilot dredging program, was that you can use a diffuser to diffuse the energy out of that head, the spoil head, and place those sediments with really little turbulence. That, on top of the geo-fabric, we believe will not result in any disturbance of the underlying sediments.

If it would turn out, through discussions, that an offsite source was a preferred source of cap material, we could conduct a similar operation, somewhere just south, or

even in between these two bridges. Essentially the same deposition mechanism.

The final step would involve construction or planting of some salt marsh in the upper estuary. And we thought perhaps the best way to show you what that might look like is we met with a landscape architect, who helped us prepare some renderings. And these are renderings of what that architect, with some assistance from us on the nature of the cap, and the extent of the cap, would look like in the upper estuary.

This is a picture of the upper estuary, also at low tide. The extent of the cap again is right in through here. We are going to be creating again about 35 or 40 acres of inter-tidal zone. Part of the zone is going to be under water most of the time. This is low tide. That's going to be beach. But part of it is going to be inter-tidal, and it's going to be submerged and above water enough times so that we can plant that into salt marsh.

In part, we would plan to extend the existing salt marsh, and plant salt marsh in this cove, as well as along this upper area.

This portion of the site, where the highest portions of PCB concentrations are present, will have the most rigorous capping, combination of stone and geo-web. And I believe we have some geo-web samples here. We can bring them out later

tonight during discussions, if that's appropriate. But breaching through that geo-web, unless were to attack it with some pretty heavy tools, is virtually impossible.

I'm going to put some of these down here. I know you people in the back can't see. But this is what the upper estuary will look like at high tide. Compare it to this at low tide, if you want.

The principal difference is that this part of the site is going to be salt marsh. This cove here is going to be salt marsh.

The final view that we asked the architect to prepare was an aerial view. I don't know if you can see that at all in the back or not. Of the upper estuary at mid-tide. And it shows you what the whole thing might look like.

So that's really an overview of what we would plan to do, how we would plan to do it, and how we think it might look like when the program is done.

Maybe before I move on into how I think it's going to work though, I could discuss a little bit about some other sites. I know Helen mentioned the Duwamish River way, and she mentioned Rotterdam. I don't know if she mentioned the Damo sites, the sites that are present that the Army Corps has been studying for years, in Long Island Sound.

She said that the levels of contaminates are lower, and in some instances they are. But other contaminates were

present in those same sediments. And in particular, at the Damo sites, the Corps has been monitoring those sites for years. My understanding, from a reading of the Corps' reports, is that by and large the capping has been effective in containing sediments, and that the cap has been found to be stable.

But there is one site that we discussed at our last meeting, which Helen didn't bring up, and that was the James River site in Virginia. And the James River site is unique, in that a compound very similar to PCBs was spilled there. It was a pesticide called kepone, and has a molecular structure very similar to PCBs. They had a very similar problem, but they have one difference, in that the river had sediment transporting down and then slowly depositing.

They studied the site for some years, and finally concluded that the best thing to do at that site was no action, because natural capping was occurring.

That spill happened in the mid-seventies. Natural capping began immediately.

During this whole period the State of Virginia and EPA conducted monitoring of biota, of water and of sediment. The most recent reports released on that site indicates that this natural capping has been effective in containing those contaminates. They no longer are seeing any detectable levels of kepone in the water column at that site, and the

biota concentrations, the fish concentrations of kepone, are much lower.

So we do have other sites comparable, where capping of one sort or another has taken place, and has been effective.

We also have to understand that this site is unique, it's almost unique in the country. It's one of the few marine PCB sites that I know of. And that it's not so easy to say: "I'm going to find another site just like it, where that same solution was tried", because we are really on the cutting edge of how to remedy a site of this nature, and at this date.

Now let's talk a little bit about how this is going to work. There were a lot of ideas about how contaminates moved in and out of New Bedford Harbor in the sediments. People originally thought that tides came in, and storms came in, and stirred the sediments up, blew them up into the water column, the tide went out and they washed out. Studies to date have indicated that doesn't really happen. So we had to take a step back, and think about what is really happening there.

We found two processes, and I believe EPA concurs with this in their latest hot spot feasibility study, to be most significant in controlling contaminate migration from the upper estuary sediments. And we've tried to depict those here in this drawing. Bioturbation.

Now bioturbation is the movement of sediments through these biota, worms and clams and snails, and such, moving the sediment. Some of them move it right at the surface and turn it over, some of them dig burrows and turn it over. Some of them dig these pits and dig them over. But they move the sediments and they bring those contaminates up to the surface, where those PCBs enter into the water column.

The other process is molecular diffusion. Molecular diffusion, on a molecular basis, is a very, very slow process. To give you an idea of how these two compare, these guys move contaminates a 100,000 to a million times faster in this molecular diffusion. About a 100,000 to a million times faster. And that's when we began to realize that capping could work. Because if you could separate these two processes, it would take a long time for much of this PCB to get to the surface.

And that's essentially the theory of why capping works, of why it's worked at other sites, or why it should work at the New Bedford site.

The theory of the cap is to provide two layers, a layer within the cap, to allow all of these biota. We could even have some flounder in here, mixing up these sediment, for all of these biota to be healthy and active in the cap.

We believe the vast majority of these critters live in the upper 20 centimeters, actually probably the upper five

to ten, but a few down to 20 centimeters.

This part of the cap then is protection. This is where we provide a buffer for these PCBs to move on a molecular basis, which is a very random process. You can see these red arrows, which are PCB molecules. There are also PAH molecules. There are also heavy metal molecules moving randomly in every direction, but they move very, very slowly, and on their own they can contribute barely any PCB to the overlying water column.

Up here these biota mix the sediment and bring that contaminate right to the surface. It then gets into the water column, and that's how it discharges out into the rest of the harbor.

With that understanding, we developed some calculations, which quantified the amount of flux, or loss of PCBs from sediments in the upper estuary. And that relationship is affected by two things. It's affected by PCB concentration, which is shown down here, and it's affected by the area, the contaminated area.

What this picture shows really is what percentage of PCBs in the water column come from these different parts of the upper estuary. And it provided us a means of saying: "How much do we need to fix? How much do we need to remediate?" So we used this picture and this together. And what this told us, in essence, is that 99 percent of the

flux of the PCBs which discharge the sediments, the overlying water column, 99 percent come from sediments with about 50 parts per million or more PCB. 97 percent at a hundred parts per million.

And say, for argument's sake, a thousand parts per million might be around 75 percent. We chose 99 percent reduction as our goal. That's one of the reasons we selected 50 parts per million.

What does this mean in terms of effectiveness? 50 parts per million means 99 percent flux reduction. What does it mean in terms of reducing the rate of PCB flux or discharge to the upper estuary? Well, current estimates in the EPA's hot spot feasibility study per flux, are from 200 to 600 kilograms per year. And for those of you who, like myself, don't think in metric, that's about 450 to 1,300 lbs. per year.

We're going to have a half a pound per year coming through the cap. I'd call that pretty effective.

What are we going to have in the sediments in the cap? One of the concerns Helen had. Under this condition, 0.2 parts per million. That's a pretty rigorous clean-up level. We don't think this is going to present a significant threat to human health or the environment. We think the cap is going to be pretty effective in remedying upper estuary PCB problems.

One of the most important questions after effectiveness: "Is the cap going to last?" And we spent a lot of time looking at that, and we discussed it in a little more detail in that text hand-out. We went through each of these activities or criteria. We broke things up, sort of combined some, but hydrodynamics and sedimentation into one area, and public activity.

We talked already about some of these hydrodynamic forces. Are there tidal forces in the upper estuary that could scour the cap away? Studies indicate there is only one area where very high tidal forces exist, and that's right by the Coggeshall Street Bridge. We are not proposing to cap in that area. Tidal forces are not going to affect the long term integrity of our cap.

We looked at wind-driven currents. When the wind comes up, and it can be very windy, those of you who have been out on the harbor and the estuary on a windy day, it can be very windy, and that wind creates waves. We looked at that in terms of erosion. Similar to the tidal effects, it's not going to significantly erode the cap.

We looked at storm flow. Storm flow was found to very high on peak discharges in the upper estuary, northernmost part. So we designed a riprap system with geo-web, to protect the cap from storm flow.

We looked at surface water run-off, just to be sure

water running off from areas, parking lots, and hills and such, to make sure that would not have a significant effect on the viability of the cap. Those flows were very low, especially as compared with tidal-driven.

We then looked at other aspects, other natures of the upper estuary, and we said: "By nature do sediments want to scour out the upper estuary?" Well, studies have been done back since the middle seventies in the upper estuary, throughout the whole harbor area. And all the studies agree, sediments deposit in the upper estuary. They deposit net depositional area in the upper estuary. The tendency of the dynamics is to add material to the cap, not to take it away. In fact, the cap may increase with thickness with time.

So then we looked at the second group of activities, public activities. And to be honest, I hope that these increase with time. I don't think very much really goes on up there right now. I think that most people in New Bedford know that if you want to catch fish, you probably don't want to catch them up there. And I really haven't seen too many people beach combing up there. There is really not too much beach to comb on, with the exception of the Fair Haven wetlands.

We looked at shell fishing. Shell fishing is probably the most intrusive, the most disturbing activity, that could

occur in the upper estuary. Most of the shell fishing is going to happen in the area where those shellfish live, that upper 20 centimeters. Shellfishermen, as people, are the same as a big clam. They bioturbate or humanturbate those sediments. They are going to dig them up.

Well, what happens? Who has built a sand castle at the beach? The tide comes in, and those holes fill back in. We are going to be using a relatively non-cohesive material for the cap. These breaches will be self-healing.

Some comments have been raised some months ago by people about beachcombers, are they going to walk through the cap? The type of material we're going to use is going to densify pretty quickly. It's a sandy material. It's just like walking on a beach after the tide has gone out. It's very dense material. Beach combing will have no effect on the integrity of the cap.

We looked at boating activities. Well, first of all, big boats don't go into the upper estuary now. It's going to be shallower when we're done by about ten or eleven inches. They are going to go out there even less after remediation. So we are going to have some small boats go up. A boat might throw an anchor out, we agree. The effect will be less than shellfishing. It might create a little pocket. The tide goes in and out a few times. We expect that pocket to be self-healing and refill.

Prop wash. Prop wash affects more fine grain sediments, the muds and the silts that are up there right now. The sands are a lot coarser. They are not going to be moved as easily by prop wash. And if somebody was desiring to get into the real shallows, it would probably destroy their prop or their motor before they do much damage to the cap.

So in response to some of the concerns about permanence, we have looked at this very closely, and we will be willing to talk through or answer questions on any of these elements during the question and answer period. We do believe this cap will be permanent throughout our lives, and through our children's lives.

The next element of effectiveness is reduction of site risk. Well, we've all had a chance, or some of us have had a chance, to begin looking at EPA's risk assessment or impacts on human health. I believe that what they found is that direct contact and ingestion of sediments, consumption of biota, are the two principal exposure pathways. That little risk, no significant risk, was attributable to direct water contact. This is due to PCBs and heavy metals, not the sewerage that's in the water. Direct water contact, or inhalation or consumption of that water. We agree with these conclusions.

Direct sediment contact. Well, my review of the risk

assessment to date indicates that we are going to be capping the areas with elevated concentrations of PCBs down to 50 parts per million throughout the upper estuary. That we are really going to be precluding any direct contact or possible ingestion of contaminated sediments in the upper estuary.

If you recall, I'm going to flip back really quickly to some of these other pictures. There were some concerns about direct contact and ingestion of sediments in other parts of the harbor. As you recall, there were some areas around 50 parts per million. There are some PCBs here. These levels are relatively low. We don't think these pose a significant impact to human health.

In addition, these sediments really are not subject to any human contact. This is all bulkhead and industrial. This is all recreational up here. And unless someone were to dive in, and dive to the bottom, they would have no direct contact. There would be very brief contact as you swam to the surface and wash your body off.

And I guess you could eat the sediments, but it would be a pretty difficult thing.

So I think we've really addressed this consumption of soil, of eating of soils, and direct contact. Consumption of biota, to address that, we are going to be reducing, in summary, about 98 percent of the PCBs from the system. While 90 percent of the total PCBs will be contained, about

90 percent of the flux of the PCBs out of the upper estuary will be eliminated. That is going to result in a reduction of the PCB concentration in biota throughout the site area.

One of the things we thought was interesting though are the current levels of PCBs in fish. We have not received all of the EPA data to date, describing PCB body burden throughout the site area, but we did get one report on PCB concentrations in edible flesh.

Those of you who don't know, at an earlier meeting we discussed this briefly. Let me show you one quick map, so you understand where these fish came from, and then we'll go back to this chart.

EPA and the state, or the state, have imposed two closures in the New Bedford area. One is due to PCB contamination, and the other is due to sewage contamination. The closures are for different types of fish in different areas. But area one is basically the active harbor area. Area two is the area between Rickerson's Point and Wilbur Point. Area three is really a lot further out. Some pretty broad reaching areas.

Then I want you to overlay this to an extent. This part of the harbor and bay right now is also closed. And it's closed due to sewage pollution. John Bullard talked a little about his problems about getting his sewer lines fixed.

Well, keeping those areas in mind, let's look at these data now. Winter flounder, according to these. These are Battelle data, one of the EPA's consultants, not here tonight. Winter flounder within the harbor is about .88 parts per million PCB in the edible tissue. The FDA acceptable limit, which is true for chicken, eggs and fish is two parts per million. We're below that level.

Lobster, .83 parts per million. We're below the FDA limit.

In fact, the entire area for this tissue is closed right now to PCBs, is below the FDA action limit.

This right here is lobster liver. It's the same as our liver. Lobster liver accumulates PCBs. Our liver accumulates PCBs. These are much higher concentrations. This is also known as tomale or panel pancreas. Some people eat tomale, some people don't. That's why it was included in the reports. Some people eat tomale. I don't eat it myself.

The reason that we got these data was that EPA, with another contract, Metcalf and Eddy, was studying another bay, the Quincy Bay, which is part of Boston Harbor. And they were trying to compare different PCB concentrations. Their conclusion was that this type of a concentration, which was comparable to what is being seen in Quincy Bay, is not significant. That they recommended perhaps that

pregnant women restrict consumption of fish in that area, but that basically these types of concentrations were not significant.

We talked a little earlier about our team of experts, and our team is a little bit different from EPA's team. Now we have bio-degradation experts of our team, that discovered bio-degradation in New Bedford Harbor. We shared that with EPA, and we've had several meetings with them. And, based on my reading now of the hot spot feasibility study, I think they agree that it's occurring.

We started off by showing that bio-degradation is well-established in the literature. There are literally inches, almost feet, of documents that explain what happens to PCBs, through micro-organisms under controlled circumstances, laboratories.

We began looking at the PCB bio-degradation, and in the hot spot feasibility study, EPA acknowledges that the process is occurring. In New Bedford Harbor.

Some of our experts have also looked at PCB bio-degradation at other sites. Silver Lake, which is a site that General Electric is involved with; Hudson River is another General Electric site; and the Waukegan Harbor site we talked about earlier, that's an OMC site, Outboard Marine. What do these all have in common? They're all aquatic sites.

For years people were studying PCB bio-degradation, and they weren't finding that much. And one of the reasons was because they were looking at a lot of dry sediment. There wasn't enough water and nutrients for the microbes to live.

The other thing all of these sites have in common, including New Bedford, these sediments, and the sediments in the New Bedford Harbor, are anaerobic. They're without oxygen. It turns out that the anaerobic micro-organisms, non-oxygen needing bugs, are the right ones to effectively degrade PCBs.

This is relatively new science. It's been published probably for the first time on a wide scale basis in late 1986 or 1987. And since there there's been more articles released. But it's really a new cutting edge science.

John Brown of General Electric, who is working on these sites, we asked him to look at ours. He filed a report in 1987 on this. Since that time we have undertaken laboratory experiments. And one of our experts, Dr. James Tiedje, who has also published the findings of this in national journals, has been conducting experiments with New Bedford micro-organisms. These are the bugs that are living there now. We did nothing to create them. They are there right now.

He used a little higher temperature, because it can take these bugs a while to be active. A little higher

temperature, he was showing bio-degradation of the PCBs in New Bedford Harbor in eight weeks.

One of the questions that we have been getting, and I think it's a valid question: "How fast does this happen, and how extensive is the process?" That's a very fair question. We're using another expert. Dr. Yoakum was actually the individual that discovered PCB bio-degradation in Silver Lake sediments in the early eighties, which got John Brown interested in this.

She was in the process of finalizing her studies in her reports. She is seeing extensive bio-degradation throughout the upper estuary, in large parts of the harbor. John Brown looked at some limited number of samples. She is looking at a large amount of all the sampling data, that we used to generate that upper estuary PCB concentration plot. And we'll be discussing individual sample analysis, to demonstrate how this process occurs.

Dr. Yoakum's findings to date have indicated significant dechlorination taking the majority of the chlorine off the PCBs which, fro the literature, indicates the toxification and reduced toxicity of PCBs.

The last thing we looked at is capping the upper estuary, going to affect the process? From all we can see right now, capping should not affect the process. Once contained in place, the microbes should continue to degrade

the PCBs that will be contained.

The final element of the program is monitoring. This is the proof that it works. This is the proof that it has integrity. This is the proof that it has permanence. On a monthly basis there will be a physical survey of the cap, to insure that it's not eroding, that it's not being breached, and not healing, on a monthly basis.

On a quarterly basis we'll be taking surface water samples. We could take biota samples. We can sample the cap itself. All of these things should serve to determine whether the cap is working.

This is type of program, by the way, that was implemented at the James River site in Virginia with the kepone spill.

In our prior discussions we generally got questions, the same questions over and over from people. These were the five questions we got. Some of them we've already answered. "Can the cap be built?" What we are using is a series of proven technologies, technologies that have been used around the world, in the United States, and New England. We've blended the technologies together. We've taken things like geo fabric installation and sediment spoil placement, and building of wetlands, planning of wetlands, taken those things and put them together into a system that's innovative. But each of those components is proven.

I think, without a doubt, the cap can be built.

Is the cap permanent? We spent quite a bit of tie talking about each of the items that we identified that might affect permanence. We think it is permanent.

In answering that question we did ask: "Can the cap be breached?" Yes, it can. But what happens when it's breached? Well, the cap is self-healing. We don't think there is any significant impact. If someone would choose to go into the upper estuary, following recolonization, which probably is going to happen in two to three years. A healthy community would be re-established in two or three years. We don't think significant effects will result from that clamming.

Short term effects. Well, if you go back to our initial objectives, that was really one of our concerns. Some of the dredging alternatives, the treatment alternatives, carry with the some short term effects. Sediment resuspension, PCB volatilization. Incineration might have metals volatilization out of the stack. What do you do with the ash? Is there going to be wind blown problems? We don't think our program has significant adverse short term impacts.

Can capping remediate the hot spot? Well, that is certainly a central topic tonight. Our opinion is that it can, and it can because of the mechanisms that control

contaminate movement out of those sediments. They are limited processes. If you can separate the bioturbation activity from that diffusive process, that moleculare process, the cap can contain a hot spot as well as a moderate level of contamination.

Charlie Dill really discussed this at the very onset of our presentation this evening. We are looking for a solution that John Bullard said we could all live with. We think this is a cost that we can all live with. We are in the final stages of our cost estimates. We've gone through two revisions, and we're still under $15 million for the total program. That's about the same amount of money as the hot spot program.

We can fix 90 percent of the PCBs for about $15 million, as compared to a portion present in the hot spots. So, on that basis, we think it's a very cost-effective, and an environmentally sound program.

Because the technologies are not too innovative, we don't really have to do a lot more studying. And, in fact, that was one of the comments that the community work group raised. "What are you going to do with the ash? Has anybody tested the ash yet?" The answer was no. There's going to have to be more studies.

Well, we think we have most of the studies performed. EPA did a lot of them for us. We are using as much of the

EPA data that we can get in the support of our program.

What that means really, in summary, is that by 1992, about two years in the field, we think that the harbor could be remediated, and that's what we really all want.

So, on that note, I'm sure there will be a few questions this evening, and Charlie, thank you for welcoming us to the hot bed. We'll open the floor for questions.

THE CHAIRMAN: Let me proceed to handle up front first, as I initially announced we would do, and then call upon EPA consultants in the audience, and then open it up for general questions.

Let me start out with a couple of comments or questions, if you don't mind. I'm pleased that EPA's data was useful to you, as it was to us, in the design and in your work.

Can people hear okay?

MR. BOSWORTH: I'm going to come over there in a minute.

THE CHAIRMAN: Your proposal involves controlling flows through the use of three dams on the Acushnet River, and you noted that the City of New Bedford owns and operates one of those. What about the other two?

MR. SARAPAS: That's a good question. I happen to have a view graph here. The upper estuary drainage basin I think.

We have three dams. New Bedford Reservoir, 6.8 square miles drainage area. We have an un-weired structure. I think we can work with them.

Second, Hamlin Street dam. I believe this, right now, is under the jurisdiction of the City of New Bedford. We've actually talked with them. They have plans to retrofit this, because in the past they have had some constriction problems. I've seen the dam. In fact, it could use a little help. That could be part of the program. We could work with the City of New Bedford in resolving that problem.

The third dam is the Sawmill Dam here. I believe that is privately owned by the Sawmill Company.

THE CHAIRMAN: Is that just a mill dam or a flood control dam, or what? Do you know?

MR. SARAPAS: It is mill dam. There is a fish ladder in it. There are weirs in that structure. Yes.

THE CHAIRMAN: Okay. You mentioned the James River kepone situation. That was back in the 1970's, wasn't it?

MR. SARAPAS: The spill occurred in the mid-seventies, and it's been studied since then. Yes.

THE CHAIRMAN: So that whole operation though was pre any federal Superfund program? Right?

MR. SARAPAS: Yes. The reason that I brought that up, Mel, is not so much as to show a precedent, a regulatory precedent, but to demonstrate a technical effectiveness.

But yes, that's correct, that was not a post -- and for the people in the audience, that don't understand that, Superfund was amended in 1986, and there were new requirements in Superfund. And I think that was really your point.

THE CHAIRMAN: I guess my point was, even going back to that Superfund, it was amended in 1986, it was passed in December of 1980.

MR. SARAPAS: Yes.

THE CHAIRMAN: So there were no Superfund requirements on the remedy.

MR. SARAPAS: Oh, yes there was. I believe EPA's contractor studied that site.

THE CHAIRMAN: But since there was no remedial action taken under Superfund, and therefore, there was no requirements that had to be met.

MR. SARAPAS: To answer the question, I believe they did study it, and they selected a no action alternative, which included natural capping. So that was the remedy.

THE CHAIRMAN: Where is Silver Lake, Massachusetts?

MR. SARAPAS: Pittsfield.

THE CHAIRMAN: Okay, that's the Pittsfield one?

MR. SARAPAS: Yes.

THE CHAIRMAN: That's fresh water? Right?

MR. SARAPAS: Yes, it is.

THE CHAIRMAN: A couple of other questions, then I'll turn it over to the rest of the panel here.

If you know, there are some specific requirements in the Superfund legislation, that spell out what kind of remedies EPA is supposed to select at the Superfund site. And, first and foremost, of course, is that remedy has to be adequate to protect the public health and the environment. Secondly, it has to meet applicable relevant and appropriate requirements, and state and federal environmental laws. The Congress wrote in some other requirements also, such as a strong preference for treatment. As a matter of fact, I think the words are "treatment to the maximum extent practicable." How does that remedy comply with that congressional mandate?

MR. SARAPAS: Well, to be quite honest, that question is almost directed to a lawyer, because it goes right back to EPA's definition of treatment.

I have read the definition of treatment, which is contained in the solid waste act, not in RECRA, not in Superfund. And I think that's a question open to a lot of legal interpretation. And I don't really want to get into a legal interpretation tonight, but I would say that reading that containment and reduction of volume could be considered a treatment. That's exactly what we're doing.

That's a little bit of what is in the -- Helen's gone.

THE CHAIRMAN: She's over here.

MR. SARAPAS: Oh, you're up on the panel now. You've moved around on me.

That's a little bit of what I read into 21E, but I'm really not a lawyer.

The second part, and I don't want to sell the program on the basis of bio-degradation, but bio-degradation is treating the PCBs present in the harbor sediments, in our opinion. So that would be probably a non-legalistic answer to that question.

THE CHAIRMAN: Okay. Frank?

MR. CIAVATTIERI: Leonard, you indicated that the 45 centimeter cap that you're proposing is based on some work done by EPA's Army Corps of Engineers. And, as I understood you to say, validated only by some modelling done by your team, not any actual laboratory analysis. Is that correct?

MR. SARAPAS: Well, actually, we used your own laboratory data in our model.

MR. CIAVATTIERI: But you used EPA's data as a basis for the thickness of your cap?

MR. SARAPAS: That's right.

MR. CIAVATTIERI: And don't feel any further validation of that?

MR. SARAPAS: That's right.

MR. CIAVATTIERI: How do you respond to the fact that

the Army Corps of Engineers, who did that study, to determine the thickness of the cap, have proposed to EPA that the thickness of the cap needs to be two times that laboratory thickness, in order to account for the uncertainties that come with bio-degradation, and the differing opinions one can get from the various biologists, about the effective depth of bioturbation, and the Corps' concerns that lay a cap in an estuary situation, where you have tidal influences, and various depths of water? And based on the fact that the Corps of Engineers probably considered international experts on capping.

How do you respond to that large difference of capping thickness?

MR. SARAPAS: I'm going to turn part of this question over to Dr. Bosworth, who will address the bioturbation aspect.

I do know that the Corps is an expert in dredging, which is the principal reason they were retained on the project, but we did utilize their data on capping.

I think we had one of the benefits of speaking with the Corps, and the representatives, both out of the west, and some of the people here this evening.

My understanding of the times two is a safety factor, and a safety factor is, in part, due to breaching. What are we going to have to do to protect it from breaching? We

look at site specific conditions to address breaching. We went through each of those elements in terms of permanence. Is a 45 centimeter cap going to be permanent in the upper estuary? We looked specifically at the hydrodynamics in the upper estuary, to see if that would result in scouring. And, yes, it would. It would in the northernmost part. So we designed the cap to withstand those erosive forces.

So what we did is we looked at the concerns that we heard in the meeting, which is a little more of an advantage than just reading the summary and text, and tried to address them specifically.

We also looked a little more closely at the contaminate transport mechanisms. I don't really want to turn this into an arena where we get into long-winded technical debates, which most of the people here didn't come to listed to, but we looked at the nature of the contaminates that were modelled in the Corps' work, and we looked at how PCBs act. And that is why that one picture about molecular diffusion is so important. The process is very, very slow.

The Corps used a conservative tracer, something that solubleizes and moves in water, like water. And that was one of the differences.

All of this is going to be discussed in our upcoming report released next month, and we would be happy to meet with you on a full blown technical discussion to get into

that question.

MR. CIAVATTIERI: I also don't want to get into a detailed technical crossfire here, but I think I wanted to raise issues that people here can appreciate, where there are some differences in technical conclusions made on behalf of your proposal and our consultants.

MR. SARAPAS: Well, we were going to talk about the bioturbation.

DR. BOSWORTH: I was going to address that. Biologists always sit in the back seat on these kinds of things.

But I think there is very close agreement between what we have looked at, in terms of bioturbation depth and the Corps. They felt that 20 centimeters was an adequate protection for bioturbation. We've done further extensive literature review of what is expected up there, and we feel that 20 centimeters is adequate as well.

Now there are species who, in other places, on the coast of the United States, may grow deeper than that, but their habits in this environment are such that it's unlikely that they'd be deeper than 20 centimeters. So we feel comfortable that the significant majority of the species that will live there now, or will live there after the cap, will stay in the top 20 centimeters.

MR. CIAVATTIERI: Let me ask you a second question, then I'll turn it over, because I'm sure a lot of people

have questions, and they may raise the same issues.

You indicated that your point of departure for capping was 50 parts per million, based on what happened in Waukegan Harbor, which is, I think you would admit, not necessarily the same geo-hydrological conditions that one can't arbitrarily extend what's happening in one estuary, and at one lake side situation, to a harbor situation with tidal influences, with one that doesn't have tidal influences.

You've also indicated that the 50 parts per million, as I understood it, would reduce the flux 99 percent, which happens to be a number not exactly the same as the EPA's, but somewhat higher than our predictions. And at this level that may make some significant difference. Percentage points add up.

But the point I wanted to ask you is, what information will you present to us, other that the fact that your clean-up level is consistent with this one other site, and that it gets 99 percent flux? That, in fact, one can expect the applicable regulations regarding water quality criteria and reduction of fish levels which, by the way, seems to be a selective presentation, on what is actually out there, would result?

What are you going to provide to EPA, the state, and the public, that other than this view, what solid information you're going to give us?

MR. SARAPAS: Well, I'd like to say that's all of the data that we have on fish. It's not selected, it's all that we have. And if we can get more we'd be happy to include it. And I'd like to look at it, because without that data it's been very difficult, actually, to try to predict the percent reduction of PCB in the biota. We don't have all of the food chain pieces.

Actually, one of the pieces that we're still waiting for, I don't know how many millions of dollars were spent on that transport and food chain model, but that type of work, without us having to spend that same millions of dollars, would allow us to quantify.

So in lieu of having all that data, we tried to take a little more pragmatic approach. And I think we did the same thing your consultants did, Frank. And that is, we looked at what happened as you reduced that action level, and likely it will be to achieve it.

In dredging, we believe there will be some resuspension. In dredging, if you make a single pass, there is going to be sloughing in those soft sediments.

We tried to put all these things into perspective, and we tried to blend then the data that we did have, i.e., the amount of PCB we could contain, the amount of flux we could reduce, into the pragmatic aspect of how could you remediate New Bedford Harbor. That also fit into our selection of an

action level.

In going to an action level much lower, or lower than that, may result in a program that's so extensive, it could involve dredging the entire thousand acres. That could be an option EPA selects, but it's one that's costs are probably going to exceed a billion dollars.

MR. CIAVATTIERI: I think I should point out to the public, which I hope knows that, that EPA's proposal for cleaning up the hot spot is not its overall remedy for cleaning up the harbor, and that we ought to be careful we are not comparing a first phase clean-up with what is purported here, as to be an overall remedy.

EPA does intend to come up, in the very near future, with a plan for dealing with the upper estuary and the lower harbor and bay. We are not stopping at the hurricane barrier. The site, by definition, goes out beyond the hurricane barrier.

Let me ask you one other quick one, and then I will let somebody else. And that has to do with the placement of the cap and the geo-fabric. You seem to state, with a great deal of assurance here, that in fact placement of this cap material on top of the hot stop in the rest of the estuary, and this geo-fabric can be done without any disruption of that material causing resuspension, a situation which we found, during our field studies, to be rather difficult to

control in even low concentration areas. You get a mud wave when you put any kind of load on that really mushy material.

Can you point to us any experience or any other areas where there has been the placement of a cap, or a geo textile fabric, or an armoring material, in a situation where the concentrations of contaminates are at such extreme levels?

MR. SARAPAS: I'm going to keep my questions to you short, but that was quite a question.

MR. CIAVATTIERI: Somewhat of a statement.

MR. SARAPAS: Yes. Well, first of all, I did happen to bring an article along, which was in the American Society of Civil Engineers Magazine, Civil Engineering. It's entitled "From Soft Soils to Heavy Construction." I'm sure you've seen it.

This is a method that would be similar to the construction of the CDF that you and the Army Corps did.

I have to explain though the difference between capping and the difference between constructing a ten or fifteen foot high dike. The process is very different.

Our geo-technical engineers bought this concept a little bit more perhaps than the concept that was used. The concept that was used in constructing the CFD, that created this mud wave, was to build the load straight out. You not only had a mud wave problem, you had a displacement problem.

It actually displaced those underlying sediments, right out. It squished them out.

How can you prevent that? You prevent it by uniform load placement. That's where the diffuser head comes in.

As we place our cap, keeping in mind it's not ten to fifteen feet, it's about eighteen inches, the loads are much less. We're going to try to place the load more uniformly. Part of the program will be to have an air boat or a boat, something which won't stir up the bottom, to move that diffuser head around, so we try not to build up a big load. The intent will be not to build up big mounds of sediment. And to do that cap placement will proceed at a lower rate.

I think you learned this also in the PDP. It was easier to go at a lower volume to achieve your objective, rather than to go at a high volume and put down a lot of material, or take a lot out fast. So by a lower rate of displacement, by distributing the load more, we believe, and our engineers have said we will not have much of a mud wave form.

MR. CIAVATTIERI: We did learn very much that operator control and design is extremely critical. And that any failure of that can have some major consequences.

I'm going to now turn it over to someone else.

THE CHAIRMAN: How about the state? Mrs. Waldorf?

MS. WALDORF: I have a few thousand questions.

The main thing. The letter fails to mention, because we were focusing on what we had heard so far, and the permanency standards contained in obviously the statute and regulations we have to follow.

But part of the state's role in the federal Superfund program is that the state must guarantee the operation and maintenance of Superfund sites, once a remedial action is complete. That is, anything that would be required to either repair or maintain, or run any kind of treatment facility that would be required, whatever the remedy is, the state must guarantee, under the law, to maintain that.

We obviously have some very serious concerns in the state about our ability to pay for maintenance of Superfund sites in the future. One of the reasons that we are very concerned about a cap for this particular site, over these particular levels of contaminants, is that we feel that because it's so important to monitor this, and make sure that the materials do not re-escape into the environment, that we could be facing in the state some pretty severe costs in terms of operation and maintenance.

My other concern---

MR. SARAPAS: Is that a question.

MS. WALDORF: I just wanted to make that as a statement. I don't know how many people know, in the Superfund process, that it's the state taxpayer dollars that

pay to maintain any of these remedial actions that are implement by EPA, or PRPs, or anybody else for that matter.

MR. SARAPAS: Can I respond with a statement?

MS. WALDORF: Sure.

MR. SARAPAS: What percentage of the total remedial cost will the state pay? Does the state have to pay ten percent of the total remedial cost also?

MS. WALDORF: Yes.

THE CHAIRMAN: Well, that's assuming that the clean-up is done by using the fund, the federal trust fund.

MR. SARAPAS: Would it also be then valid to assume that perhaps monitoring could be -- if the remedy is paid by the PRP, then monitoring might be part of that program also?

MS. WALDORF: For any foreseeable period of time, it would have to be for.

THE CHAIRMAN: I would just acknowledge that when we do have settlements for PRP remedial action, the PRPs do sign on for long term monitoring, thirty years and more in the future.

MR. SARAPAS: Could I also ask, is there a provision in Superfund for a re-opener, and how frequent that is?

MS. WALDORF: Yes, there are provisions for re-openers. But my point was that this was something that potentially could be a state cost in the future and, therefore, the Commonwealth has a stake in making sure that the operation

and maintenance costs are not excessive for the future.

MR. SARAPAS: I guess one of our objectives was to look at costs in a total picture, a comprehensive picture. And I know EPA has not released the feasibility study, and they will be releasing the feasibility study for the remainder of the site.

It's also quite possible that ten percent of the costs of that remedial program, which will be a very immediate cost, might be larger than a monitoring program. And if the PRP's agree to participate in the remedy, and really that's the whole purpose of this evening, for solutions oriented with trying to come to a solution together. As Mel said, there might be some agreement on who would perform that monitoring.

MS. WALDORF: Well, although that may be true because, as you said, the site is unique, and because we don't really have an experience specific to this for capping of material this highly contaminated, we don't know what possible costs could be in the future, for either monitoring, or maintenance, or rebuilding the cap, should it slump, for this particular site, for these highly contaminated materials. So, therefore, that is an unknown cost at the moment.

MR. SARAPAS: We'd happy to put that cost together for you.

THE CHAIRMAN: Does your $15 million cost include monitoring?

MR. SARAPAS: It did not includes monitoring.

THE CHAIRMAN: For how many years?

MR. SARAPAS: It did not include.

THE CHAIRMAN: It did not include? Okay, so it's $15 million, plus whatever that monitoring program would cost. Okay.

MS. WALDORF: The molecular diffusion issue, and the flux, or amount of PCB flux. Now those estimates are based on what average concentrations of PCBs and sediments?

MR. SARAPAS: That is the sum total of all PCBs that will come through the 135 acre cap.

MS. WALDORF: But the concentration that was listed for sediments breaking through the cap, is over the top of what concentration? What average concentration underneath?

MR. SARAPAS: It's irrespective. This is really one of those technical questions, because the PCB transport rate is limited by the solubility of PCBs in water. And the PCBs in water, for the PCBs that we have, in New Bedford Harbor, their solubility ranges 10 to 60 parts per billion. And doesn't really take more than -- Weldon, do you remember the numbers? Is it 250 or 500 parts per million to saturate the water?

DR. BOSWORTH: It's on that order. Yes.

MR. SARAPAS: Above that level, Helen, it doesn't really matter. You can't get any more to come out any faster. And that's really the critical -- and that's a pretty complicated issue. That's probably one of the issues that should be addressed better in writing, in our report. It could be a two hour discussion.

So we will respond specifically to that question. It's a very complicated issue. We will be responding to that specifically in our report.

DR. BOSWORTH: But the concept is, once you remove bioturbation from the contaminated zone, diffusion then controls the flux rate. So once you get it under there, it doesn't matter what the underlying concentration is of PCBs.

MS. WALDORF: And one last thing. The bio-degradation of PCBs that was described in these little bullets, the degradation throughout the harbor in the 1987 study, what concentration of PCBs did that degradation occur on, for the materials that Dr. Brown used in his study?

MR. SARAPAS: I'm not sure what Dr. Brown used, because that was so long ago. That was the precursor to this whole program. Dr. Yoakum has shown PCB degradation to be occurring, in the sample she's looked at, up to 60,000 parts per million. I believe there was one sample reported with a presence of 64,000 parts per million. Is that correct? I believe there was 64,000 parts per million. And that will

be included in Dr. Yoakum's report.

Dr. Teidje's results, and I believe he's reported some of these to a science magazine, has indicated that the degradation rate is higher for some of the more elevated concentrations. Now his idea of more elevated, in his laboratory studies, was 5 to 100 to 1,000. He saw a faster rate at 1,000. But Dr. Yoakum is seeing transformation, and significant transformation, of concentrations up to 64,000 parts per million.

THE CHAIRMAN: Ms. Sanderson.

MS. SANDERSON: Being the new kid on the block, I will be brief, and I'm beginning to get up to speed on the wealth of information. I'll simply make one observation.

Although I am familiar with the Waukegan Harbor site, I would just like to point out, although they use a 50 parts per million PCB clean-up, that record of decision calls for treatment of highly contaminated soils, sediments rather.

I think it's important for people to understand that it's a combination containment remedy, and it does call for treatment of the higher contaminated materials.

THE CHAIRMAN: Okay. I'm going to be a little bit flexible. I had originally said what we would do, after we finished the group up here, is turn to EPA's consultants, and so forth. You people have been very patient sitting here for a couple of hours at this point. And I think what

I am going to do is ask the public if you have any questions or comments, to do that. We can always stay here, since we are on the payroll, we can always stay here and make the consultants earn their money by asking questions after you.

So let's go to the public. Now, again, when I call upon you, please identify who you are, and what your affiliation is. Let's start right over here.

MR. DEVINE: My name is Richard Devine. I'm now just a private citizen in New Bedford. I am a professional researcher. In 1981 I developed for the City of New Bedford an economic development plan, with a committee of consultants from the city government.

My question doesn't have to do with that, that's just my background. My question is, for those of us who are not technical in this area, can you tell us? You focus on the results of what you propose to do. What I'm interested in knowing, what my question is, to what degree can you assess the error free aspect of the process you propose to do? In other words, what errors can occur during the process?

MR. SARAPAS: I think this is the same type of process EPA tried to go through. We're going through a multi-phased peer review process. We have, I think, in excess of fifteen groups of consultants involved in the project.

What we're currently in the process of doing, actually we have been doing this for close to a year now. I believe

the first time we met with EPA was in November, and we actually talked about the remedial program with them at that time. So we have been going through critical flaw analyses.

I'm going to break that down into two pieces, because I think that's a good question. The first piece is the practical piece, can you do it? Can you do it? And that's where we've taken the people with a lot of years' experience, a lot of marine engineers, and we've reviewed and talked to other people that have constructed projects using the same technology.

The technology is proven. The technology is used every day. Every day thousands of linear feet of geo textile get placed. Every day people build breakwaters by placement of underwater sports.

We got one of the best experts. We didn't bring him to the community work group meeting, but we brought one of the best experts, and he came to an EPA presentation, Ed Garbisch of Environmental Concern. He works at lot with state agencies and the EPA, rebuilding wetlands, or with the Corps, when they dredge material, build an island, and want to stabilize it. So we have tried to minimize the number of possible errors, by using proven pieces to build a system.

So on that site we're pretty comfortable, and we've gone through many peer reviews, with different types of people, to say "you've got a good system."

We've actually been working on this since probably 1985, five years, the ideas.

The second part is the theory, the effectiveness. And that's probably where some questions are going to have to be hashed out. That's one of the reasons I brought up the kepone river, James River site. It's one of the few cases that we have, that's similar to New Bedford, where there's been long term monitoring. There's been monitoring there since the seventies.

That gives us an inclination of does this process work? Does capping work? We are then trying to take those data, apply them to our site, look at the specifics of our site. We're designing the type of material that we would put to build a cap, to put down, trying to take all those pieces in together.

I would have to say, in honesty---

MR. DEVINE: Those results are in. But what I'm wondering, for instance, is what percent of your key labor force that would do it, if it went into effect, has done it once before, and what percent has done it twice before?

MR. SARAPAS: That could be part of the assignment of contractors to be quite honest. There are many people that have done that. We could have brought pictures demonstrating the whole process. It's been done before. That can be part of the performance package that a

contractor would have to respond to, to be eligible to participate in doing the project.

We do that ourselves, on other Superfund work, on other hazardous waste site work, part of our bid package is qualifications. And those people have to present the qualifications on the people that will be involved, to make sure they have the appropriate training and backgrounds.

That's a good suggestion.

THE CHAIRMAN: Okay. Other questions from the general public? Yes, way down back.

MR. NUGENT: My name is Corey Nugent, and I'm just a wee bit confused. That's my state of mind. In regards to relatively is a word you've thrown around a lot. Relatively safe, relatively large. We know, or at least you stated in your speech, that the FDA has set a limit of two parts per million edible foods.

Now what is 50 parts per million in the Acushnet River, in the bay and so forth? What does that mean? Has there been any investigation as to what sticking your hand in this is going to be, or eating this, or playing soccer on top of the capped fill for kids who are doing that right now? Do we know? Do you know? And where does this word "relativity" come in?

MR. SARAPAS: That's a very good question. I might even do a little drawing on that question.

The question is, does anybody really know how toxic PCBs are? That's probably a good place to start off with.

A lot of testing has been done with PCBs, a lot. I said there were inches of documents before. There's feet of document. In fact, one of the thickest pieces of our report is going to be a discussion of all of those documents.

The first thing that we've learned, not all PCBs are equal. It's like saying arsenic is equal to cadmium, is equal to lead, is equal to copper. Some people take copper as a vitamin. I don't know anybody that takes lead as a vitamin.

What kind of PCBs have been studied a lot? I'm going to try to answer your question, because relative is as best we can do with the science that we have.

These are some of the most studied PCBs. These are four types of aerochlors, if you've ever heard that word in these meetings before, and I'm sure you have. Aerochlor 1260 to 1242, 1254 and 1016. This has 60 percent chlorine by weight, 54 percent, 42 percent. This one is a little weird, it's like about 40 percent. Weird in the nomenclature more than anything. This is what we have in New Bedford Harbor, those three. We do not have this one. Okay?

Studies by about everybody, and everybody agrees, this one causes cancer in laboratory animals. Nobody argues

that. EPA's position, and correct me if I'm wrong, this causes cancer. Well, there's a group that EPA works with that published a toxic profile. They recognized that there were different toxicities with different PCBs. And other states have recognized this also.

Our studies of all this literature indicate the PCBs we have in the harbor are not carcinogenic to humans. They do not cause cancer in humans.

The State of California, and the State of New York, are probably two of the most advanced states in setting precedent. Massachusetts is third. But California tried this. They had a major piece of legislation called Proposition 65. They reviewed all of this literature, carcinogenic, not carcinogenic. They do not rate these as carcinogens.

MR. NUGENT: I don't understand that. It's a matter of points more than six percent. Is there something you're not telling us here?

MR. SARAPAS: It's the next step. And that is, what is a PCB? Maybe you've seen this before. But PCBs are a mixture of compounds. They're a little bit similar in nature, in that every PCB looks a little bit like these. Each of these nodes, each of these red nodes -- I'm going to make them green nodes -- are carbon molecules. So every PCB has twelve carbon atoms in it, and it's shaped in these

rings. They're cyclic.

And then comes chlorine, poly-chlorinated biphenyl. This is a biphenyl. A chlorine can be on any of these spots. What people seem to be concluding, and this will be discussed as part of our report, is that where the chlorines are, and I'm not a toxicologist by background, but where these chlorines are has a lot to do with toxicity. And that, for whatever reason I can't say, these things only seem to be present in 1260, the ones that cause the cancer.

So when we talk about what does it mean to take 50 parts per million, and stick your hand in it, for example? Well, that could be part, and will be part, of our risk assessment. We are preparing a risk assessment to answer that exact question. There are very few areas that will be left throughout the whole site where you could do that. While all 50 parts per million in the upper estuary will be capped, the areas in the harbor itself, that we found to be present there, based on EPA's data, are underwater.

So if you are willing to go swimming in that harbor, and maybe dive, you could get into it.

EPA has released a risk assessment, and they tried to look at these kinds of things with some very conservative assumptions.

By and large, the risk levels using probably, not extreme, not conservative assumptions, are that kind of

exposure. And I believe this is correct, and you can correct me if I'm wrong, using probable exposure scenarios, in the other parts of the harbor where we have those types of concentrations, are in the acceptable Superfund risk range for cancer causing compounds. They're in the ten to four, or ten to seven range.

So it appears that this kind of clean-up level for this site, which is not a soccer field, which is not a beach that people walk on every day. It's a harbor, most of it is under water, it's probably a pretty safe level.

Our risk assessment will be addressing that specifically also.

That's where some of the relativity comes in, varying toxicities.

By the way, EPA's risk assessment based everything on this. That's their policy. They have to do that right now. That's their policy.

THE CHAIRMAN: I would just respond to that very briefly by saying that I think it should come as no surprise perhaps that EPA's assessment of the risk posed by the PCBs in the harbor may differ somewhat from that presented by AVX. We do have our risk assessment. It's out for your comment and review, in the administrative record, and you may want to take a look at that. And you may want to see if you can get your hands on a copy of the report that AVX is

putting together, and compare the two, and make a judgment, which is what EPA will be doing.

MR. CIAVATTIERI: I would also point out that EPA, Region One, sent all its information on the concentrations and make-up of PCBs in the estuary to its risk assessment group at headquarters, which is responsible, in part, for setting out and making determinations on the carcinogenic and non-carcinogenic effects of PCBs. And their determination was the combination that we had was, in fact, perhaps more toxic than the standard toxic carcinogenic toxic factor that EPA used in its calculations.

However, since those values were already unacceptable, that number was not used. So I think we have a strong disagreement between EPA and AVX, as to whether PCBs, as they exist in the New Bedford Harbor, and PCBs in general, are a probable carcinogen.

THE CHAIRMAN: Okay, next question? Over here.

MR. FINKELSTEIN: My name is Ken Finkelstein. I'm not exactly with the public. I'm with the National Oceanic Atmospheric Administration, or NOAH. What NOAH is is a federal trustee for natural resources, natural resources being the wetlands, salt marsh, and of that nature.

We are now in negotiations with AVX to settle on the damages caused in the past and the present. And what I'm here tonight for is to try to make sure, or be left with the

feeling that the future holds well for the New Bedford Harbor.

And one thing I was disturbed about what your target level. And this is something that had been brought up, 50 parts per million. And you may be right, maybe it isn't carcinogenic to people, but I'm concerned about the fish. I'm concerned about the biota. And certainly our data shows just the opposite.

We would never allow 50 parts per million target level if we had any power over that. This is something that we feel very, very strongly about, that 50 parts per million is a detriment to the natural resources.

And your data even showed that. The lobsters are suffering. You showed the edible flesh being below FDA limits, but your levels were very high. So the lobsters may be fine to eat, but they are suffering, and maybe there's less lobster out there. And that concerns the fishermen, and they should be concerned about that. That target level is way too high.

MR. SARAPAS: Could I respond.

MR. FINKELSTEIN: I have a question.

MR. SARAPAS: I figured you might have a few.

Number one, as part of the pilot dredging program, some bio-assay work was done with the sediments from the upper estuary. I don't know if you're familiar with that work,

but I believe, and you can correct me if I'm wrong on this, the toxic effects that were found with those sediments were attributed to the heavy metals, and not the PCBs, and these were several hundred parts per million.

I am not going to argue the toxicity of a PCB to all of these marine species, because that's a pretty big question.

DR. BOSWORTH: I think those in situ bio-assays were more the aquatic concentration of PCB. There was one sediment bio-assay done by EPA at Narraganset, which we feel are proper controls. In other words, it didn't control for other potential toxins in the sediment itself.

There is, in the literature, certainly evidence that PCBs of some toxicity, or some concentration, can be toxic to aquatic species. Surprisingly, with the exception of one bio-assay that we feel did not adequately test for that, there has been very little site specific information gathered in New Bedford Harbor as to the relative degree of toxicity.

MR. FINKELSTEIN: The data we're using is from literature.

DR. BOSWORTH: That's right.

MR. FINKELSTEIN: That's what's available.

DR. BOSWORTH: This is a subject for a lot of research right now. EPA has some independent grants going on that it's trying to define just exactly what the relationship is

between sediment concentration of contaminants, and species that live in the overlying water.

MR. FINKELSTEIN: But at this point, we're right now saying these are what the levels are, and they're too high for us. And the literature seems to support that.

Although I am the first one to admit that there is more information that needs to be collected. What we have is what we have.

The second question I had had to do with the metals, since you brought them up. You didn't mention them at all. These metal levels are way above the AVX threshold levels that were found in Commencement Bay, Washington, which is another site where testing was done, and it wasn't mentioned at all. So I think that should be addressed as part of your remediation.

You said that EPA is not looking at that specifically as part of their -- I think it's something you should do.

MR. SARAPAS: Maybe I mis-stated or I mis-quoted. I'm not sure. EPA did look at metals. To date we have seen just the human health effects risk assessment, and we did address that, in that the areas we are capping do have the highest level of metals also.

We felt that we were covering that base from a human health assessment.

I guess I would accept your comment. I think more

could probably be looked into at the site, in terms of the viability of the area.

DR. BOSWORTH: I think the same comment, in terms of heavy metal toxic effects has to be made.

Essentially, one of the things that was done in the pilot dredging study, was a screening of the water in the area by using a variety of short term bio-assays to ascertain what the effect might be.

They had no real positive results, positive in the fact that they saw toxic results. I think it was Chaffee, or something like that, where they had a speculated effect of copper. But that was not treated any further.

I think we are still in the same situation in terms of the comment I made in regard to PCBs. As you know, metals in sediment are often bound up. And just because you have a high level in the sediment doesn't necessarily mean that they are available or bio-available to the species.

MR. FINKELSTEIN: I agree with you there, but unless we are going to go out there and do all sorts of biological studies, we have to come up with some kind of target level, and be it conservative, overly conservative, well so be it. I don't know what else to say. The only data we have is the work that was done in Commencement Bay, Washington. And that is fairly conservative compared to what the numbers here are.

I'll end it there.

THE CHAIRMAN: Fine. All the way down back.

MR. MATHISON: Thank you. My name is in Mathison. I'm the executive vice president of the New Bedford Area Chamber of Commerce.

I'd like to say I'm very impressed by what I've seen here tonight.

THE CHAIRMAN: Hold it, I'm sorry. I'm sorry, our recorder can't pick you up.

Would you mind coming forward a little bit, so that our recorder----

MR. MATHISON: I'm not being heard?

THE CHAIRMAN: You're not being heard, because he can't pick you up on the microphone. So either come up and use the mike---

MR. MATHISON: My name is Jim Mathison, and I'm the executive vice president from the New Bedford Area Chamber of Commerce. And I'd like to again say we're very impressed with the presentation that was made tonight, in that it was one of the most comprehensive and easily understood, for the layman, which I am when it comes to an issue like that.

And I am also very impressed by the fact that I think it represents a cooperative effort between the government agencies that are represented here, that have worked so hard on it, and many citizens, as well as the PRPs who have been

involved with it.

The New Bedford Chamber, in July of 1985, published a document that we just simply called a piece of white paper, pertaining to the issues here. And one of the things I really felt good about hearing, just a few minutes ago, was we were very straightforward in presenting a lot of people, in 1985 and before that, scientists and technical people were stating at that time that PCBs, in many instances, and was demonstrated here, were not a human health hazard. You would never believe that by reading any papers or any media reports.

We looked into it, again from a layman's perspective, and tried to present information on both sides. And I'd like some responses to the accuracy of what I'm saying, if you're familiar with it, anyone who is here. But in the mid to late seventies there were two studies done on General Electric workers, who had PCBs all over their hands. They weren't just walking on top of soccer fields that had some under the grass roots, they were working with it, and working with it regularly. And they had been working with it for at least eleven years, and that's an important figure. And in those studies that were completed there were no higher incidences of cancer, or other human health risks noted, as compared to the normal study groups.

The eleven year figure I thought was important, because

there was an incident in Japan that seemed to have started all this, where people ingested rice oil contaminated with PCBs, and eleven years later many had died, and many had died of cancer, which was far greater than what would have been expected.

One of the points I want to get to, in your presentation and the strengths of it, things I like, ties into that. Because it was subsequently found, after the stampede of fear on PCBs began, that the contaminated rice oil, the rice oil with the PCBs, had been heated. And it causes a chemical transformation, creating something called a chlorinated dibenzyl furens, which is known highly toxic substance to humans. And you wouldn't want to have that around you at all.

The treatment that is being proposed here is one that does not involve any incineration or heating. The treatment that is being proposed by the EPA does.

Now if it runs normally, and if it's designed and controlled properly, as the similar types of statements that have been made about this proposal, then everything would be fine there too. But if it wasn't designed, controlled, or operated properly, and you had an accident, in my opinion you would have a far greater health risk, because you would have introduced heat to the contaminate PCB itself, which, in the first place, in my opinion, is not a hazard, but once

heated could create something that would be very hazardous to all of us.

I made some notes. And the reason I was impressed was because you are proposing using existing proven technologies, no new wizardry. And it involves cooperation between yourselves and the agencies, which I think is something that is most needed in our community, because we're folks from New Bedford. And I'd rather see is solve it together, rather than having powers from outside come in and try to do what they feel is the best for us.

I think it recognizes the bio-degradation. That's something subsequent to publishing our white paper, I had an opportunity to talk with one of the scientists here, Dr. Brown, in 1986 or 1987, after we published our paper. And he had first discovered bio-degradation in the Hudson River. And studies have taken place here. And I don't think that's really been brought out. That the things are being bio-degraded at a fairly rapid rate, sitting down there right now. And they're not milling around. They're not migratory in our water right now.

And so I think just recognizing that it important. It minimizes the disturbance of the sediments, as compared to dredging. And something I don't want to do, I wouldn't want to see it disturbed, so that it can migrate, and back up into the water, and flow all around, because it can change

all the studies that have previously been done, in terms of readings that have been taken in certain parts of our harbor, and could actually be altered. Because if you get a back up in the water stream, if it does go with the tidal flow, it's going to be not only above the Coggeshall Street Bridge, but all the way down points south as well.

The high level of effectiveness, and some of the statements made about the relatively. If that high level of effectiveness is not being challenged by the other parties that are here, then I would have to believe that's something that---

THE CHAIRMAN: Let me interrupt, just to make sure that everybody understands what we are doing tonight. We're having a presentation by someone on an alternative clean-up plan for the entire harbor. It is not a direct comparison for what EPA is proposing to do. Point number one. We are not proposing to clean up for the whole harbor at this point, only the hot spot, only the first operable unit.

Second, we have been cooperating to AVX and their consultants, in terms of exchanging data, and so forth. But this is their plan. It is not a joint plan by government and by AVX. It is an alternative prepared solely by them for our consideration, as an alternate to what we have planned.

But I think we want to be careful we don't create any

mis-impressions about what you've been listening to tonight.

In terms of the fact that we have not challenged every statement that has been made tonight in the presentation, does not mean that we do not reserve unto the government the right to challenge every statement that has been made, through the response of the summary process, as we go through our remedy selection.

So there have been many things said tonight. The fact that we have sat here and not interrupted does not mean that we agree with those statements that have been made.

I'll get off my soapbox. I just want to make sure you understand what we're doing tonight. Okay? And the fact that we have asked a few questions. But that's just the tip of the iceberg.

Sorry for interrupting.

MR. MATHISON: Any misinterpretations I might state, would you please repeat them to me.

I guess my real feeling here is that in the comprehensive sense I know there are a lot of legal issues that pertain to, and technical issues, and policy issues in EOPA that pertain to these things called PCBs. I just think, as a community, that we really need to take a very hard look at the total issue. We need to take a real look at the different kinds of PCBs, and which are toxic, and which aren't, and if we recognize that, and if there is a

remedial action plan that needs to be implemented in the hot spot area, I would think one that is effective, and has the full support of the PRPs, and hopefully can gain the support of the regulatory agencies, and could be done quickly with proven technologies.

From my perspective, from where I am sitting, I guess what I am trying to do is I'm trying to say what I've heard so far tonight, and there are more questions that my organization would have for these people, and we will probably want to meet with them now, I would hope that they would be listened to in earnest, with an ear toward accepting what they're saying. And that there wouldn't be any professional defensiveness, which I doubt that there is anyway.

I'm just trying to be somewhat forecasting, ownership of plan types of issues that could come up.

It's a very interesting proposal. It seems to be one that eliminates the one single fear I have of a PCB, of an individual who's a layman, who's done quite a bit of reading about it, and that's I just don't want to be around one that's been heated up. Because if something goes wrong them then I know I could have some problems.

Because of that, and the other things that I stated on this hot spot area, I'd really like to offer support.

THE CHAIRMAN: Okay, thank you. Next?

MR. DAVIS: My name is Robert Davis.

THE CHAIRMAN: Bob, can you come up and use the microphone?

MR. DAVIS: I'm a little raspy. Can you hear me all right now?

My name is Robert Davis. I testified at the last hearing. And I want to commend you in many ways, because you offer something which treats the whole estuary. And if the mat is effective, as you say, it would exclude all contaminates, heavy metals, as well as PCBs.

But I would still stick with the point I made at the last meeting. I do think there are enough unknowns, so more directed research would be very helpful.

Ultimately what you want to do, and this is very consistent with the mandate of the EPA, is to restore that estuary to its natural state, to the extent that it can be done. And that estuary is, for any observer, unprejudiced observer, is very beautiful. When you get south of that you have what the CDM classifies as an industrial harbor, so your expectations there are radically different than the expectations for this estuary.

When I say you have certain unknowns, I mean the fellow from AVX said of the study recently done by the EPA, one of which was lobster, one of which was winter flounder. And then it was testing of the edible muscle, and testing of the

tomale. And it was a contrast in the levels between the inner harbor, outer, etc. etc. Okay?

And my question, when I read that, it said for the inner harbor, but you don't know where from in the inner harbor. And it may have been a sample that migrated from outside, came in, would be going back out.

What I have seen lacking is any real direct testing of species north of the Coggeshall Street Bridge. As a matter of fact, I think what you can do, in order to accelerate that research, is pen some crustaceans in there and observe them over a period of time. And you know what their levels are before you put them in, and find out what their levels are after.

If my memory serves me correctly, in 1976, the EPA, I believe, sampled the hard shell clam, I think it was, it may have been the soft shell. The soft shell is generally not common in that area. And I think the levels were much, much higher than say in Clark's Cove. I think it was like 22 PPM. That's very high for a shellfish.

I mean, you could take muscles. John Farrington, with a muscle watch, uses a station which was off Butler's Flat. I think he had one just on -- I'm not sure if he had one directly on the inner harbor, but it would be the outer part of the inner harbor. But what you could very simply do is put some muscles in the upper part of that river, and see

what their levels are, and compare it with the outer harbor. That would give you an idea of the impact on the environment, on the species there.

The one reservation I have with respect to the cap is the consultant said that in the upper five centimeters most of the marine life occurs, and almost all of it occurs down to 20 centimeters. And, indeed, if that were the case, that may be persuasive. But I am a little leery of accepting that from bedrock up to the surface layer of the soil, it would seem that that whole profile, that whole soil profile, has a contribution to make to any life that resides in the upper layer. It would just seem. All right.

Now if it is true that after you go 20 centimeters, the contribution to marine life in that upper layer is nil, well, then I think their alternative has real promise.

What has to be assessed is the contribution, if you return it to the natural state of this lower substrate, just say with nutrients to support marine line in that upper layer, that has to be assessed. These kinds of things have not been done. And I think if you move in that direction with this kind of detailed research, taking into consideration the alternative, it may be the most viable way. Assessing that kind of research in terms of their alternative versus incineration or some other means, that is what I believe remains to be done.

Okay, thank you.

THE CHAIRMAN: Thank you. Any other questions from the general public? Down here in the back.

MR. COOLEY: Peter Cooley from L Box.

I'd like to know if you read the report that was publicized in the Standard Times, that one in a hundred children who play in this area are affected, and what your feelings are on it.

MR. SARAPAS: I did have a brief chance to review that article. I really haven't studied it. I think that probably the statement was a little out of context. I brought some excerpts of the EPA risk assessment. But rather than get into details, the number that was in the newspaper, from my understanding, is based on EPA's most conservative assessment of possible risks.

It included things like going to highest concentrations of PCBs, about a hundred times a year, from the way I read the risk assessment. So children have to go there about every three days, I guess, and play in those hot spot sediments, which is a pretty unlikely scenario.

It again assumes that PCBs are carcinogenic with a cancer rating the same as 1260. There's different schools of thought on that, but again we would beg to differ with the toxicity of the PCBs in the harbor versus the toxicity of aerochlor 1260.

And it really assumes a long period of exposure for that child. I look at that, and I also look at the likelihood of access to that area, to go out and clam or play, and actually the ability to do that, with those relatively soft sediments, and my opinion is that if you look at the probable risk, I believe it's a thousand times less. So EPA's probable exposure is a thousand times less. And that might be some reflection of a more realistic approach to looking at a risk to a child that could get to that area.

THE CHAIRMAN: Next question, right down in back, over here.

MR. RAPLEY: It's a quick question.

THE CHAIRMAN: If you would identify yourself, please?

MR. RAPLEY: My name is Bill Rapley, and I live in New Bedford. Mr. Sarapas, or maybe Mr. Dill, are you all saying that you will pay for this program?

MR. DILL: No, we're not. We've said nothing about the relative liability. We're trying to find a common remediation plan that's responsive to the requirements, as a basis for discussion among the various current PRPs, and the number of additional PRPs that very well will be brought in, from a legal standpoint, before this is all over.

One potential PRP is the City of New Bedford. The whole thrust of our direction has been that you can't

possible create a settlement environment without once figuring what it's going to cost to fix it.

I mean there is some much potential dispute between PRPs and potential future PRPs, and then all of us have insurance companies who, per policy, cover the risk, but say they don't, so there's a whole bunch of litigation there. So you have an enormous amount of litigation going on. I think just what's happened so far is this harbor has been developing, developing since the late seventies. I think the EPA has spent over $20 million. I think the PRPs, so far, have spent over ten. That's a guess.

I wouldn't even want to hazard if this thing went on in a litigating mode for the next probably five to ten years. And I'm not sure where money would come from. And the issue of liability is an entirely separate question. There have been many people dumping many things into this harbor, for many years, not just PCBs, but heavy metals. There are a lot of potential heavy metal people here in this lawsuit. It's a disputed issue as to what was put in, how much was put in, when it was put in, and who put it in. It's a big mess.

And the issue is trying to agree on a common plan to fix it, and there is a hope that if you can once decide that, and you've heard numbers tonight that go from 15 million to a billion, then you have some chance of resolving

your problem.

If you don't resolve what you're going to do in the harbor first, forget it. It's a mess. I'm neither a lawyer nor a technologist. Just as a manager, it's a mess.

MR. RAPLEY: Let me ask you this. Has AVX contacted any of the other PRPs regarding this?

MR. DILL: Certainly. We cooperate and we exchange information, and we talk to them. They all have their relative positions, we have our position. We have taken the initiative because that happened to be what we, as a management, decided would be the most constructive approach in the situation.

We spent some considerable amount of money since 1983 on legal and technical fees. You don't get this kind of developed approach for nothing, let me tell you that.

MR. RAPLEY: How much have you spent?

MR. DILL: I can't tell you exactly what we have spent. We have not been looking at what we've been spending, we've been trying to drive to a solution. It's a lot of money. And we've spent a lot of money. I wouldn't even hazard a guess.

As a matter of fact, it's not just the harbor, there have been other sites around New Bedford that have been involved here as well: Sullivan's Ledge, the resolved dump site. You just heard the Mayor talk about Bellville Avenue.

It's a problem, it's a big problem.

THE CHAIRMAN: I guess I should just jump in, and make one additional comment.

I think we have said in our general information on our proposed plan, that the requirements for the remedy, as specified in the law, in the Superfund law, and in nine criteria which we have to evaluate all the alternatives against the likelihood of a settlement with the responsible parties, and the likelihood for their paying for the remedy, is not one of the nine criteria.

That is why, even though we are hopeful that we can come up with a remedy here, as we have many other places, where the responsible parties will step forward, and undertake the clean-up, that is not a factor in making the remedy decision.

And that's why when you get some of these conversations, for example, earlier tonight the state was asking about the long term operation and maintenance costs. They have to look at the site in terms of the fact that there may not be a responsible party clean-up. There could be a glitch in the best laid plans, and the state would have to come up with ten percent, plus contract with us to assure perpetual operation and maintenance.

So we're still trying to drive for the best overall reedy that meets all those requirements. After that is

selected, we do hope then that we can encourage the responsible parties to get together and do the clean up.

Now any other questions? Any other questions fro the general public? I see now.

Now we have EPA consultants out there, we've got the Corps of Engineers, we've got the State DEP people. How many of you have questions? Raise your hands.

All right, I have a court reporter up here, who has been going solid for two hours and forty five minutes. I'm going to suggest that we take about a ten minute break. Then we will reconvene, and then all of our consultants and state DEP people are going to have an opportunity to raise questions and so forth. But that could be a lengthy time.

So I think we'll take a little break at this point, come back in ten minutes. I'll allow you to get yourself a breath and water.

(Off the record).

THE CHAIRMAN: EPA's consultants, or state DEP, and they are going to be asking questions. Do you want to move up a little bit more to the front of the room? It's a little bit easier for the reporter to pick up your questions and so forth.

I'm going to declare this formal hearing re-opened, and I want to start out by calling on one of EPA's consultants from Ebasco.

Introduce yourself for the record.

MR. FOWLER: I'll make it even easier on the reporter. I'm Alan Fowler. I'm the project lead on the New Bedford Harbor Project for Ebasco Services, CPA's prime contractor on the site.

I'm not going to get into a lot of the technical discussions that we've had earlier. We started those, and if we got into it, we could go on for days.

But what I would like to say is we did look at the harbor as a whole, and we did we came up with an operable unit. When I look at the AVX plan, it addresses the estuary, but it doesn't necessarily address the harbor as a whole.

I think, as Weldon pointed out, that to some degree water into the water column is controlled by area, not only just concentration. And there are significant areas below the Coggeshall Street Bridge, and outside of the hurricane barrier, that do have contamination.

And I wanted to point out that a comprehensive plan should look at these areas.

And I'll let the other consultants make some of the technical comments.

MR. SARAPAS: Thanks. I'd like to respond to that though first, Alan.

MR. FOWLER: All right.

MR. SARAPAS: Actually, I think we have the right to respond to comments.

Actually, we had, in some regard, looked at that. We just did get the risk assessment, and we looked at the numbers on the risk assessment, and we looked at also the conservative basis, and the probable basis of exposure. We did look at heavy metals in the harbor, and we did look at PCBs in the harbor.

We think that our plan, especially when we submit our risk assessment to you, which is going to reflect some of our opinions about the toxicity and likely exposure scenarios, that our plan will address PCB exposure in that area.

From my reading of your plan, you have not found significant risk components to heavy metals, probable exposure scenarios through the rest of the harbor.

That's one of the reasons we think, in terms of human health, that the plan is comprehensive.

MR. FOWLER: Okay. I would point out that human health is not solely evaluated on the basis of the FDA limit, but on the risk assessment, and you will see that in the administrative record. So you do need to look at more than the concentration in regards to the FDA limit.

I will point out, in looking at your data, in fact I was happy to see that when you look at the data, and when

you look at the relative contribution of the hot spot, your analysis or your histogram showing percentages, that five acre area does contribute in the vicinity of forty to fifty percent of the contamination in the estuary.

MR. SARAPAS: That number is open. Maybe thirty, maybe forty. But I guess that I could bring up the concept of the operable unit, and what is the operable unit? Is the operable unit thirty percent of the mass, or is it ninety percent of the mass, for the same dollar. That might be another concept to think about.

Now I know originally the estimates of the volume of PCBs, and the impact of PCBs, in the hot spot were much higher. That's part of the problem of presenting information with work in progress. And I think over time, if I recall some of the presentations made in Washington, at a Superfund conference, the numbers were much higher at that time.

The numbers have begun to come down. The numbers are at 45 percent of the mass, and thirty to fifty percent depending on the histogram, doesn't really correspond exactly to your 4,000 PPM definition.

Certainly there is a significant amount of flux, PCB flux, coming out of that hot spot. In fact, there might even be a basis for a hundred part per million action level. But we thought that maybe perhaps in the terms of an

operable unit, the upper estuary made a little more sense, and we think the capping will address the contamination within the hot spot.

THE CHAIRMAN: Leonard, are you suggesting that EPA evaluate your proposal as a first operable unit for the harbor?

MR. SARAPAS: I'm saying it may be the harbor, and that harbor is the operable unit.

We have tried to consider the site as a whole.

THE CHAIRMAN: Okay. E.C. Jordan, Guy Vallancourt, another EPA consultant.

MR. VALLANCOURT: My name is Guy Vallancourt. I'm the hot spot feasibility study lead. And, Leonard, I just wanted to ask you a couple of questions.

In doing the hot spot, and taking all the data that EPA has collected, we have actually written reports that you've had an opportunity to review and check out calculations. But we've not had a similar opportunity. So the questions I ask are because I've only heard your presentation, and I've not had a chance to look at your data.

One of the things that's not clear to me is in the riprapping of the hot spot, are you planning to riprap the whole hot spot area? In the riprapping of the upper estuary, does the riprap cover the whole hot spot area?

MR. SARAPAS: We'll try to get the report to you next

month. I understand it's very difficult really to not have anything in writing in front of you.

We are going to use a riprap and geo-web system over the five acre EPA hot spot, because we believe it will increase the integrity of that area.

MR. VALLANCOURT: When you talk about laying down the geo fabric, a lot of your presentation is geared to using existing proven technologies, yet my main concern is that when you actually lay down that geo fabric, that you could get a lot of sediment resuspension, a lot of the PCBs in the hot spot greater than fifty thousand parts per million in the top fluffy inches of the sediment. You didn't really give a feeling for the actual technology that you were going to use to lay that down. So my question is, is it a proven technology for laying down on top of highly contaminated sediments? And if you should get high concentrations of PCB in the water column, are you prepared to treat that water?

MR. SARAPAS: That's a good question. We're looking at two ways, three ways, to lay or place the geo fabric.

The first is a method that's been used on other sites. And that is having a barge with rolled geo fabric, relatively wide seams, or wide pieces, the wider the piece the less the amount of overlap needed.

Those barges are going to be operated by cable winch, with a dead man at both sides. We're doing that to prevent

prop wash. Prop wash could create a lot of resuspension.

Every time we sample up there, you see, with just an outboard motor, how much prop wash there is.

The action of putting it down is not exceptionally disturbing for the water column. I do not know of cases where that has been studied, with exceptionally levels of contaminates.

The next method would be, that we're looking at, is similar in nature, that the material is folded. It's a little more common actually, because you don't need to fabricate any rollers. But you fold the material on the barge, and as the barge proceeds across the water, it just unfolds, almost like what you see in a fabric shop.

The third method is the method that we've looked at, and it's, some of this, in a dry method. We're not really leaning towards that right now, but it's something that would be evaluated. We're in a thirty percent design stage. It would be evaluated. In going to the hundred percent design, and preparing specifications for the contractor, to make sure that we have a good method, and the contractor is familiar with the method.

In regards to the PCB concentrations, I guess our feeling is that the amount of PCB that would be resuspended would be less than dredging. And our belief is that unless we stir up an awful lot of PCB, the amount of PCB that would

migrate out of the estuary is probably not going to be much more than what's going out right now.

So the question then would be, is it necessary to treat the current condition, i.e., those millions of gallons that flow in and out of the upper estuary every day now, under current conditions? And our position would be, during remedial implementation, concentrations are not all that much higher, we would not want to, or need to, treat that water. It would be basically a continuation of what is currently going on, and that would be accepted as part of the remediation.

MR. VALLANCOURT: But if, during your installation, you noticed higher concentrations of PCBs, you know, what type of stop gap measure do you have?

DR. BOSWORTH: I think we set up a program similar, that was visualized for the pilot dredging study there, where we monitor the operation. And if some event took place, which we felt exceeded whatever criteria we had, we could cease operations, suspend them, and evaluate in a similar manner that the Corps of Engineers did for the pilot dredging program.

MR. VALLANCOURT: One of the other questions I had was you're talking a lot about bio-degradation. The hot spot area has been studied for over ten years, and still contains PCB concentrations in excess of hundreds of thousands of

PPM. How long, based on the accelerated rates that you're seeing in the literature, would you feel it would take, or are they projecting it would take, for the hot spot to bio-degrade down to a level, say 50 PPM. Our calculations show it would be in thousands of years.

We acknowledge that bio-degradation is taking place, but feel it is not taking place at a rate that would be acceptable.

MR. SARAPAS: Am I wrong? I thought I read three hundred years. Is that incorrect?

MR. VALLANCOURT: That may be correct, but that's what it was, three hundred years in the feasibility study.

MR. DILL: I think it's four thousand to fifty.

MR. SARAPAS: Then I stand corrected on that. That is one of the pieces that we're working on right now.

The degradation that we're seeing really reduces the chlorine content of the PCBs. We're seeing the degradation process at present, removing the chlorines down to mono-dyes and some tries, that we believe reduces the toxicity of the PCBs. The rate question is an exceptionally difficult question to answer, because there is no easy environmental monitoring program that can be conducted to answer that question. You have to answer through modelling, basically through paper analysis.

That is what we're doing right now. We're trying to

understand, and I think we've made some progress in understanding the pathways, preferential pathways, for the degradation to occur.

And what we're doing now, and this we hope to have as part of our report to you next month, is an evaluation and comparison of samples from different lenses, different depths within the harbor sediments. We are going to then try to correlate about when those PCBs were discharged to the depth in the sediment, and look at the level of transformation and degradation in those sediments, and compare them to overlying.

What we are seeing, in essence, is a series of cascades. We have near the top the least degraded, below that more degraded, and below that more degraded. And we are trying to then understand, and it sorts of fits in with the sedimentary rate, sedimentation rate of that process.

I think that's a good question. That's one of the ones we'll try to be addressing in our report. I don't have that answer tonight.

MR. VALLANCOURT: My other question is, should there be, since the hot spot sediments will remain in place, and can be a potential future source, and if there were some catastrophic event, a hurricane, or something that was above the engineering calculations, if the vertical diffusion was greater than expected, what would happen?

First of all, I'm assuming that you would set up a monitoring program for an extended period of time, and that there would be an alarm or some trigger, if the levels reached a point, and you would kick into a remedial action.

My concern with putting a cap in, and an armoring on it, is that if in the future you needed to go in and get the material, and now you have much contaminated material, I have to ask the question. If this didn't work, would you be willing to go back in and then do a treatment alternative, and treat all the additional material, and the costs associated with that.

MR. SARAPAS: I can't speculate to the future. If I didn't think it would work we wouldn't have presented the idea this evening.

Superfund has a re-opener. I think the statute is clear. If something doesn't work. If the CDF that's currently constructed doesn't work, the scenario is the same. What do you do? You have to go back in and do it again.

You do a dredging program and it doesn't work, you go back. The answer is quite evident. If something doesn't work you have to go back and make it work.

MR. VALLANCOURT: The proposal for the hot spot now is a treatment alternative that actually treats the material and it goes away, versus something that stays as a potential

future source?

MR. SARAPAS: It does treat the PCBs. It also treats the heavy metal.

MR. VALLANCOURT: It does? And how does it do that? By fixation?

MR. SARAPAS: I don't want to get into a technical argument. If it doesn't work it's got to be addressed, and that's true with any remedial program.

MS. KELLY-DOMINICK: Can I just follow up on what Guy just said? I'm Debbie Kelly-Dominick, I work for the State Department of Environmental Protection.

What we, in EPA, have looked at is a number of different remedial alternatives. And back last year, when we went through and screened the remedial alternatives, there were, I think, four alternatives that addressed capping, and they were all eliminated.

We're staying open to your proposal. At this point we're looking at the hot spot sediments. And, again, what Helen said before about the mandate for MGL Chapter 21E is permanency. And certainly what the call an act of God, a natural disaster, is something that occurs. And I have questions about the resuspension of sediments in a hundred year flood, five hundred year flood.

MR. SARAPAS: That's a good question. It's one of the central issues about the effectiveness of the program. And

it was central enough to the program that we redid some of the EPA studies. We redid some of the Corps studies. They studied the same thing, which was the flow of the Acushnet River.

And there's sort of a limiting function in the Acushnet River, and that's if you go up the river to the Tarcon Hill Street Bridge, that bridge in that area is only going to carry so much water. At some point in time the City of New Bedford, with a five hundred year flood, it's going to flood. And that whole area, Bellville Avenue, the Acushnet facility, is going to be under water.

There's a dam right there. We're not calling it a dam, but there's a significant flow restriction. There's limits as to how much water that river can carry before that whole area goes into overbank storage and flooding.

So we did look at that, because we don't know if a five hundred year storm would happen next year. We looked at that, and that's why we looked harder at studies that EPA and the Corps had done on flood routing down the Acushnet River.

That figure that I threw up here for the dams, to address Mel's question, was part of that study. So we do share that concern. We did look very hard at that, because the erosive forces from a big surface water run off event, I think were the largest threat of the permanence of the cap.

That's why we spent that extra effort looking at that harder.

MS. KELLY-DOMINICK: What did you conclude?

MR. SARAPAS: We sized our cap for a storm twice as large. CPAs.

MS. KELLY-DOMINICK: A 45 centimeter sand cap we feel significant for a hundred year flood that could come up that river, or in any direction, and move that sediment around.

MR. SARAPAS: The permanence relates to the design and the placement of the erosion or armored protective zone. It relates to the number of acres, and the type of material, and the extent of the geo-web that we would place. And the geo-web is expensive, but we have designed into the armored cap a pretty large area of geo-web, just because it's so stable.

The rest of the sediments, the studies that have been done, some of them have been done by other consultants, I think when you get into that kind of flow -- yes, we have looked at that, and we're comfortable.

DR. BOSWORTH: I think another response too. You mentioned a flood coming from either direction. As you know, of the hurricane barrier, the flows, in the event of a potential hurricane or elevation coming up from the silt. So it can be a relatively controlled environment.

Certainly more advantageous in terms of control, than

probably any other similar estuary and site that you might encounter.

MS. KELLY-DOMINICK: I realize the barrier that was built up to the '38 hurricane. I'm not sure if they consider that to be a hundred year flood or five hundred year flood. But storms can come from any direction, and floods only just occur like a hurricane.

THE CHAIRMAN: Any other questions?

MS. KELLY-DOMINICK: Yes, I do have a couple of other questions, actually.

You discussed the control processes of bioturbation, and molecular diffusion. Back when the NUS was involved in the project, they did a ground water study, and they concluded that the ground water was discharging into the river.

I'm wondering if you feel that there's a significance to the upwelling of ground water in the upper estuary, and would this decrease in salinity, increase in fresh water, increase the solubility of the PCBs?

MR. SARAPAS: The fresh water solubility for PCBs is somewhat higher. I don't have those numbers on the top of my head.

The amount of fresh water, as compared to the amount of salt water, is quite low. We have done sediment profiles in the upper estuary, and in that zone right now we are seeing

principally saline waters. So our field data indicate salt water would extend down into that cap.

The fresh water that does occur is probably minuscule in comparison to the amount of salt water that is there.

MS. KELLY-DOMINICK: What about when you have the control with the dam? You're going to have less salt water moving up into the upper estuary.

MR. SARAPAS: The salt water will be there. It doesn't need to go in and out every day, especially if it's a high level.

In the Acushnet River, which ten to thirty CFS a day base flow, is a pretty minimum input to that system. I don't think you're going to have a significant difference in solubility.

MS. KELLY-DOMINICK: What about the other question of the upwelling of ground water? Do you think that would have an impact on the integrity of the cap and movement of contaminants up through the cap?

MR. SARAPAS: I don't think it's going to have any effect at all on the integrity of the cap.

MS. KELLY-DOMINICK: And the basis of that?

MR. SARAPAS: I would know of no reason to think that it would. But do you have a reason to think that it would?

MS. KELLY-DOMINICK: Ground water is continually discharging into the river, so there is a movement of water

into the river, and it would be moving into the sediments underneath the cap, and it could be pushing the contaminants in pore waters that the contaminants are not only bound to the sediments, they are also in what they call the pore water, the water in between the grains. And the pressure of the cap could, you know, squeeze out some of this pore water, and you would have the ground water flowing in. And that could act as a transportation route.

I can affect transport, PCB transport. The amount of ground water in the area. We have looked at that. It does not appear to be a significant contributor, but it will be one of the elements that's discussed in the report, which leads us to believe that molecular diffusion and bioturbation are the principal transport mechanisms.

So I guess, in that regard, we do acknowledge the process occurs. We don't believe it's significant. And, in response to the first question, I don't think that ground water, at vective flow, will have an effect on the physical integrity of the cap.

THE CHAIRMAN: Other questions? Anybody else?

MR. KRAFT: I have a question.

THE CHAIRMAN: Why don't you introduce yourself?

MR. KRAFT: I'm Paul Kraft, I work for the DEP. I'd like to ask the question about the decay or the deterioration of the cap or geo-fabric, because of seasonal

variations.

I was there in the middle of the winter, and there was ice on the estuary. And that implies to me that that is fresh water.

What kind of movement is this cap going to have when there's ice, and those kinds of forces?

DR. BOSWORTH: Well, first of all, you realize that salt water does freeze?

MR. KRAFT: But I'm assuming most of the freezing came from the fresh water.

DR. BOSWORTH: That's really not necessarily so.

MR. KRAFT: Okay, so salt water does freeze?

DR. BOSWORTH: Certainly.

MR. KRAFT: Okay. What affect does that have on the cap, especially around the edges, on the shore?

DR. BOSWORTH: The potential effect that might have, and this is in situations where ice may increase the salt marsh, and eventually be carried away, leaving what is commonly called a salt path, which is a depression in the salt marsh per se.

MR. KRAFT: So you are going to move the material due to ice?

DR. BOSWORTH: It is possible that a clump of salt marsh could be moved by the ice. That's right. And that's part of what I think we need to inspect for, and monitor. If

that occurs in the winter, then that will have to be filled.

But if you look at any salt marsh, that's the only type of potential effect of ice in that kind of situation. It needs the salt marsh roots and so forth to essentially accumulate a big bunch. It doesn't generally take large portions of say sandy inter-tidal area. That is a potential.

MR. KRAFT: But the question was. The reason I asked the question. What effect does this have on the edge of the fabric?

DR. BOSWORTH: To fully answer the question, it would have the potential to take that salt marsh that may grow, that is above the geo-fabric, and move it.

MR. KRAFT: Okay. The other question I have is the damming. When you dam the estuary, how many outfalls go into that estuary? Do you know?

MR. SARAPAS: We do know about the CSOs, some of the CSOs that do go into the estuary.

MR. KRAFT: How many is that?

MR. SARAPAS: How many permitted?

MR. KRAFT: No, how many?

MR. SARAPAS: Well, we don't know about all the unpermitted, because some of them are under water.

MR. KRAFT: So you will get some kind of flow if there is a storm or whatever, and if you put the fabric down, or

whatever, the cap down, and you have a storm, you're going to end up with water.

MR. SARAPAS: Right.

MR. KRAFT: And if it's not permitted, I'm assuming it could be combined flow, or sewage discharge. What is that going to do to the quality of this water? Why are you putting this material down?

MR. SARAPAS: There is going to be water during the whole process, because most of the work is going to be done by barges. The intent of the hydraulic controls, for the most part, is it maintain a high water level, to capture the high tide, so you have a little more depth to work with, with the draft of the barge.

The CSOs, and I think that's one of the reasons that the Mayor of New Bedford is so interested in trying to find a solution that's comprehensive for his city, is he would like very much to try to resolve that problem, perhaps in concert with this. And we certainly would. And I think EPA would want to talk with him about trying to find a solution for all of this together.

DR. BOSWORTH: In terms of an operation, on an operational basis, if for instance, you did have upper estuary hydraulically controlled, and you did experience a storm, there are things you can do.

For instance, you secure operations. You bring the

dredges and so forth, the barges which are laying the geo fabric back, you then allow crushing to occur by opening a couple of the logs in the dam there at the Coggeshall Street Bridge.

So we'd be dealing with the same kinds of issues that anybody who is working in the upper estuary, either dredging or laying cap, would have to deal with and include as contingencies in an operational plan.

MR. CIAVATTIERI: Just a comment, if you don't mind me interrupting for a second.

The Mayor has asked the EPA unofficially, and officially tonight, to consider what might be done in terms of integrating disposal and/or treatment, and just how to resolve the situation of grit which is trapped in the interceptor sewer system, which does contain PCBs and other contaminants.

Partially as a result of that grit, and partially as the result of the system of the combined sewer system, which inherently means that it will be overflow during certain flow conditions, waste water does escape, sewage does escape. It actually floods the city street, but it also does escape quite frequently from the combined sewers that abut the estuary.

I know you guys have been down there and have seen that happen.

A couple of comments. First of all, your scheme of essentially capturing the flow, how would that deal with the fact that combined sewers would be discharging solids and other waste material, floatables, as they are sometimes called, and those materials could potentially be trapped, as you've indicated. The upper estuary is a sedimentary kind of situation, which means solids tend to accumulate, so you would have the potential for organics to stay and to settle to the bottom.

And secondly, your schedule would indicate a time frame that would probably well precede any remedy for the intercepter sewer system, under even the best of circumstances. In which case, what I am saying is you will have to deal with those CSOs being in place. I think it would be illogical to assume that they would not be there, and there would not be discharges.

MR. SARAPAS: I think of Weldon's response. I have a better a better response, and probably I should have answered that a little differently.

Part of the operation of the program is going to be to open and close those gates on a periodic basis. That's going to have to be done to maintain the existing wetlands in the upper estuary. And so that is part of the program. That opening and closing could be done every weekend. It could be done depending on the magnitude of the discharge of

the CSO.

I don't know what EPA would do if they were proposing to dredge the upper estuary, but I would assume they would need some hydraulic control, if they intended to keep the barges operating on any type of a regular basis. Or you'd go around.

So I think, as Weldon said, the problem is going to be germane to all the remedial programs in the upper estuary, except for no action. Whether you're placing the material down, or dredging the material up. And I think we can open and close the gates on a periodic basis, and under special circumstances. For example, when there is an exceptionally large sewage discharge.

The sewage particles that would settle out during the remedial program, I don't think are going to be significant in terms of effectiveness of the cap. In fact, they may help the cap a little bit. They're going to provide a little more organic matter into the cap material.

I don't see thousands of tons of solids coming out and settling in that cap, I hope, for the City of New Bedford, during that period. So that, in and of itself, I don't think will affect the effectiveness of the cap.

THE CHAIRMAN: I want to just follow up on one thing you said, Leonard. I'll go to Mark Otis from the Corps of Engineers, and ask him can we dredge without hydraulic

controls.

MR. OTIS: Yes. As it goes to the hot spot, you would plan on working the tides.

DR. BOSWORTH: What about the rest of the estuary, Mark?

THE CHAIRMAN: Again, I want to jump in, because the EPA's plan is for the hot spot, and I think you've got to keep that in mind. We haven't decided how you would dredge the rest of the harbor, nor have we yet made a decision as to whether we should dredge the rest of the harbor.

DR. BOSWORTH: You're think you can dredge the hot spot working the tides, a foot and a half of water with those barges?

MR. OTIS: The pilot study area, the water depths in there are a foot or a foot and a half, which are pretty much representative of the hot spot. I would foresee a similar operation.

MR. CIAVATTIERI: Once you dredged a space, then the dredge can move into that dredged area, then you have a little more draft.

THE CHAIRMAN: We're going to back to Mark from the Corps for a statement. Any more questions? Okay, then I will go back to Mark, and ask you if you had any questions from the Corps of Engineers standpoint?

MR. OTIS: Not really questions. The Corps has been

mentioned a considerable amount of time tonight, in regard to the work we've done, and in regard to capping. And just to clarify that somewhat, as part of our effort, we looked at several alternatives that are involved using a cap to cover over the contaminated sediments. And as part of that evaluation we recommended a cap thickness of three feet.

We arrived at that following a similar procedure as was presented tonight. Basically the first step was to do some laboratory testing, that determined the thickness, as a chemical barrier to the PCBs. Our laboratory work arrived at 35 centimeters as that thickness.

I then looked at an additional layer for the bioturbation question. We arrived at a 20 centimeter thickness, and that was based on reviews of the literature, also discussions with various personnel from other agencies, and in the area familiar with the life in the New Bedford area, and what could be anticipated to recolonize that cleaned up site.

We had a wide variation of answers that came back as to what an appropriate thickness would be. But we settled on twenty centimeters as being a realistic figure.

That added up to 55 centimeters, a recommendation of three feet. The additional thickness was based on what we perceived to the be the inaccuracies of the construction process that would be used to place a cap. We thought three

feet would be a recommended conservative figure, but it would also be a likely outcome of the capping process.

THE CHAIRMAN: Thank you. Now who else do we have? The State?

DR. PETERSON: Dr. Judith Peterson, a marine ecologist with the Massachusetts Coastal Zone Management Office.

I'd like to make a comment first. And that is that I'm actually very concerned about a lot of the assertions that were made tonight, without a lot of verification, in terms of written form. There was a lot of "I feel", "relatively speaking," "we think this will happen", "we predict." And it's very difficult to rebut those kinds of comments without looking at the information in the written form, finding out what the primary documents were that were used to come up with that piece of information.

And I really feel, and I hope that the citizens who are here tonight appreciate the difficulty in trying to sort of comment and make some very valid responses to some of the documents, and some of the information you presented tonight.

I do have two questions. One of them is basically related to the wetlands issues that you were talking about. You had said that you would be adding some thirty to forty acres of wetlands. The question is, that given you are altering the flow, to what extent are you going to be

destroying any wetlands?

DR. BOSWORTH: Let me answer that. First of all, I agree with your statement, it's very difficult to respond to somebody's presentation without having any written data. Unfortunately, we didn't make the time schedule for this, and in fact we've been working in the same kind of situation with the transport study, as well as the food chain study, not available to us. The risk assessment was just available to us last week. So you can understand that to a certain extent we're both working with a disadvantage.

In terms of the wetlands, we speculate by considering what the cap is, and considering what consolidation might take place out of the cap in the underlying sediments, that it will contribute about thirty acres to the inter-tidal area. Some of that will be above the mean sea level, which we think will be amenable to planning to a kind of alternate for us, cord grass, new salt marsh. Part of that will be increased inter-tidal mud flat basically.

What you are going to be losing most of, that is going to be converted into that habitat, is going to be sub-tidal mud flat.

Now I think as you know, that legions of researchers are trying to develop relative values of inter-tidal, sub-tidal, mud flat and trade off in terms of habitat value. It's not exactly clear. How much do you use when you give

up a little bit of sub tidal habitat, mud flat habitat, to gain some inter-tidal mud flat habitat.

If I could just continue. I think that one of the things that we consider is that the somewhat degraded condition in the upper estuary right now, due to a variety of factors, including organic pollution and other things, that the habitat is very much greater. This is very easy to see with the species that we see there living in there right now.

We think with cleaning up this area, that we would be able to increase the carrying capacity of that habitat, to basically compensate for a loss of habitat. And, in addition, you will gain approximately twenty to twenty five acres of salt marsh.

DR. PETERSON: I think you are not quite understanding my question. And that is you have a fair amount of salt marsh right now on the Fair Haven side. When you add 45 centimeters of sediment capping into the whole estuary, you are going to now be displacing some water coming into that area.

My question is are you now going to be altering the upper marsh, the high marsh, and some of the low marsh that's already there?

DR. BOSWORTH: I think the ocean will stay at the same level.

DR. PETERSON: You've done these calculations?

DR. BOSWORTH: Yes, we have.

DR. PETERSON: That's all I wanted to know. You are predicting that there would be no net loss of salt marsh? I'm not talking about the habitat loss due to the additional---

DR. BOSWORTH: No. The level of water is not going to change any. All right? I mean, what drives the level of water is what's happening in the tidal cycle.

DR. PETERSON: It depends on whether you also---

DR. BOSWORTH: Well, if you did, if you had a tidal bore or something like that, then I guess you could, but we don't envision a tidal bore.

DR. PETERSON: The second issue that I wanted to ask you quickly about was the capping material is certainly a change in the type of material that's there now, so this would represent a definite habitat change for the organisms that are in that part of the estuary.

So you're predicting that the whole upper estuary habitat would be different than what is existing now? Sand and armored material is certainly not the same things that are there??

DR. BOSWORTH: That's true. There is sand. On the east border of the marsh there is sand. The habitat, as you know is very organic muds, silts and a fine sand. There's a

lot of what I would call organic and micro carbon pollutants in there right now. So presumably it changed the cap material, which will be primarily well sorted sand with some organics. It will be a beneficial change. It will result in a more diverse and better community. And I think that most research is considered to be, in an anthropomorphic sense, a healthier community, a better base for food, that you might use in estuaries as a nursery or feeding area.

DR. PETERSON: I'm sure that there are a lot of people who have thoughts about that.

The other issue in respect to the cap. Would you just review again where you are going to get all this material from? It's going to come from a quarry nearby? And somewhere in Buzzards Bay. You're talking about inside Buzzards Bay or from the communities surrounding Buzzards Bay? I wasn't quite sure.

MR. SARAPAS: At this stage of the design we're looking to assure feasibility of the source of cap material, but we're not finding the source itself. There are two sources, one very generic, which is somewhere outside of the hurricane barrier, an offshore source.

DR. PETERSON: Are you aware of the regulations that are involved in that process?

MR. SARAPAS: We are aware of them. We're not saying that where we'll get it, we're saying there's a possible

source of material. The second source is in the existing quarry. It's in Acushnet very near the site. We were actually there today talking with the quarry operator.

DR. PETERSON: One of the reasons I bring this up, and some of the other questions, is that you did talk about meeting the regulations of the state. There is a very long permitting process. The process that's normally involved, if these are not Superfund sites, do not easily address issues, particularly mining anywhere outside the hurricane barrier in Buzzards Bay.

DR. BOSWORTH: In terms of doing any remediation to the upper estuary is basically working in a wetland, and you are discharging dredger filament, you're doing everything, whether it's dredging, whether it's capping, whether you're building confined underwater disposal sites, whatever it is requires, if one had to go through that, if an independent already went through it, he would have to go through a very lengthy and controversial permitting process.

As I understand it on the Superfund, they have to follow the procedure in intent, while not necessarily in form, and in fact when they built the CDF, if anyone else would have had to do that, they would have had to have gone through an extensive permitting process.

So what we're proposing is not, in that sense, any different than any other remedial alternative, in terms of

what activities would take place in the upper estuary.

DR. PETERSON: But there are some activities, such as trying to mine outside of the area, which is a permittable process. You would have to go through federal consistency. I'm just simply pointing out, that you try to make this sound as though this were a very quick kind of process, and it is not. There are other aspects to this that I don't think you fully addressed, at least in the presentation. Whether that's in the written material or not, I don't know.

DR. BOSWORTH: Well, anything in the upper estuary would have to go through federal consistency.

MR. SARAPAS: I don't think our intent was to make anything sound --everything here is complicated. Everything here has had a lot of thought put into it. But we had an hour to present the whole concept, and that's a lot of material. We didn't mean to simplify the process. We do understand the requirements for off shore mining material. That is specifically why we have also looked at an on-shore source, and that would be part of the process of saying: "What makes the most sense? What is the most environmentally acceptable?" That would be involved in that process. It is in our considerations.

THE CHAIRMAN: Okay. Do we have other federal or state employees or consultants here who have any questions?

MR. KROHN: I have one comment. My name is Hans Peter

Krohn of E.C. Jordan. I would like to bring out again, because of lack of benefit from the report, that the cost presented may not be indicative of the types of costs that were presented for the hot spot.

For example, I heard that the monitoring was not included. I don't know what else may not have been included. We have used different contingencies, different engineering costs, I don't know, things of that nature may have been included in your costs or not. Or the costs, for example, of dealing with the CSOs, that they will not have been addressed at that time.

Do you think you can respond to that?

MR. SARAPAS: As I said earlier, monitoring costs were not included. Dealing with the CSOs we've already discussed. We can deal with them in their current discharged state. We have a variable weir dam. We can open and close it to allow circulation within the estuary.

MR. KROHN: What about to with respect to putting eighteen inches of material down? How would that impact the CSOs in any manner?

MR. SARAPAS: There is one or two CSOs. There are a number, but not all of them are within the cap area.

MR. KROHN: Some of them are in the storm drains, I believe.

MR. SARAPAS: We have considered extending the CSOs

within the capped area out into the water. The costs that we developed are real costs, real construction costs. They include the same types of things that you include. They include a more standard contingency factor used in most construction practices. We did not use the 1984 NUS basis of a percentage for this and a percentage for that, because we didn't think it really applied to real cost proposals.

MR. VALLANCOURT: I guess our concern, without seeing the real actual cost breakdown, is it may not be comparing apples to apples, and it may appear that $15 million is a real bargain, when in reality, if you compared apples to apples, it may be far greater. Without seeing the cost breakdown.

MR. DILL: We'd be happy to discuss that, but we'd have to see the second half of your proposal to have any relationship of comparison.

THE CHAIRMAN: We have no second half.

MR. DILL: You know, whatever you come up with.

THE CHAIRMAN: Oh, for the balance?

MR. DILL: Yes. Whatever that might be would have some relevance to comparing costs, I would think, relative to what you get.

THE CHAIRMAN: Okay, any other questions/comments from EPA/state people? Anybody from the public? Oh, go ahead.

MR. CIAVATTIERI: You've indicated that we will see

your proposal in writing next month. Can we get a little more specific? October 2nd? Before then?

MR. DILL: Actually, Frank, I'm trying to get it tomorrow.

MS. RYAN: I know lawyers aren't supposed to talk, but the prospects of getting expert reports is no different for private parties than for the government.

THE CHAIRMAN: You've still got between now and eight o'clock in the morning. You've another nine hours to go there.

MS. SANDERSON: There was one comment made by a member of the community work group, saying that they're having difficulty, you know they've had the EPA materials for some time, and they are under this October 2 deadline to comment, and they're in a bit of a pinch. Say, for example, if a September 11 date was a community work group meeting, that you folks would be able to present some things in detail. That's giving them two plus weeks to comment on it.

I understand that you get your comments in in the comment period and then we have as long as we feel we need, and on a number of issues how long it takes us to do the responsiveness summary. I just had a couple of people come up to me today and say: "When are we going to see this stuff?" So there is interest at the local level.

MR. DILL: We're going to try to get as much done as

fast as we can, and we're more than willing to meet with any party on any issue, as extensively as you want. If it's a matter of record, we're not concerned about whether it's on the record, or any way you want to meet. You call the shots.

THE CHAIRMAN: Okay. Any member of the public out here, who has any final say, who hasn't spoken?

Okay, I want to remind all of you again we are in the public comment period, and we are accepting comments on EPA's proposed preferred alternative, and also if you want to make comments on the AVX, we are interested and willing to accept those, any time between now and October 2nd, which is the end of the comment period.

One of the criteria of the nine criteria we have for selecting a remedy is public acceptance, and that's one we factor in through the public comment process.

With that, I thank you all for coming. It's been a long time. I think Mr. Dill, and AVX, and their consultants. They've been under the fire up here all evening. I don't envy them that job. It's more fun to sit up here and fire questions, than it is to sit there and try to answer them. I commend you for your patience, and thank you very much.

Thank you all for coming, and I hereby declare this hearing adjourned.

(Whereupon, the hearing ended at 10:45 P.M).

CERTIFICATE OF REPORTER AND TRANSCRIBER

This is to certify that the attached proceedings before: THE ENVIRONMENTAL PROTECTION AGENCY.

In the Matter of:

NEW BEDFORD SUPERFUND

Place: New Bedford, MA

Date: 8/22/89

were held as herein appears, and that this is the true, accurate and complete transcript prepared from the notes and/or recordings taken of the above entitled proceeding.

M. Farley
Reporter

8/22/89
Date

P. Sullivan
Transcriber

8/27/89
Date