HUDSON RIVER PHASE 1 DREDGING
PEER REVIEW PANEL

Transcript of May 4, 2010

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The Queensbury Hotel
Glens Falls, New York
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PROCEEDINGS

Welcome and Introduction

MR. GARON: I see a lot of familiar faces. As many of you, if not all of you, know, we were last here in February for the Introductory Session meeting. That meeting featured a lot of presentations by EPA and GE on the Phase 1 dredging experience and the ability to meet the Engineering Performance Standards that were established for the dredging project.

This meeting is a little bit different in that the focus here for the most part is on deliberations between and among the panel as they wrestle with the Charge Questions and the information that they have been provided.

It will also include opportunities for EPA and GE to present some new information to the panelists, but, again, the focus here is really more on their deliberations and their opportunity to ask clarifying questions of EPA and GE.

I want to make a couple quick announcements before we get started. One is that this meeting is being recorded for the purpose of producing a transcript. So I urge members of the public, the panel, and presenters alike to be mindful of that as they are making presentations, to do their best to speak clearly into the microphones.

The other thing is I just want to quickly commend and thank EPA, GE, and the panel for all of the scrambling they have done to pull this meeting together, either by compiling new information, performing additional analyses, responding to panel requests, and, from the panel perspective, just wading through a sea of information. So I want to thank you for all the hard work you have done and acknowledge that.
As I did back in February, I just want to quickly set the context for this peer review by reviewing a few key milestones, and, again, I recognize you folks are intimately familiar with this site and probably don't need me to tell you this, but I am doing it for the purpose of the public record or any of the uninitiated who might be in the audience.

Quickly, the first key milestone was the 2002 Record of Decision in which EPA mandated targeted dredging of PCB-contaminated sediment from portions of the Upper Hudson River. According to the ROD, this project was to be done in two phases over a 6-year period of time, and the ROD required the development of engineering performance standards for resuspension, residuals, and productivity.

In 2003, EPA issued Draft Engineering Performance Standards, which were the subject of a separate peer review process in 2003-2004, and three of the members of this peer review panel served on that peer review.

After the peer review panel concluded its work, EPA considered those recommendations and issued the Final Engineering Performance Standards in 2004.

Then in 2006, the Federal District Court blessed the Consent Decree between EPA and GE, and then over the course of 2007-2008, there was a lot of preparatory work to get ready for the dredging project, and Phase 1 was completed last year in 2009.

So the purpose of this peer review was set out in the November 2006 Consent Decree, and it provides for an independent contractor peer review process that will review the EPA and GE Phase 1 evaluation reports, in light of the dredging data;
evaluate the ability to meet the Engineering Performance Standards that were established
for the project individually and simultaneously; and further, if the panel determines that
the experience in Phase 1 and other evidence show that it will not be practicable to
consistently and simultaneously meet the Engineering Performance Standards that are
proposed for Phase 2, the panel will then recommend modifications to those standards.
This purpose is embodied in the panel charge, which I will review in just a moment.

Quickly, I mentioned that this is a contractor-run peer review process.
Essentially, what that means is that it is being run by a neutral entity; in this case, SRA
International. It is not being controlled by EPA or GE, by either party. So the contractor
is responsible for the selection of a panel, the design of the overall process, running the
individual panel meetings, and preparing the report that includes the panelists'
recommendations and conclusions.

Because it is a contractor-run process, EPA cannot make changes to the
panelists' recommendations and conclusions, and then, finally, because it's being run by a
contractor, it is not subject to the provisions of the Federal Advisory Committee Act.

As I mentioned, SRA is the peer review contractor. Basically, we are a
government consulting firm based in Fairfax, Virginia. We have done a number of peer
reviews, but that's all I will say about us because this is not about us.

That brings us to the Panel Charge Questions. Again, as I did in February,
I ask your indulgence because I am going to read through each one individually.

Charge Question 1. Does the experience in Phase 1 show that each of the
Phase 1 Engineering Performance Standards can consistently be met individually and
simultaneously?

Question 2. If not and if EPA and/or General Electric Company (GE) has proposed modified Engineering Performance Standards, does the experience in Phase 1 and any other evidence before the panel show that it will be practicable to consistently and simultaneously meet the Engineering Performance Standards that are being proposed for Phase 2?

Charge Question 3. If the experience in Phase 1 and other evidence before the panel does not show that it will be practicable to consistently and simultaneously meet the Engineering Performance Standards that are being proposed for Phase 2, can the Phase 1 Engineering Performance Standards be modified, so that they could consistently be met in Phase 2, and if so, how?

Charge Question 4. If EPA and/or GE has proposed modifications to the monitoring and sampling program for Phase 2, are the proposed modifications adequate and practicable for determining whether the Phase 2 Engineering Performance Standards will be met?

So those are the four Charge Questions with which the panel is wrestling, and note that there is a specific limitation that has been placed on the panel which reads, "In accordance with Paragraph 14.d of the November 2, 2006, Consent Decree between the United States and GE for the Hudson River PCB site, the peer review panel will not evaluate whether the remedial action will or may achieve the human health and/or environmental objectives of EPA's February 1, 2002, Record of Decision for the site, nor will the peer review panel evaluate whether Phase 2 should be implemented."
I just want to quickly give you an overview of the entire peer review schedule, where we have been and where we are going.

The selection of the panel was completed back in September of 2009. At the beginning of October, the panelists came to the Upper Hudson River for a day tour to view the dredging in progress and to tour the sediment processing facility. Then, as I mentioned before, in February, we held the Introductory Session, February 17th and 18th, in Saratoga Springs. The final EPA and GE Phase 1 evaluation reports were released on March 8th.

EPA just concluded or recently concluded a public comment process on the Phase 1 evaluation reports, and those public comments have been provided to the panel for its consideration.

Coming to the present, we are at May 4 through 6, the peer review panel meeting, and the schedule currently holds that SRA will deliver the draft peer review report with the panel's recommendations and conclusions by June 30th, and the final report will be delivered by July 28th.

Before I ask the panelists to introduce themselves, I want to acknowledge one other person who is new to our team since the February Introductory Session, and that is my colleague, Bill Michaud, from SRA. Bill's role here is he is our technical lead on this project, and he is working with the panel to develop this report. So, from time to time, he may chime in during the course of the meeting to ask some questions of the panel. So I just want you to know who this mystery person is who might be talking.

With that, again, I will ask Paul, because he is the panel chair, to introduce
himself, and if you gentlemen can just work around quickly, and then we will turn it over to Melinda for the rest of the meeting.

Thank you.

**Panel Member Introductions**

**MR. FUGLEVAND:** I am Paul Fuglevand with Dalton, Olmsted, and Fuglevand from Seattle, Washington.

**MR. MAGAR:** I am Victor Magar with ENVIRON in Chicago, Illinois.

**MR. SCHROEDER:** I am Paul Schroeder with the U.S. Army Corps of Engineers, Engineer Research and Development Center.

**MR. THOMPSON:** Tim Thompson, Science, Engineering, and the Environment, Seattle, Washington.

**MR. BRIDGES:** Todd Bridges, also with the Engineer Research and Development Center.

**MR. FOX:** Rick Fox, Natural Resource Technology, Pewaukee, Wisconsin.

**MR. HARTMAN:** Greg Hartman with Dalton, Olmsted, and Fuglevand from Seattle.

**Review Meeting Agenda, Meeting Objectives, and Ground Rules**

**MS. HOLLAND:** Thank you, everyone. I am Melinda Holland. Again, lots of familiar faces. Thanks, everyone, for coming.

I will be the facilitator for this meeting, and my role in that is to keep us
on the agenda, keep us within our time limits. I will remind people to speak their names
before they speak for our recorders and the report that will come out of this, so that's an
important thing. If I forget, Steve or Bill or anyone else can chime in and remind that we
have to have everybody give their name. That is very important.

We have three pretty long days of meetings. I hope everyone will be
comfortable and has their needs met here in this facility.

The primary focus, as Steve said, is going to be on panel deliberations and
the panel having the opportunity to get the information it needs, ask questions, et cetera,
so that they can go and write the report.

I want to briefly go over the agenda. You all should have a copy of it. It
was out at the front desk. I am not going to read every single item.

I want to remind you that at 4:45 today and tomorrow, there will be an
opportunity for public comment, 45 minutes. You need to have signed up for public
comment by one o'clock today or, if you're going to talk tomorrow, by one o'clock
tomorrow, and that would be with Alison out at the registration table. We will talk more
about that in a moment.

So, today, we are going to have two fairly long presentations from GE and
EPA. Each day, we will have an hour-and-a-half lunch break, which will give all of you
time to go and find something to eat. The hotel has a restaurant, and there are other
things within walking distance.

Then, this afternoon, the panel will probably mostly focus on questions for
the presenters about their presentation and new information that they have been given
quite recently, and then, tomorrow, it is basically all day focused on panel discussions
and deliberations. Again, we will have at 4:45 an opportunity for public comment, and
folks need to register by one tomorrow. On Thursday, we have a concluding
presentation, one hour each, by GE and EPA, and then panel deliberations, and we will
adjourn by 3:45.

Steve has already mentioned that the Consent Decree really sets the stage
for this entire process, but it provides a number of things that are relevant to this meeting,
one of which is that the panel is not allowed to have ex parte communications or private
communications with basically EPA, GE, or the public.

Also, it provides that GE and the public have the opportunity to orally
express their views to the panel on the Charge Questions, and then for this meeting, it
provided that GE is to have 2 hours on day one to present its views on a Charge
Question, and then the panel also offered EPA the same opportunity. The final day of
deliberations, GE is to have one hour, and the panel again offered EPA that same
opportunity, which you will see reflected on our agenda.

The Consent Decree also provides that the panel may request clarification
from EPA on the Phase 1 evaluation report, Charge Questions, and EPA’s presentation,
and from GE on their Phase 1 evaluation report and their presentations. The panel
questions are to be germane to the issues raised in the Charge Questions. The EPA and
GE presentations must pertain to the scope of the panel’s charge.

Contractors or staff are not allowed to speak unless called on either by the
panel or the presenter, and I will be reminding folks of that.
We have one new ground rule. The panel has requested this particular setup, so they have plenty of space for their papers and to work. They also request that no one come in this space here when we are in session, so no coming up and taking photographs or looking at stuff while we are in session. There will be plenty of breaks and lunch time for everybody to come look at all these materials, but during the last meeting, it was pretty distracting from time to time.

There is coffee and stuff for everyone back there, and then during the break, it is also available up here, but we ask that everyone remain behind the panel working space during this meeting.

Then, of course, we ask everyone to honor the time limits. Be respectful. Turn off your beepers, et cetera.

We have a set of ground rules for the panel, and by the way, you all should have picked up the ground rules at the table outside. We would appreciate it if you would read them on your own.

The panel members are entitled to ask brief clarifying questions during the presentations, and I will nudge them to keep them brief, and, of course, questions pertain to the charge. We ask that only one panel member speak at a time and refrain from side-bar conversations.

The panelists may not discuss the peer review subject with the public, EPA staff or contractors, or GE staff or contractors any time outside the public deliberations.

Then there are the usual "be civil," turn off your beepers, et cetera.
Lastly, we have our ground rules for the public. There is no active audience participation allowed outside the public comment times on the agenda, but the agenda does provide an opportunity for comment by the public on the topics within the scope of this peer review.

Members of the public are welcome to provide written copies of their comments to SRA for inclusion of the record and to Steve or to Alison or to me, and I will pass them along. It will be fine.

We have set this up where there will be a fair opportunity for all members of the public to speak within the limited time frame defined per person. We are going to basically just divide up the time by the number of people that register in the public comment sessions, and if you are not pre-registered, you will not be recognized to speak.

We ask that you please stay within your time limit, and I will be there to nudge everyone along.

I remind you that the public may not address the peer review panel members outside of public comment time, and you may not address questions to the panel. Again, the reminder of please don't enter the panel's working space during our sessions, and turn off the cell phones.

The meeting materials will be available online. The basic materials were at the front desk, presentations and other things that are distributed at this meeting. That link is provided by EPA on their website.

Correct, Steve?

MR. GARON: [Speaking off mic.]
MS. HOLLAND: Could everyone hear Steve? If not, I will repeat that.

So EPA's materials will be on their website, GE's materials on their website, and then the transcript, when it's available, will be posted. It will be sent. Okay, great.

All right. We have already mentioned that this is being recorded and will be transcribed.

Lunch is on your own. We have an hour and a half. The men's room is right outside that door, and the women's room is way down in the lobby, so I think that is all the logistics.

All right. So we will start off with GE's presentation, unless, Steve, do you have anything I have forgotten?

[No response.]

MS. HOLLAND: All right. We are a couple minutes early, so that is always a good thing.

We have three laptops which are connected. So, from time to time, you will just have to put up with me when I say would you turn on laptop number two, and we have an AV person in the back who will be taking care of that.

Thank you very much.

GE Presentation

MS. KLEE: I am just doing the introductory, a very, very brief introduction, and then John is actually going to do the real presentation, and he will hand out the hard copy.
So, good morning. My name is Ann Klee. I am the Vice President for Corporate Environmental Programs at GE, and among my many responsibilities, the Hudson River is one of them.

I wanted to come today to do a couple of things. First of all, I want to thank the panel for the tremendous time and effort that you clearly have invested in this project, reviewing voluminous data, participating in 5 days of sessions, Q&A, listening to our presentations and the deliberations. We very much appreciate the work that you do and think that it will really be critical to helping our discussions with EPA as we move forward into Phase 2 of this project.

From the very beginning, we have thought that the peer review process would really ensure that at the end of the day, we ended up with a project that was good for the Hudson River.

This is an important project for GE. It is our largest cleanup project anywhere in the world. It is important to GE. It is clearly important to the Hudson River. It's important to the project. In many respects, the performance standards that you all are reviewing are really the linchpin for the success of the project.

Now, as we talked about this morning, the panel's charge is to look at the performance standards and make an independent assessment about whether or not they can be consistently and simultaneously achieved and, if they can't, to make specific recommendations for changes to the performance standards.

I think you heard from both EPA and GE that we found from Phase 1 that the performance standards could not be met as they are currently drafted. Now, we and
EPA may have some differences as to what changes should be made, but there are some
areas of agreement, I think, and as we work together with EPA, we will continue to
narrow those differences. And there are some areas where we do disagree and
significantly, and that is the purpose particularly of the discussion that we are going to
have over the next few days.

From the very beginning, when the ROD was signed in 2002, the
performance standards were really intended to achieve two fundamental goals. The first
was to ensure accountability for the project, and then secondly and most importantly was
to ensure that the performance standards and the project achieved the intended human
health and environmental benefits. Those were four, and they were pretty simple: reduce
PCB concentrations in fish, reduce PCB concentrations in water, reduce bioavailable
PCBs in sediment, and reduce transport of PCBs downstream. Very simple.

You are going to hear from John Connolly today in great detail and then
John Haggard on Thursday about the changes to the standards that we think are
necessary. We think -- and John will go through this in much greater detail -- that the
critical performance standard is the mass load. All of the performance standards are
clearly important, but the mass load standard is the standard that dictates resuspension,
how much PCBs can be resuspended in the water, how much PCBs can be transported
downstream, how much additional PCBs will be bioavailable to fish.

He will also talk to you about what we talked about in February, which is
the tipping point. We believe that there is a point at which, if you would add further
PCBs into the water, you increase the resuspension beyond that tipping point, you defeat
the fundamental objectives of the remedy, that you cannot achieve those four
fundamental objectives. So John will talk to you about what we think that number should
be and how we calculated it.

John will also talk to you about redeposition, and in February when we
met, we talked about lines of evidence that we thought suggested that there was
redeposition occurring as a result of Phase 1 dredging. We have done a great deal of
additional analysis, including analysis from the recent high flow events in March and
April, and those confirm that redeposition is real and that it has a significant impact on
those four objectives.

EPA, in contrast, will offer changes to the performance standards that are
based on what we saw over the weekend as calculations and statistical analysis and that
will produce performance standards that may result in a 50/50 chance of downstream
benefits in 2050 and some upstream benefits.

We don't think that is the right approach. We think we can do better. We
think that with the right mass load standard, with some improvements on the residual
dredging process, with some process improvements at the wastewater treatment facility,
we can do a substantial dredging project in Phase 2 that achieves all four of these
objectives, including reducing PCB load going downstream. We can do it faster, we can
complete the project in 5 years, we can minimize downstream adverse impacts and
adverse impacts on the fish in the short term, and we can accelerate the benefits of the
project. We think that the performance standards that we are offering are a better
approach.
Finally, I would like to just make one point about the data and analysis that has been undertaken on this project, particularly since it's received some attention this morning in the Times Union.

This project has involved the collection and analysis of more data than any other Superfund or RCRA cleanup in the country that I'm aware of, and that includes all the projects that I worked on when I was at EPA.

Before dredging even started, we collected 50,000 samples. During dredging, we in EPA collected an additional 18,000 samples. We did additional sampling and monitoring after dredging. We've done more sophisticated modeling than any project that I can think of, and all of that sampling and data collection was done pursuant to protocols that were reviewed and approved by EPA.

EPA now suggesting that maybe some of that data is unreliable, the data that is unreliable is data that they interpret as being inconsistent with their views of the project.

I think you are going to see from John's presentation and from all of the reports that we have submitted that there is simply no basis for that broad allegation, and more than that, I think you are going to see and that the public will see and that anybody who looks at the reports that were prepared by GE that our analysis is not artificial, it's not oversimplified, and it is absolutely reliable.

What I hope is that the discussion that occurs over the next few days can be a meaningful discussion of the areas of scientific disagreement, and that any decisions that are made in this project can be based on sound science, on good science and reliable
science, and not the kind of rhetoric that we saw in the paper this morning.

So, with that, I'd like to turn it over to John, and thank you again for your
time.

**MR. CONNOLLY:** Good morning. It is nice to be back with you all.

[Pause.]

**MR. CONNOLLY:** Is the clock running?

[Laughter.]

**MS. HOLLAND:** We started 5 minutes early.

**MR. CONNOLLY:** I don't know how many of you start the article in

The New York Times, but about a week ago, there was this really interesting article in

The New York Times about the use and abuse of PowerPoint, particularly as it is used by

the military, and the big conclusion the article attempted to make was that PowerPoint

can be damaging because, other than putting up figures like this, what you can't get out of

PowerPoint is sort of detail and nuance.

I am going to give you 2 hours of PowerPoint, without a lot of detail and

nuance. So what I am hoping is that a lot of what I go over in this 2 hours sort of

generates questions by you that we can go in much more detailed discussion on in the

Q&A because I think that discussion is going to be important in order to fully understand

the points that we are trying to make to you as well as, obviously, the written materials

that we have provided to you, but I will do the best that I can to get as much nuance and

detail into what I show you.

I did delete a quote from the article that was up here because I didn't want
anybody to get the wrong impression, but the last sentence of this New York Times article talks about the one good use of PowerPoint, which is briefing the press in something that the military called "hypnotizing chickens." But I didn't think that people would take that the right way, so I deleted that.

I am going to spend time on four topics here, and we have laid out these topics in response to the communication, the written communication we had gotten from you all, the things that you have a lot of questions on and wanted more information on. So I am going to spend a fair amount of time talking about the load standards.

One of the things that you all brought up in February was that we were hyperfocused on a load standard for the Lower Hudson River, to the exclusion of the Upper Hudson River, and there were a lot of questions about what are the impacts in the Upper Hudson River.

As you will see here, as we walk through this, reflecting on what you told us in February, we actually think that there needs to be a separate load standard to protect the Upper Hudson River in addition to a load standard to protect the Lower Hudson, and I will talk to you about that.

Redeposition is a lightning-rod issue on this project, it seems. We have spent a lot of time looking at it. We think it is very important. EPA spent a lot of time discrediting it, suggesting that it is not an important issue here, and we think it is very important and has significant impacts with regard to the load standard. So I am going to spend some time walking you through that and why we think the data are pretty persuasive, that this is an important finding from this project that has implications with
regard to the performance standards.

Then I will talk a little bit about EPA's proposals, as we understand them, recognizing that they're somewhat in flux, EPA having just released its addendum, and then finally our proposal on the standards.

We spent a lot of time writing our reports. You guys have spent a tremendous amount of time reading and digesting our reports. Based upon the communications we have had back and forth, it is clear that you guys have done the deep dive, that you have really gotten into this. You have spent a lot of time trying to understand the massive amount of information that has been collected and analyzed, and we really look forward to the Q&A session and your deliberations because it is clear to us that you have been developing some important insights into this project that I think will help us -- "us" being GE and EPA -- move forward into Phase 2 and craft a project that can meet performance standards and can achieve the benefits of the remedy, and so we really look forward to that.

First thing, one of the things you guys talked about or asked us about was the basis for the standards. When we looked at the load standard, it was pretty clear when EPA crafted the load standard that the real objective here was to protect the benefits to both the Upper and the Lower Hudson River, and I am not going to read the quotes here, but these are two quotes out of the resuspension performance standard that I think highlight EPA's original objective, which was to reduce risks to human and ecological health, so that the load standards were really crafted to protect the benefits. There is no distinction in these quotes between the Upper and Lower Hudson. So it is to
protect the benefits of the remedy in total.

When it came time to developing the standard itself, the focus, though, became the Lower Hudson. So the objectives here really pertain to the remedy in total.

The load standard that was developed, though, really address just the Lower Hudson River, and it was crafted, again with these quotes, with the idea that you wanted to send less PCB to the Lower Hudson River with dredging than you would with monitored natural attenuation, to protect some benefit to the Lower Hudson River. And that was a big focus of what we talked about in February.

It continues to be a very important part of the performance standards, but it is not the exclusive role of the load standard, since we need to protect the benefits to the Upper Hudson, and as indicated to you, I will spend some time talking to you about ideas -- and we would really like to get some feedback from you -- on how we might craft a load standard for the Upper Hudson River.

We think that there are some critical lessons out of Phase 1 that help us as we try to decide what are appropriate standards for Phase 2. It is clear that dredging elevated water column PCB concentrations for 40 to 50 miles of this river, fish concentrations went up for 40 to 50 miles, which makes sense if the river water concentrations went up for 40 to 50 miles. The fish should have gone up for 40 to 50 miles. If they didn't, it's kind of odd.

We also found that we have spread contamination on the river bottom, what we are calling redeposition, and that that has had a longer term impact, an impact that has lasted beyond the end of the dredging project. We know from Phase 1 that we
send a considerable amount of PCB to the Lower Hudson as we dredge.

We also found in Phase 1 that after the first or second pass of the dredge, we were continuing to dredge but removing little PCB mass, that the efficiency and effectiveness of dredging went down considerably after the first or second pass. We think that these are all critical findings from Phase 1.

PANEL MEMBER: Clarifying question.

MR. CONNOLLY: Yes.

PANEL MEMBER: Could you distinguish on the map your Upper from Lower Hudson?

MR. CONNOLLY: Yes. The Upper Hudson River is the upper 40 miles of river from Rogers Island down to the Troy Dam, right about here. So the Troy Dam splits the Upper and the Lower Hudson. The Lower Hudson is the tidal river, and so it is 150 miles of river down to the Battery in New York City.

We think that the key to preserving the benefits, as Ann indicated, is the PCB load standard, and so we are going to focus a lot on the load standard. Although all the standards are important, this is the one that will control the benefits of the remedy.

We think that that load standard must protect both the Upper and the Lower Hudson. We also think that there is really only one good way to estimate what that number should be, and that is to use modeling.

PCB fate and transport modeling is our best tool to try to predict what will be the impact on the river if we didn't dredge and what is the impact and benefit to the river if we do dredge and using that information to craft a load standard.
Modeling is sort of the standard of practice at contaminated sediment sites. All the major contaminated sediment sites have a fate and transport model developed for them, and there is a list of some of the larger sites here. Those models are used at almost all of these sites for the purpose of evaluating the remedies, evaluating the effectiveness of the remedies, what happens if you don't dredge, what happens if you do dredge. So this is the way that the EPA has gone about its business. It is the way that EPA conducted its business in the first instance here.

The FS for the Hudson River relied on modeling to evaluate the various remedial alternatives, the effectiveness of those alternatives, and as a basis for choosing the alternative.

EPA's models, along with a model that we developed, were developed in the late '90s. So there's over a decade since those models were developed. There's a lot that has happened in the last decade. If we just think back to what our computing power was in the late '90s and what our computing power is today, there is a huge difference.

In addition, there is a lot more information that's been generated about the Hudson since that time. So there is an opportunity here to improve the models that were originally developed.

We took that opportunity and updated the model that we developed in order to have the latest generation tool to use to evaluate the load standard for this river, and the model that we've used begins with the model that we used in remedial design, which was approved by EPA for use in remedial design. We used it in design for purposes of evaluating resuspension controls and the need for controls and evaluating the
shear stresses on the bottom to help design caps. So that approved model is the basis for
the further development of a model to predict, in essence, what will happen if you
dredge.

This is EPA's original modeling analysis, which we talked about in
February, that was used to evaluate the load standard that was used in Phase 1. Here, we
are looking at the cumulative PCB load over time starting in 2005 to 2067 for MNA
(monitored natural attenuation), which is the red line, and for the ROD remedy, with
resuspension set at what is the load standard for Phase 1.

EPA used this to say that the load standard was appropriate because, with
that load standard, the remedy would send less PCB over time to the Lower Hudson
River than would have occurred under natural recovery. EPA's analysis indicated a
crossing at around 2030 or about 20 years after the dredging would have ended. Based
upon this analysis, dredging ended in 2010. So we begin to accrue a benefit to the Lower
Hudson about 20 years after the dredging project ended. So that was the original basis
for setting the standard for load.

EPA has now moved away from modeling, and they have had three
versions of how they would go about setting the load for the Lower Hudson. In the Draft
Report, it was 1 percent of the mass that we dredged, and so they proposed 2,000
kilograms as the load.

In their final report, they did an analysis to try to evaluate how much PCB
would go downstream if you didn't dredge and how much would go downstream if you
did dredge, to set a load that would accrue a benefit similar to what I showed you in the
last chart. In doing that, they made the assumption that the river was not recovering, that there was a 99-year half-life for PCB load in the river, and then computed essentially loads continuing at current rate out into the future, made an assumption about how dredging would reduce those loads, and then drew the lines. They used that to conclude that 2,000 was still the appropriate number.

In the addendum they have just released, they have now indicated that the analysis that showed that the river was not recovering was not correct and that the river is recovering. This is a plot from EPA’s addendum report in which what they are showing are calculated values for PCB concentration annual average.

This is not data. These are calculated numbers that come from a manipulation of data using a loading estimate model, a load estimate model that they try to back out of concentration, and they plot concentration from ’95 through 2008 and show that the average annual concentration of PCBs is declining at a rate that, if you look at their exponential equation, is .069 per year, so on the order of 7 percent per year, PCBs are declining.

We did something similar. Rather than using a calculated estimate of annual load or annual concentration, we used the data directly, and what we did was to take a time period in the summer, July through September, which is a good time period to look at PCBs because it is the summer low flow period. So we are not confounded by high flow events -- and it is the time when the PCB concentrations in the river are the highest -- and simply just averaged the data from July through September, and this is at Schuylerville. So this is a very similar presentation to EPA’s where there is a decline in
the summer average PCB concentration in the river at Schuylerville.

The rate of decline is a little bit different than EPA's analysis. If you look at the exponential there, it is .1 or about 10 percent per year. So that the decline rate looking at the data in this way is a little bit greater than the decline rate that EPA estimated with their calculated annual concentrations. Nonetheless, both analyses indicate that the river is recovering.

The question here is how much will dredging accelerate that recovery. We have developed the models to answer that question, and I will walk you through a little bit in sort of high level the results of our modeling effort.

We have distributed to you a summary report that goes through the development calibration of these models. It gives you a lot more information than the information I am going to show you here, and we are intending to develop a full documentation report on this model by early June or so that will go in excruciating detail into the development and application of the models.

But the modeling framework here is the same as the modeling framework that GE and EPA developed back in the '90s, consists of four components, and hydrodynamic model to compute river flow and velocity, a sediment transport model to compute erosion and deposition of sediments, a PCB fate model that takes the results from the hydrodynamic and sediment transport model to compute the fate of PCBs in the river, and a bioaccumulation model to compute what would be the concentrations in the food web as a result of the concentrations in the water and the sediment.

The big difference between the earlier models and this model is spatial
resolution. The spatial resolution we can now model this river at, given the current
technology, computing technology, is tremendous compared to what we were able to do
in the '90s.

This is an example. This is Reach 7 of the river. So this is the second
reach below Rogers Island. So the first reach below Rogers Island is Thompson Island
Pool. The next reach below that, which is called Reach 7, starts at the Thompson Island
Dam and goes to the Lock 6 Dam, which is also called the Fort Miller Dam. It is about a
two-and-a-half-mile reach of river.

In EPA's original model, that whole two-and-a-half-mile reach was
modeled as a single element. So one element for the two and a half miles of river, in
essence, the way these models work, that makes this just one completely mixed box.

The new model here, you can see the size of the grid elements. There are
more than a thousand grid elements in that two-and-a-half-mile reach, tremendous spatial
resolution relative to what we were able to do back in the '90s. That becomes very
important when we are trying to evaluate natural recovery and dredging because, if you
look over here, these little green areas are the dredge areas in Reach 7.

So, if you look at the scale of the dredge areas, in order to properly
simulate dredging in this river and the impacts of dredging, you need pretty good spatial
resolution. The new model provides us that resolution; the old model was unable to do
that.

In addition, we have the benefit of much more data than what we had back
in the late '90s. We have got 50,000 more measurements of PCB in river sediment than
we had. Associated with those measurements of PCB and river sediment are measurements of sediment type, are measurements of bulk density.

Back in the late '90s, the data that existed below Thompson Island Pool was very sparse. So the models were actually very crude at understanding and simulating what was going on below Thompson Island Pool. Now we've got tremendous more information of what is happening in this river below Thompson Island Pool.

In addition, there has been intensive monitoring of water transport in this river, various hydrodynamic studies that have been conducted. There is an additional decade of fish and water data over what we had before. There is refined bed mapping. So there is sidescan sonar data for the entire Upper River now that allows us to distinguish fine sediments, coarse sediments, transitional sediments, information that we didn't have before.

We have much greater resolution bathymetry than we had. We have single-beam data throughout the river now at 100-foot spacing. We didn't have that before. And in many of the areas in Thompson Island Pool and some of the downstream areas, we actually have multi-beam bathymetry, which allows us to really map the river bottom very well.

We also now have measurements of river velocity that allow us to look at how well the hydrodynamic model is able to reproduce the velocities in the river, the cross-channel variations in those velocities, how those velocities change when we go from low flow to high flow, tremendous information to develop a model.

In fact, the amount of data we have on the Hudson River now is by far and
away the most comprehensive dataset that exists in the United States and probably the
world for developing a PCB fate model. This is the best dataset that I have ever worked
with to develop a model, and I think it has allowed us to develop probably the best model
that has ever been developed for a PCB fate or any contaminant fate project.

Quickly, I'll just go through a couple of the model data comparisons to
give you some sense of how this model works.

With regard to sediment transport, here is an example, and, again, all of
these are in the report that we showed you. This is a flood that occurred in 1994. The
top panel shows the river hydrograph, so you see the flow coming up.

This is flow at Fort Edward. So the river is about 5,000 CFS. It comes up
and it peaks at about 30,000 CFS. This is a pretty good-size flood.

We've done a mass balance analysis in Thompson Island Pool looking at
solids coming in, solids leaving, so that we can evaluate based on data, which is the
dotted line here, whether we are having net deposition in the pool or net erosion in the
pool. Under this horizontal line here, it is erosion; above it, it is deposition.

So, over the first part of this period here, we are depositing material on
Thompson Island Pool. The flow comes up, and all of a sudden, we switch to start
eroding material. The erosion basically stops here. You can see with the data, there is no
longer any erosion. The river bottom has essentially armored itself.

The solid line is what the model predicts, and so you see the model does a
pretty nice job of getting the deposition and erosion pattern in this river over the storm.

This next chart is one of the calibration plots for PCB fate. This is the
period from 2004 to 2008, so it is the baseline monitoring period. You can see the river hydrograph, and then you see two sets of plots here. The old models, model Tri+ PCB, PCB with three or more chlorines -- and we have continued that, and that is what this bottom is -- we now, in addition, model mono- and dichlorobiphenyl. So there are essentially two PCB fate models, one for mono- and dichlorobiphenyl and one for Tri+ PCB.

What is shown here are the data, so these are the symbols that you see here, and the model prediction. This happens to be at Waterford. You can see that the model captures the annual cycle in PCB concentrations and the variations that occur within the year, and it does a pretty good job for mono and di and for Tri+ PCB, and you can see some of the high flow events here. So, overall, the model does a nice job of getting the PCB concentrations in the river.

Now, another way to look at that is cumulative load.

Yes.

PANEL MEMBER: A question on the previous.

MR. CONNOLLY: Yes.

PANEL MEMBER: Were those all dissolved concentrations?

MR. CONNOLLY: It's total pool water sample, so it's dissolved plus particulate expressed in a volumetric basis.

PANEL MEMBER: Okay.

MR. CONNOLLY: This is cumulative load. What we do is take the data and just keep cumulating PCB load over the year, and so we look each year at the
baseline program, 2004 through 2008. So, for each year, you see a start. We didn't start
sampling until July in 2004, so that is when that starts.

The points are the data, the cumulating load through the year, and then
there is a line here which is the model. Where the model goes right through the data, the
model is right on in terms of getting load through the year. So you can't see any
difference between the model and the data here.

In 2006 and 2008, you see that the model is a little high at this period.
During the high flow period, which is when this jumps during a high flow event, the
model is a little bit low but then tracks pretty well the data at the end of the year.

So, overall, this model seems to be doing a pretty good job at getting the
cumulative load through the year in the river.

We have used that model now to make projections, similar to what we saw
in EPA's original analysis. So this is a prediction from the model of cumulative load at
Waterford starting in 2009 and going out to 2059.

What we are looking at here is the model's prediction for natural recovery
and the model's prediction for dredging, and this happens to be the Phase 2 dredging
footprint with 180,000 kilograms of PCB sitting under it, which is EPA's estimate, and
3-percent release at the dredge head.

We have measured 3 percent, by our analysis, at the first far-field station.
Here, we are assuming we just backed that up to the dredge head to get a number. So you
can see the cumulative load, the impact of the resuspension, then the benefit of the
dredging that reduces slope afterwards.
So now we have a tool that we can use to try to evaluate allowable load, and the way we use that tool now is to back down the dredging simulation until it crosses the natural recovery simulation.

Based upon what EPA had done originally, where they crossed about 20 years after the end of dredging, we have looked at crossing 20 years after the end of dredging which, if dredging ends in 2016 which would be the current plan, that would be 2036. So we have just drawn a line here at 2036. We have analyzed the dredging that would cross there, and that allows us, then, to look at a gross load from the dredging project by the end of dredging.

So we use the model now for the dredging projection and say by 2016, the dredging simulation will have sent a little over 3,000 kilograms of PCB to the Lower Hudson River. We use that number. It is 3,100.

Yes.

MR. THOMPSON: Could we go back two slides, please?

MR. CONNOLLY: Sure.

MR. THOMPSON: I just need a clarifying question here.

MR. CONNOLLY: Yes.

MR. THOMPSON: So, when you construct this, this model, and you make the Phase 2 post-dredging calculations, what do you do with the areas that are remediated?

MR. CONNOLLY: All the areas that are remediated are at the end of remediation, and we have a dredging schedule.
MR. THOMPSON: Yeah.

MR. CONNOLLY: So we follow this dredging schedule. When we remediate an area, we reset its concentration at .25 parts per million PCB.

MR. THOMPSON: So 250 ppb.

MR. CONNOLLY: Which is EPA's objective to reach at the end of dredging, that each dredge area would have on average .25 ppm. So that was the assumption we made.

MR. THOMPSON: So, even with backfill or capping, you still anticipate that will be at 250 parts per billion?

MR. CONNOLLY: 250 parts per billion.

MR. THOMPSON: Yeah. I said "billion."

MR. CONNOLLY: No, we actually think it is probably going to be lower than that.

MR. THOMPSON: Okay.

MR. CONNOLLY: But we have used that because that was, in essence, EPA's objective to get to that, and we have not done measurements to see where we are.

MR. THOMPSON: Okay. The next slide, please. Just spend a little bit of time explaining to me how you back down the line here, if you would, please.

MR. CONNOLLY: Yeah. The way you back down the line is the post-dredging slope is fixed. Once we are done covering all the areas, that is what it is going to look like, assuming no redeposition, which is a critical component here, and you see that in the title. So we are not thinking about redeposition yet.
So that slope is fixed. No matter what we release during dredging, we get the same benefit after dredging, and all you do is you just drop this down until it crosses at 2036, go back to 2016, and that gets you the load.

MR. THOMPSON: Okay, I got it. Thank you.

MR. CONNOLLY: So that is 3,100 kilograms.

But one of those years is a non-dredging year, 2010. So we take what the model predicts for 2010 and subtract it out, 150 kilograms. So the gross load during the dredging period is 2,950 kilograms.

Now, we don't track gross load. We track net load, and the net load that we track is the gross load minus the load that occurred during the baseline period, 2004 to 2008. So, in order to get the net load, we have to subtract the baseline over a 6-year project based on the 2004 to 2008 data. When we do that analysis, that is about 1,740 kilograms.

So you take the gross load, minus the baseline, which is the way we calculate at net, to get a net load, and that net load is about 1,200.

So our initial estimate, our first estimate of allowable load to the Lower Hudson River, in order for the river to begin to accrue a benefit 20 years after dredging ends, is 1,200 kilograms. If we didn't have any redeposition, that would be the appropriate number, 1,200; however, it is an overestimate because we do have redeposition.

EPA has done something a little bit different. Rather than using 20 years after the dredging period to set the load, they have done their analysis, which they don't
use a model. They use their estimated decline of MNA and then an estimated benefit of
dredging by looking at how much they think the surface sediment concentration will drop
if you remediate certain areas of the river.

They concluded that 500 kilograms of Tri+ PCB would be an appropriate
number because, with 500 kilograms of Tri+ PCB released to the river during dredging,
there would begin to be a benefit or at least a 50-percent chance of a benefit by the year
2050. So, prior to 2050, their analysis is there is less than a 50-percent chance of a
benefit to the Lower River. After 2050, there is a greater-than-50-percent chance. So
2050 becomes the crossing line.

So, rather than 20 years after dredging, to 2036, they are willing to say,
"We can take it out to 2050 before we begin to see any benefit to the Lower Hudson
River."

They, though, say that that is not going to be the standard, that the
standard will continue to be 1 percent net loss of PCB inventory or 2,000 kilograms of
PCB, which they equate to 667 Tri+, using a factor of 3. So that the load standard is
actually bigger than a number that will not allow a benefit to accrue until 2050. So, if
you hit the load standard, there is no benefit in this river till -- I don't know when because
they haven't done the analysis, but it is past 2050, so, therefore, the reason for the title of
the slide.

EPA's view is that, "At least for the Lower Hudson, we don't need to have
a benefit for the Lower Hudson. We can set a load standard that, in their view, will not
allow a benefit to accrue for the Lower Hudson until at least 2050," the goal number they
have, which would be an evaluation level, "or something longer than that," and we don't
know how much longer than that. We don't think that is appropriate.

We also don't think it is conservative for two reasons. One, their estimate
of the decline in the river due to MNA was about 7 percent per year based upon
calculated annual concentrations. When you use the data directly, the recovery rate is
more like 10 percent a year. That will result in MNA reducing loads faster than EPA
says they will, which would actually reduce the allowable load, so that the 500 is not
conservative, that, in reality, there is less than a 50-percent chance of there being a
benefit by 2050.

Then, just like the analysis I showed you that we did, this analysis doesn't
take account of redeposition.

PANEL MEMBER: John?

MR. CONNOLLY: Yes.

PANEL MEMBER: Redeposition. Define "redeposition." What are you
talking about?

MR. CONNOLLY: Redeposition is the phenomenon that when you put
the dredge bucket down and you hit the bottom and you kick sediment up in a flowing
river, that sediment goes downstream and deposits someplace downstream, and that is
what we call redeposition.

EPA has set about a standard that will have no benefit to the Lower
Hudson River till at least 2050 and probably later but then did an analysis of fish
concentrations in the Lower Hudson River if they send PCBs to the Lower Hudson.
They looked at two scenarios, one where it is 600 Tri+ and one where it is 800 Tri+, so the lower line here is close to the number that they would say is okay.

This is their predictions in fish at River Mile 152, which is Albany. The red line is monitored natural recovery, so that is their prediction of what the fish concentrations would be if we hadn't dredged. With the releases to the Lower Hudson River, they predict a tick-up in fish concentration. Dredging ends here, and then the fish concentrations come down.

This is at River Mile 50, 100 miles further downstream in the river. We're getting down around Poughkeepsie. Natural recovery, dredging. So, by EPA's analysis, the load going to the Lower Hudson River would have a negative impact on fish but would not have a positive benefit later. It sits right on top of monitored natural recovery.

So the only impact to fish in the Lower Hudson River of the PCB going to the Lower Hudson River is a negative impact on the Lower Hudson River. The more PCB you send, the greater that negative impact. By their analysis, by River Mile 50, that negative impact persists for a decade after dredging ends, before you come back to that monitored natural recovery line.

So I think that this is an important point that came up in February. What does it mean to the Lower Hudson River if we send PCBs to it? Well, EPA's analysis suggests what it means is a net negative impact to the Lower Hudson. What is interesting, we have had this debate about whether fish concentrations have gone up in Albany. We say they must have because the water concentrations went up. EPA says, "Well, it's not statistically significant." But it is
interesting that their modeling of the 2009 period shows that fish went up about 40 or 50 percent, which is what our calculation says fish went up. So the data seem to agree with their model prediction.

Now let's talk about redeposition, because everything up to this point has been without considering redeposition, and we think that you cannot set a load standard without considering redeposition.

In February, we talked to you about the various lines of evidence that we were looking at, at the time, that suggested to us that there was considerable redeposition of PCBs in this river.

We talked to you about the sediment trap PCB levels. We talked to you about the loss of PCBs as we move downstream. We talked to you about the fact that every time during the dredging, the flow went up. All of a sudden, we started sending a lot more PCB downstream. And we talked to you about what we were initially seeing in terms of PCB concentrations after dredging ended. We told you that we really wanted to see what happened during a high flow event because, if this phenomenon was real, we would expect to see an impact during a high flow event.

I am going to show you that data. I am going to go through some of this earlier data, just as a reminder, and some additional analysis that we have done of this data to get a better sense of this redeposition phenomenon and its significance with regard to how we would set a load standard for the river.

When we were last together, we had showed you this plot, only we didn't have this first bar. We showed you a plot that showed the net load at Thompson Island,
Lock 5, and Waterford, and it was declining. EPA's figure is identical to this. Their numbers are a little bit different, 450 and 150 instead of 500 and 200, but the pattern is the same.

You asked -- and I think, Todd, it was specifically you who asked -- well, that's fine at Thompson Island monitoring station, but that monitoring station is 3 to 7 miles downstream of dredging. What's happening between the dredge and that first station?

Well, we have used the transect data that we have to try to make an estimate of how much PCB loss was occurring between the dredging areas and the dam, and it's in our report. By our estimate -- and clearly, it's just an estimate because we have only got a few of these transect studies. We tried to do time at travel, but it wasn't perfect; nonetheless, I think it gave us a good sense of things. By our estimation, we were losing about 35 percent of the PCBs between just below the dredging and the Thompson Island station. So, using that number, we have backed the 500 up, assuming that 35 percent, and get 770, clearly just a rough estimate but nonetheless a good working estimate.

If you look at that, then, we have 770 near the dredges, 200 by the time you get to Waterford. 570 kilograms of PCB, by our analysis, have disappeared in the Upper Hudson River, and the question is what happened to them. There were really only two mechanisms. Either they went to the atmosphere, or they went to the bottom.

We have done analysis of how much of that PCB could have gone to the atmosphere. We have done it two ways, a simple mass transport calculation using just
simple mass transport theory and using our complete PCB fate model. Both results are very similar. I am just showing you the simple calculation. I am not going to go through the details of this.

Using a simple mass transfer analysis, that 770 kilograms that we start with, about 140 of it could have gone to the atmosphere.

There is additional loss at the dams, and there are published models of volatilization of dams. We have used those models to figure out how much additional volatilization would occur at the dams, and that works out to be about 5 percent -- we have got a write-up of that, that we can share with you, if you'd like -- and 5 percent of the 770 is about another 40 kilograms.

So, by our estimation, we can send to the atmosphere about 180 kilograms, which is about one-third of the drop. We had this 570-kilogram drop. We think we can only account for about 180 of it by volatilization. Our full PCB fate model, which is doing a much more sophisticated analysis of all this, calculating dissolved fractions and looking at water depths and velocities and everything, gets a similar number. So this seems to work pretty well.

Yes.

PANEL MEMBER: Most of that would be mono and di?

MR. CONNOLLY: It would be more mono and di than tri, tetra, penta, but it wouldn't be exclusively mono and di. It is dropping because the partitioning is putting more and more particles as we go off homolog. So the most is mono. The next most is di.
PANEL MEMBER: Yeah, of course.

MR. CONNOLLY: And then tri and so on.

PANEL MEMBER: Okay.

MR. CONNOLLY: So, if we do a simple accounting, if we believe that the release near the dredges is something like 770 kilograms, that we could lose 180 to the atmosphere, and 200 showed up at Waterford, the remainder of that we can't account for is 390 kilograms. So that becomes our estimate of what must have gone to the river bottom, that we dropped about 390 kilograms of PCB to the river bottom.

The fate of that becomes important now. We have put 390 kilograms, by our best estimate, on the river bottom. Is that going to continue to be transported downstream over time, providing more load to the Lower Hudson River and to the rest of the Upper Hudson? Is it going to be incorporated into surface sediments and have a longer term impact on fish in the Upper Hudson River? Is it going to be removed in subsequent dredging? Is it all going to fall in dredge areas and be removed? Those are all important questions to try to understand what are the impacts of this.

The idea that this 390 must have gone to the sediments is supported by a number of lines of evidence, the first of which is this comparison.

When we look at what passes Thompson Island Pool and what passes the next station, Lock 5, and do a subtraction -- and we do it on a PCB homolog basis -- we can say how much mono dropped out, how much di dropped out, how much tri dropped out and so on, that we can get a fingerprint of what dropped out, and that is what this is. This is mono, di, tri, tetra, penta. This is percentages of total.
So you can see that we are dropping out. Blue bar is the calculation of what dropped out. It is mostly di and tri PCBs, tetra, penta, and so on.

The interesting thing is the red bars are the PCB composition on particles near the dredge in Thompson Island Pool. We did a near-field PCB release study and separately measured particulate PCBs from dissolved PCBs. The dissolved PCBs and particulate PCBs have a very different signature. The dissolved PCBs are dominated by mono and di. The particulate are dominated by di and tri and tetra. So there is a pretty close match between what dropped out and what looks like the signature of particulate matter.

In fact, what dropped out looks a little more chlorinated than what we measured on particles near the dredge, and perhaps that is because we lost some of the mono in Thompson Island Pool before we get below Thompson Island monitoring station.

Now, we also look at the change in overall composition as we move through the river, and so this is the percent of the PCBs that are Tri+, so the fraction total PCBs that have 3 or more chlorines, at Thompson Island, at Lock 5, and at Waterford.

So, at Thompson Island, on average during the dredging program, 45 percent of the PCBs past Thompson Island were Tri+ PCBs. By the time we get to Waterford, that drops to 40 percent. So we have this decline that is going on here.

What that means is we are losing the higher chlorinated PCBs faster than the lower chlorinated PCBs because we are dropping the fractions that are Tri+, which means we are increasing the fraction that are mono and di.
If we are losing, preferentially, the higher chlorinated PCBs, that is consistent with redeposition. The particles take out selectively the more highly chlorinated PCBs.

We have done some reality checks on this 390. I mean, this is 390 that passed the laugh test. The first was how much sediment would have to be resuspended to go downstream and deposit in order to put 390 kilograms of PCB on the river bottom.

So we do this simple analysis where what we say is from the sediment traps, the average PCB concentration on posi particle, 65 parts per million. So let's assume that's the global average of what drops to the bottom, 65 parts per million.

Well, if we have 390 kilograms depositing at 65 parts per million or 65 times $10^6$ kilogram, that means we would have had to have dropped out 6 million kilograms of sediment, would have dropped to the river bottom.

Well, using a bulk density of 1 on average, that would be 6,000 cubic meters of sediment that had dredged up, went downstream, and dropped out. The body we dredged was 286,000 cubic yards, which is 218,000 cubic meters. So, if 6,000 cubic meters of material that we dredged wound up going downstream and dropped out, relative to 218,000 were taken out, that is 3 percent of sediment that was dredged.

So, in order to drop 390 kilograms into the river, we would have had to have 3-percent sediment resuspension to have enough particles to drop out. That is a reasonable number. Our best estimate of PCB release is 3 to 4 percent. Estimates of resuspension of sediments at other sites are in the range of 1 to 5 percent. So a 3 percent number passes the laugh test.
The other thing we looked at was, well, how much TSS would we have had to have generated in order to put that much sediment downstream, and so we go through and just do a TSS calculation, assuming that we have 6 million kilograms of sediment over the 150 days of dredging, so that is 40,000 kilograms of sediment a day, the average river flow during the dredging is about 5,300 CFS, you calculate the CFS, it is 3 milligrams per liter.

So we would have had 3 milligrams per liter on average moving down the stream. That is within the noise of what we measure. We measured values that are 1 to 5, 6, 7 parts per million, not much different than baseline. Of course, 3 milligrams per liter on average wasn't going to generate much of a signal relative to baseline, so this also passes the laugh test.

Now we have got this drop in the river. We have got sediment trap data that tell us there must be redeposition. The expression of that redeposition, we saw during dredging, but the best evidence is what we saw after dredging ends. So, if we look at post-dredging evidence of redeposition -- and this is a chart you saw in February -- this is the gross PCB load passing Thompson Island, Schuylerville, and Waterford, starting the day after dredging ends. Dredging ends on October 27th.

Starting on October 28th, we tracked the load, and we compare it to the loads we measured in the baseline years. So these lines here, each one is one of the baseline years, 2004 to 2008. Clearly, at Thompson Island Pool, the levels we are seeing after dredging ended are much higher than the levels we saw in baseline years, same thing at Schuylerville, lesser extent at Waterford, but still, in many cases, especially out
here, higher than we ever saw during baseline.

You could say, well, some of that might be coming from dredge areas not yet covered, but all the dredge areas are covered by November 11th. So, by this time, there are no exposed dredge areas.

You might say that, well, some of that is due to the fact we still have vessels in the river. By 11/26, we were down to one project vessel on average in the river. So there are no project vessels to speak of after the 26th of November, so right here, yet the flows continue.

PANEL MEMBER: John, a question.

MR. CONNOLLY: Yes.

PANEL MEMBER: I look at the data density collected post dredging versus the baseline, and I am wondering if we missed some peaks. Could you go into a little bit on the averaging on the baseline or those individual data points, and how similar are they?

MR. CONNOLLY: Each baseline measurement is an individual data point. The baseline program was sampling once a week, and so the data are whatever the data are. Did we miss something? Perhaps at some time, but the consistency of elevation here and here is pretty good.

The other thing I think we need to remember is by November 11, we now have taken 48 acres of this river that had PCB concentrations of the surface and including down by Griffin Island which had the highest PCB concentration from the surface sediment of any place in Thompson Island Pool on average, it is now zero.
If anything, we would expect this to have come down into this data and maybe towards the lower end of the data because there's 48 acres of river that are no longer contributing PCBs to the water column.

So the fact that we remain above baseline or skirting right on the top of baseline suggests something is happening.

**PANEL MEMBER:** John, before you go back to that slide --

**MR. CONNOLLY:** Yes. Sure.

**PANEL MEMBER:** -- you only show us data through mid December; is that correct?

**MR. CONNOLLY:** Yes.

**PANEL MEMBER:** Do you have data beyond that?

**MR. CONNOLLY:** Yes. That's a good segue.

**PANEL MEMBER:** Oh, okay. You're welcome.

**MR. CONNOLLY:** This data is the remedial monitoring program data, and the remedial monitoring program ends on the 17th.

**PANEL MEMBER:** Okay.

**MR. CONNOLLY:** So I have separated now the remediate monitoring from the off-season monitoring.

**PANEL MEMBER:** I've got it. Okay, thank you.

**MR. CONNOLLY:** So I'll now show you the off-season monitoring.

First, this is EPA's presentation of the off-season monitoring. This is at Schuylerville. This comes from their addendum report. What they are showing are total
PCB concentrations starting December 1st and moving to April 6th.

   The blue dots here are the baseline data. These pink dots -- I'm sorry -- triangles are the post-dredging data.

   EPA's conclusion is that, well, we have come back to baseline, but I think we have to be careful because some of the higher values we see in baseline are actually associated with high flow events. These are the flows on these dates, 19,000 and 18,000 CFS. So you have to be careful because PCB concentrations vary with flow, and so that complicates this comparison.

   We also have to be careful because, if you look hard at this, there is actually a trend here where concentrations drop -- this is sort of the minimum period here in February -- and then they start to come back again. This is part of a long-term seasonal trend that exists in this river system.

   So that just looking at the data this way, it is difficult to really evaluate whether, in fact, we have come back to baseline. We think that you have to take account of the seasonal variations by compressing this to a shorter period, and you have to look at it as a function of flow, so that you make sure you are comparing similar flows.

   So, when we look at the data, we look at it differently, and this is the same data that is on that previous plot, but what we are looking at here is PCB concentration versus river flow, just January. So we are trying to get rid of the seasonal variation. We are just looking at January data.

   The blue samples here are the baseline data, the red are the post-dredging data, and you can clearly see, I think, that the post-dredging concentrations are higher
than the baseline concentrations.

There is a difference, depending upon whether you use the 2009 bias correction -- we talked about that in February, how we have to correct some of the peaks -- or you don't use that and use the earlier correction. It changes things a little bit, but it doesn't change them a lot. The conclusion in that, in January of 2010, the levels we were measuring in the river remained above what we saw in baseline. It is true, regardless of which correction factor we used.

I have two versions of this. I'm not sure why. This one has some data that we later believe were non-detected when multiplied, so that is why there is less points here, but the same loopholes.

Now we get to the high flow event. So, in March, starting on March 23rd, a high flow event came through the river, and PCB concentrations were very high. This is the same kind of presentation we just saw for January.

This is PCB concentrations as a function of river flow using baseline data for March and April. Remember, we need to use the baseline data for the same time of year because of the seasonal variability, so we need to stick just to the March-April. This is at Thompson Island Dam, and here are the blue dots or what we saw historically at the baseline. During the 2010 event, these are the concentrations we saw, much, much higher. In fact, there is one off the scale here at 13,000.

When we went out and inspected this station after the high flow event --

PANEL MEMBER: How high was the flow?

MR. CONNOLLY: The flow peaked at about 37,000 CFS.
Is that right? No. 23. I'm sorry. I am thinking of a different event.

Yeah. It is 37,000 at Waterford, 23,000 at Thompson Island.

When we went out and inspected the station, all of our monitoring stations are automated stations, and they have got intakes in the river and lines that run to shore.

At this station, the intakes were foul. They had dead vegetation clinging to the intakes.

We have five intakes at this location. Two of them had been dragged down close to the river bottom by the dead vegetation. The dead vegetation had solids clinging to it. All of that suggests that this data may have been altered by the presence of vegetation and potential clogging of the filter.

One thing we do know, though, is that before the high flow event started, the concentrations were relatively low. The high flow event came. Concentrations went up through the roof here. When the high flow event ended, before we cleaned this system, the concentrations came back down. So that the presence of this material didn't cause a uniformly high concentration, even with all that material on there. When the high flow event ended, the concentrations came back down. So the concentrations were extremely elevated only during the high flow event, not after, even though it's still clogged.

So our view of this data is, because of the potential issue associated with the clogging, you probably can't rely on these individual points as being accurate estimates of that concentration, but you can rely on the trend, the fact that the concentrations are elevated above what we normally saw in the river during baseline.

You can't take anything more from this figure than that. It is evidence of elevation. The
extent of elevation is difficult to say because of the issues.

PANEL MEMBER: John, could you go over the clogging thing again? I was thinking about something else when you were trying to describe what was going on. So where are these filters, and what was on them?

MR. CONNOLLY: Each intake has got a PBC line.

PANEL MEMBER: Intake for?

MR. CONNOLLY: There are five intakes for the water station. They are across the river channel.

Each one, a PCB pipe comes up and it has a screen at the end. So the water gets sucked by a pump through the screen, through the piping.

PANEL MEMBER: Where is the opening to the intake in relation to the --

MR. CONNOLLY: Mid-water depth. So they are anchored to the bottom, and they have a float on them that keeps them in position at mid-water depth.

What we saw on them was all of this dead vegetation that probably came down during the high flow event. Whenever there is a high flow event in this river, it is pretty amazing throughout --

PANEL MEMBER: How big are these intakes?

MR. CONNOLLY: Mark Larue, can you give a little description of the intake?

MR. LARUE: It's 3-inch diameter, 12-inches long, with a -- so like this.

MR. CONNOLLY: So, during high flow events in the Hudson River, we
normally see lots of material coming downstream in the river, including a lot of dead
vegetation. So, during this high flow event, I assume, a lot of vegetation is moving down
the river, and some of it hits the intakes and just sits there. In two cases, there was
enough vegetation on there to pull the intakes down. So this data is probably not
quantitatively accurate.

**PANEL MEMBER:** In the water that you are sampling with these
intakes, do you estimate total particulates in the sample?

**MR. CONNOLLY:** We do a TSS analysis.

**PANEL MEMBER:** Okay. So can you look at your data over time to
see if you are seeing a progressive reduction in particulates that would be reflected in
your observation that you have that the filters are clogging or blinding?

**MR. CONNOLLY:** That's a good point.

The TSS data that we collect looks reasonable. So the event comes; TSS
concentrations go up. They peak about the peak of the event, and they come back down,
sort of the classic pattern for TSS.

The concentrations we get in with the system are about what we see in
other cases. So they are not clogged to the extent that we can't pump water through them.
It doesn't seem that the vegetation is filtering out all of the particles, because we do get
sediment into them, but what did the presence of that vegetation do to the PCB
concentrations? Because we're sucking water. Now we're sucking it through the
vegetation and down.

So, if there is PCB on the vegetation or particles on the vegetation, are we
sucking some extra PCB in? We don't understand how much they influence what we saw, but what we do believe is that the elevation is true. PCB levels went way up. To what, I don't think we can say with this station.

**MR. FUGLEVAND:** John, can I have a question?

**MR. CONNOLLY:** Yeah.

**MS. HOLLAND:** Paul, pull your microphone up, please.

**MR. FUGLEVAND:** You indicated that the sampling tubes or pipes bent over, and so now you are collecting these samples much closer to the bottom. How much of an influence --

**MR. CONNOLLY:** Two at intakes.

**MR. FUGLEVAND:** Two at intakes.

Are they higher or different? I mean, do we expect a concentration gradient effect here also that we are seeing unusually higher TSS because of near-bottom sampling in some mid column?

**MR. CONNOLLY:** We didn't see unusual TSS.

But, again, you know, if you have got fairly high PCB concentrations from particles, it doesn't take a lot of particles to give you a high PCB number. So the TSS is not a real sensitive indicator to us, whether perhaps we're sucking in some extra stuff here at the bottom that we wouldn't otherwise.

So I think we are careful to not make quantitative statements about this data, but to use it to say, look, clearly, there's a lot of PCBs moving down this river.

This is the next station, the Schuylerville station. This station didn't have
the problems of the Thompson Island station. There are five intakes here. One was not
operational at the time of the high flow event. So there are four intakes working at this
time.

The four intakes were not clogged, and so we believe this is good data.

When we compare what we saw in March, April, in the past, we never even, at fairly high
flows, ever got concentrations greater than about 50 parts per trillion.

PANEL MEMBER: John?

MR. CONNOLLY: But we were seeing much higher concentrations,
several hundred parts per trillion. Back here, sort of in between flow, we actually got one
over 500.

PANEL MEMBER: John, to be clear, as we look back through the
various stations, was this all principally associated with suspended solids? In other
words, do we have a high-dissolved component like you saw during the dredging?

MR. CONNOLLY: We only did whole water analysis. So we don't have
a split to evaluate that.

PANEL MEMBER: Oh, you did. Maybe you said that, and I forgot.
That in terms of mono and di versus Tri+?

MR. CONNOLLY: Yeah. We have got that information, and we gave
you guys a write-up on this event that includes the compositional information associated
with this.

PANEL MEMBER: Would you just comment real briefly here, though,
what you were seeing?
MR. CONNOLLY: Yeah. I am going to let Mark answer that because he remembers the composition better than I do, I think.

Mark?

MS. HOLLAND: Everything is on the record. So you need to come on up here.

MR. LARUE: The composition, you said I remembered it better than you do. I'm not sure that's true, John.

[Laughter.]

MR. CONNOLLY: Well, then we can go by my memory.

MS. HOLLAND: We can also come back to this during our Q&A after lunch.

MR. CONNOLLY: We have actually got figures I can show you.

MR. LARUE: I was going to suggest during the Q&A, we've got a lot more information on the inspections and photographs we can show and all that. I think that would be better.

PANEL MEMBER: Let's let it go.

MS. HOLLAND: Let's come back to this after lunch.

MR. CONNOLLY: Great. I like that.

So this is the Schuylerville station. Clearly, the concentrations are higher than we ever saw on the baseline.

PANEL MEMBER: When you say higher, by how much?

MR. CONNOLLY: So, under baseline, they say flows close to 25,000
CFS. We never saw anything greater than about 50. Now we are seeing concentrations
in several hundred at similar flows, so higher by a factor of 4 to 5, let's say, over what we
saw under baseline at the same time of the year.

Now we go to Waterford, and the elevation isn't quite as clear at
Waterford, but there is some elevation. Remember, we are 40 miles downstream of
where the dredging took place now, and at the lower flows, we are sort of at the upper
end of what we saw, but, as the flows climb, we start to tend to get data that looks like it
is above baseline. Clearly, it is above baseline here, and these points are clearly above
baseline. We have got one number that came through that was almost 1,900 nanograms
per liter.

This is good data. The Waterford monitoring station was not corrupted at
this time. So we believe all of this data, and it corresponds to more PCB going
downstream than we saw during baseline.

Again, remember, this is after almost 58 acres of the river were clean. So
we don't expect after Phase I dredging to see higher levels in the river than before we
dredged, but that is what we seem to be seeing in the river.

One other way that we can look at this is compare the storm in 2010 to a
similar storm that occurred prior to dredging. We had a storm in April of 2005 that has a
flow profile that is very similar to the March 2010 flow profile, and these are the flows at
Waterford, which is why I was remembering 37,000, which is the flow of the March
event at Waterford, 23,000 at Thompson Island.

This event is a little bigger. These are daily average flows. It peaks at
about 42,000 CFS, so it is about a 15-, 20-percent bigger storm.

These are the PCB concentrations measured during the two storms. So this storm is about 20-percent bigger. It is almost classic in terms of PCB concentrations. During the rising of the storm, the PCB concentrations come up. The PCB concentrations peaked at about the peak of the storm, and then they come down. This is almost like a textbook example of what you would expect to see during a high flow event.

In 2010, in contrast, we have a much more confused pattern, and we have higher concentrations. This is a horizontal line I put in here, just so you could see. This is about 150 nanograms per liter. We never got to that level in 2005. Yet, in a storm that is about 20-percent lower, we exceeded it about on six occasions during the storm, so higher concentrations and a much more confused pattern. Concentrations come up. We get a big peak. They go down. They come back up.

Clearly something else is going on here. It doesn't follow the classical pattern. One hypothesis is that if we have redistributed PCBs in some sort of a random patchwork in the system, that depending upon the vagaries of the flow in the system and the tributaries themselves and when a tributary is flushing versus when the main stem is flushing or where the stuff is and what it takes to resuspend it, which may be very different than what it takes to resuspend the native sediments, you could get a confused pattern.

If we look at the total amount of PCBs that were going downstream in the 2005 event, we integrate over the storm 25 kilograms went past that station. In 2010, we
integrate over the storm 80 kilograms went by. If we don't use the 2009 bias correction, it changes it to 75. So we are looking at 50 to 55 more kilograms per PCB going down in the 2010 storm than went down in the 2005 storm, even though the 2005 storm is about 20-percent bigger, another indication that we're sending more PCB to the Lower Hudson River after Phase 1 dredging than before Phase 1 dredging.

So, if we look at this now, an important implication of this was that when we talked in February, we said that by our estimation, 200 kilograms of PCB went to the Lower Hudson River, and that was by November 30th.

We think since that time, we had about 50 or 55 extra go by in this high flow event, plus another 5 to 10 in the other intervening time, that we have now sent about another 60 kilograms of PCB to Lower Hudson, so that the total impact of dredging on PCB load to the Lower Hudson is about 30-percent higher than what we thought it was when we talked to you in February, and that is so far.

If we are even close in our estimate that we put 390 kilograms of PCB on the river bottom -- we have seen about 60 of it go by now -- there is still 330 kilograms sitting on the river bottom. How much of that is going to move downstream? What is the final result in terms of net load to Lower Hudson River that comes from the Phase 1 dredging project?

Well, if we look on a net load basis, in February we told you that by our estimation, 1.2 percent of the PCBs we were dredging went past Waterford, 200 kilograms lost divided by our estimate of mass removed for 16,300, 1.2 percent. By April, now that's 260 kilograms at 16,300. It is now up to 1.6 percent.
If we ultimately send another 60 kilograms, it will go up to 2 percent; if we send another 100 kilograms, 2.2, or 150, 2.5. The point here is that what we see going to the Lower Hudson River is bigger than what we thought it was at the end, and it may continue to rise.

I monkeyed with this late last night, so I'm not sure that you've got the exact information that's on this chart, so I'll point it out to you. One of the things that we did was we calculated how much PCB sits in the top 2 inches of the Hudson River sediments based upon the data we collected for this pre-design program.

By our estimation, there is about 6,000 kilograms of PCB in the upper 2 inches of the Hudson. About 3,000 of that sits in non-dredged areas. About 2 percent of what we dredged appears to have been redeposited. 390 kilograms, our estimate, is what went to river bottom, divided by 16,300 we took out. So that's 2 percent of what we dredged wound up, in our estimation, being redeposed.

There are a range of estimates for the full project, and they range between 140- and 200,000 kilograms for what sits under the current footprint. Well, if 2 percent is the right number and if that persists for the entire project, then, if we dredge the entire footprint, somewhere between 2,800 and 4,000 kilograms of PCB would be redeposited in this river.

The purpose of it was to compare it to these numbers. So it is a significant amount of PCB relative to the amount of PCB that sits in the surface sediments of the river before dredging started. So that this phenomenon is a very important phenomenon with regard to recovery of the river.
Maybe that 2 percent is not the right number because maybe there is going
to be a lot less resuspension in Phase 2, and one of the questions that you all asked in the
February meeting was how do you know you can do these kinds of extrapolations and
calculate all these numbers from Phase 1 and then you try to apply them to Phase 2. We
think that we can apply these numbers in a broad sense to Phase 2, and we've provided
you this comparison to give you some sense of how Phase 2 compares to Phase 1.

We have looked at several metrics. First is high PCB concentration
sediments, and we have used 100 milligrams per kilogram as a dividing mark, but how
much of the sediments we are taking about are going to be greater than 100 parts per
million of PCB? Well, in Phase 1, that was 32 percent of what we dredged; 16 acres of
the river bottom had greater than 100 parts per million on average. In Phase 2, it is 42
percent, 183 acres in total. So that we will be dredging, on average, higher concentration
of sediments in Phase 2 than we dredged in Phase 1.

Fine sediments. In Phase 1, 36 percent of what we dredged were fine
sediments; in Phase 2, 55 percent of what we dredged would be fine sediments.

This redeposition phenomenon, which is essentially kick solids up into the
water, the river is moving and sends them downstream, the sediments that don't settle
back in the hole tend to be the finer sediments. The sands will go up and will come down
pretty quick. So the amount of material we actually send downstream that can later
redeposit is probably related to the amount of fines that we dredge. So, if anything, we
are going to dredge more fines in Phase 2 than we dredged in Phase 1.

In terms of average velocity, since this phenomenon is stuff gets kicked up
and pushed downstream, the velocity is a lot lower in Phase 2, lessened, it might get
pushed downstream, but, at least in Thompson Island Pool, the average velocity -- and we
have used 6,000 CFS at Fort Edward, which is sort of the upper end of the flows we see
in the summer -- it was .9 feet per second in the areas we dredged in Phase 1. The areas
that we would dredge in Phase 2, the average is .8 feet per second. That's not much
difference, slightly lower.

Another statistic we looked at here is shallow water because when we
dredge in shallow water, we have got a craft in there. We have got less draft. We have
got more opportunity to kick up the sediments. Less than 6 feet of water, we used 1,000
CFS, which is sort of at the low end. Remember we have got this big within-day
variation and flows in this river, and so a lot of days, we can hit 6,000, peak in the day
and down a couple of thousand at the end of the day. So we have used this as sort of
what we might have to deal with, at least part of the day from any day.

In Phase 1, 52 percent of the area we dredged was in shallow water. In
Phase 2, 49 percent of what we dredged was in shallow water, so very similar.

Then the last one is shallow bedrock, which may have contributed to
resuspension because of the difficulties in trying to take stuff off the bedrock, more in
Phase 1 than Phase 2, 18 percent in Phase 1, and it would be 5 percent in Phase 2.

Overall, when we just broadly look at this comparison, our view is there is
no reason to anticipate that there is going to be less redeposition and less resuspension in
Phase 2 than Phase 1. So the numbers we have gotten in Phase 2, we don't think are
overestimates of what we are going to experience in Phase 2.
So our conclusion -- and Ann said this -- is that redeposition is a real phenomenon, potentially detrimental to the remedy benefits, the river remained of a baseline level, significant mobilization of PCB under high flow. If it continued in Phase 2 and we dredged the entire Phase 2 footprint, it could ultimately deposit somewhere between 3- and 4,000 kilograms of PCB on river bottom.

For reasons we don't understand -- and EPA is going to go next and will have a chance to explain to you why everything I have shown you here, they don't believe -- EPA concludes that this is not a significant phenomenon, that redeposition is not anything to worry about, and this is a quote from their report. We are very concerned because we think this is real. We think there are multiple lines of evidence that say this is a real phenomenon.

It is not a surprising phenomenon. You are dredging in a flowing river, right? This isn't a lake. It is a river that is flowing. The average velocity here is a foot per second. When stuff gets kicked up, it tends to move downstream, so it's not surprising that you redeposit material, and that this needs to be taken into consideration in developing the standards.

What does it mean? We would like to get your help on this. Here is an analysis that at the end of the day is probably an overestimate, maybe even a significant overestimate of the impact of redepositions, but what we have done here is say if we dredge the whole Phase 2 footprint and 2 percent of what we dredge redeposits on the river bottom and we make the assumption that it redeposits only in non-dredge areas, that is clearly an overestimate. So this is clearly an upper bound. What would it do to
cumulative PCB load? So we have run the model, redeposited 2 percent of what we
dredged. In this simulation, it's 28 kilograms of PCB get redeposited. It all goes to
non-dredged areas.

Overall, we are only dredging about 13 percent of the river bottom. So a
lot of it is probably going to wind up in non-dredged areas. We are only dredging 30
percent of the depositional areas of this river, so 70 percent of the depositional areas are
not being dredged. So this is an overestimate, but it is not like a totally off-the-wall
overestimate.

But what it shows is that here is the simulation of dredging without
redeposition occurring, and here is the simulation of dredging with that redeposition. It
has a significant impact on the slope and the amount of PCBs that would ultimately go to
the Lower Hudson.

Todd.

**MR. BRIDGES:** So explain to me the blue line or whatever that is.

Dredging 3 percent release at dredge head, no redeposition. That is the particles that are
suspended. This 3 percent is suspended in water column and just remain in the water
column throughout the Upper Hudson. Is that what is simulated?

**MR. CONNOLLY:** No. That's a good point that you brought up because
this isn't clear.

In that simulation, we resuspend PCBs but not sediment. So we take 3
percent of the PCBs and put them into the water.

Some of them may settle downstream with solids that are in the system --
and the model is simulated -- but there is no sediment being resuspended that can later
settle. So that is what we mean by no redeposition.

We are in the midst of trying to use the model to actually simulate the
redeposition phenomenon, simulate that we are kicking the solids into the water, and we
let the solids settle. That is not what you are seeing here.

MR. BRIDGES: I think what this is trying to tell us, where it says no
redeposition, we are really here saying no resuspension of deposited material.

MR. CONNOLLY: No resuspension and then redeposition of sediment.

All we kick in the water column is PCBs.

MR. BRIDGES: Right. But the assumption on the blue line is that any
deposition of sediment and particles with PCBs that fall in the Thompson Island Pool or
wherever will not be resuspended in another event.

MR. CONNOLLY: No, they will be.

MR. BRIDGES: On the blue line, isn't the assumption that you are not
going that contribution later?

MR. CONNOLLY: We are not getting that later contribution, right, but
we are resuspending just PCB, not sediment. Some of that PCB may ultimately settle,
and then it is in the model, and the model will be suspended later in another high flow
event. But very little of it settles because most of the dredging is occurring under low
flow conditions when there is not a lot of solids in the system.

PANEL MEMBER: John?

MR. CONNOLLY: Yes.
PANEL MEMBER: I'm sorry. I think the way I am reading this is that you are talking about near-field deposition during dredging, that you see that there is a fairly large potential for near-field deposition during dredging and that you are not accounting for that in one of these lines, but the idea that sediment resuspends and redeposits in the whole sediment transport model is still functioning throughout the river system.

MR. CONNOLLY: Yes, yes. Exactly.

PANEL MEMBER: So a lot of your emphasis seems to be, if I understand correctly, that about this near-field deposition problem during dredging.

MR. CONNOLLY: Yes.

PANEL MEMBER: When I say "near-field," it is just a term that we often use. I wonder like how far out or what your assumptions are for that redeposition process, and maybe we can get to that in the Q&A period.

MR. CONNOLLY: Yeah, yeah. The quick answer is when we look at the drops, as we move downstream, those drops are occurring throughout the river. So this redeposition phenomenon is occurring not just locally --

PANEL MEMBER: Okay.

MR. CONNOLLY: -- but through the river, but the point --

MS. HOLLAND: John?

MR. CONNOLLY: Yes. Thirty minutes? Okay, thanks.

But the point of this is just it changes the slope considerably.

Now, this is an unrealistic simulation. What might be a reasonable
alternative, for example, would be, say, all of this stuff falls, ultimately winds up in
depositional areas only, right? Maybe it initially falls in a coarse area, but it gets kicked
up and ultimately winds up in depositional zones.

So you put the whole mass in depositional zones, and then you say, well,
30 percent of the depositional zone is going to get dredged, so I will take 30 percent
away, and it will just be 70 percent of it. Is that a better simulation? Maybe on Q&A, we
can talk about that.

Another, I think, important thing is that the redeposition does have a
impact on fish, and so here is a simulation of bioaccumulation. This is concentrations in
species weighted, so it's brown bullhead, largemouth bass average.

MNA. Dredging without the redeposition phenomenon, which results
then in fish levels dropping fast, or with the redeposition phenomenon, which
considerably slows down the drop, removes a lot of the benefit to fish associated with the
remedy. So the potential here for redeposition is not just to Lower Hudson but affecting
fish concentrations in the Upper Hudson.

What does this all mean? With regard to the load standard -- and we
showed you this plot last time -- what we have got here is PCB mass stretched, and so the
scale goes up to 200,000. The estimates of how much PCBs sit in the river under the
footprint ranges anywhere from 140- to 200,000, so this is the range of what might be
targeted under the entire footprint.

On this axis is the PCB mass at Waterford. This line here is 1.6 percent.
If we got 100,000, you cross here at 1,600, 1.6 percent. That is what we now have seen
at Waterford. The latest estimate is 1.6 percent of what we dredged went past Waterford. We think it might go up. So this is the minimum sort of resuspension and transport to Waterford that we would expect.

Well, if we have a load limit not considered in redeposition that we estimated to be about 1,200 -- that is this line -- redeposition is going to reduce that. We don't know by how much. This line is just sort of a cartoon line, sitting here at about 750.

Regardless, if we send 1.6 percent down and we don't want to exceed the load limit of 1,200, you can't dredge more than 70,000 kilograms of PCB. Even if you believed that the number should be 2,000, which we don't think it should be, that allows you to dredge 120,000, 125,000. It doesn't allow you to dredge 140- to 200,000.

Now, 1.6 percent, we think is an underestimate for two reasons. One, stuff is still going down, so it is going up continually after Phase 1, and Phase 2 is going to get closer and closer to Waterford. The big drop that we see as we move downstream will get less and less because there is less distance allowed to drop, so a greater percentage will make it to Waterford, and so perhaps it becomes 2 percent.

Well, if it becomes 2 percent and you don't want to exceed this load limit, without redeposition load limit, you couldn't dredge more than 55,000, and if you believe this cartoon number here, you couldn't dredge more than 30,000. If you believe 2,000, you couldn't dredge more than 100,000.

The point of this is that wherever we set this load limit -- and the range here now is from EPA's 2,000 number to what we think may ultimately be the best number, which is going to sit down here, there is no way that you can remove 140,000 to
200,000 kilograms out of this river and stay underneath the standard that is ultimately set.

PANEL MEMBER: So the 2 percent is the mass load?

MR. CONNOLLY: At Waterford.

PANEL MEMBER: Waterford.

MR. CONNOLLY: At Waterford.

Right now for Phase 1, we believe the number is 1.6. We think that is going to get bigger, and for reasons of getting closer to Waterford, it will get bigger in Phase 2.

PANEL MEMBER: John, what I would like to have you just touch on for a moment is, these mass estimates are assuming that everything is redistributing downstream in a way that they can be resuspended and moved eventually down to Waterford. What I really haven't heard you address at all is Item 3 of the three possible scenarios, and that is that this material is going to deposit in the next CU, and you are going to pick it up anyway.

MR. CONNOLLY: Mm-hmm.

PANEL MEMBER: So, if you would just touch on that a little bit, because I think if you considered that at least a portion of that is going to be at some point picked up, now suddenly your line is going to shift to the right, and you may be able to pick up more mass than you are suggesting.

MR. CONNOLLY: This upper line here is no redeposition, zero. So, without the redeposition phenomenon, we are saying that if 1,200 is the number, you can't take more than 55 out. If you consider redeposition and say redeposition because of
the expression we are talking about lowers the allowable load to maybe 7- or 800, then
you couldn't take out more than 30,000. So, even if you don't consider redeposition as a
phenomenon, you are here, and that says that you can't take out more than about 55,000.

But if you don't accept 1,200 as the allowable load and you believe it's
2,000, even 2,000, if we ultimately --

**PANEL MEMBER:** Puts you back at 177. Okay.

**MR. CONNOLLY:** It isn't into this range, so that's the point.

Now, that's the Lower Hudson. I want to introduce you guys to a thought
process that we are on here and really want to get your input because we haven't full
fleshed this out, but we offer it to you in response to what you said to us in February.

All right. So we have been talking about load to the Lower Hudson River.

What about the Upper Hudson River? Well, the idea would be something like this. Let's
look at, as a metric, say, average fish concentration over the duration of the projection. It
started in 2009 when dredging starts, so that we can get the increase during dredging and
then the subsequent reduction after dredging, get an average concentration.

Let's say natural recovery gives you this horizontal line. Let's say
dredging, if there is no resuspension at all, so no impacts on the river, gives you that
number. So this is the benefit, then, the difference between natural recovery's average
concentration and what you get with dredging, so that's the dredging benefit.

Now let's assume that there is resuspension, only now we are looking at
the near-field. So we are looking at it close to the dredge because we are trying to protect
the Upper Hudson River.
As we start to release PCBs, we start to impact fish, and we start to impact the average. At some point, you could send so much PCB into the river that you could actually get rid of all the benefit or even make it negative, but you could use the model to generate this line. How does the average fish concentration change as you release more and more PCB during dredging? Then you can make a decision on how much of the benefit you can sacrifice, where along this uptick curve you want to set the load limit.

Presumably, for this huge remedy, that takes a lot of time and costs a lot of money. You don't want to lose a lot of the benefit. So where do you set this? Is it can we lose 10 percent of the benefit, 15 percent of the benefit, before you start to say that is too much, and then you set a load limit there? We want you guys to just think about this, and maybe in Q&A, we can talk more about it and get your view of what you think, if this makes any sense or not.

I want to shift now, because all of what I have talked to you about is hinged on the fact that resuspension for the rest of the project is going to look like resuspension in Phase 1.

EPA has made a number of proposals that are aimed to reduce resuspension. If they are successful at reducing resuspension, then, presumably, you could dredge more material because there is less resuspension.

I will give you our view on whether or not EPA's proposals are going to help in that sense. EPA's proposals are listed here, over-dredge, control sheens, don't decant buckets, research silt curtains to absorb PCBs, anchor silt curtains to the river bottom to prevent sediments of PCBs from going down.
I am not going to go through these last ones. We talked to you about these in February. They are in our report. I am just going to focus on the over-dredge, because I think EPA has put a lot of their eggs in the over-dredge basket, that over-dredging will reduce bucket bites, and by reducing impacts on the sediment, less bucket impacts in the sediment will mean less resuspension. Well, that's logical, right? If we can hit the bottom less times, we should have less resuspension. The question is, is it going to do that.

EPA's report -- they may be changing their view, but we have not understood it to that point yet, but, at least the EPA's report -- what they propose is that in low confidence areas, we would take an 18-inch overcut; in high-confidence areas, we would take a 9-inch overcut; and then we would take a 3-inch overcut on redredging passes.

What I am going to show you is that this approach will, in fact, not reduce bucket bites, and I am also going to show you that it is going to wind up taking a lot more sediment out of this river than we would otherwise, and it is going to take sediment out of this river that we would not otherwise have to take out of the river.

This looks a little intimidating, but I will walk you through it. This is an analysis here in the high-confidence areas. So we are looking in the areas where they would propose a 9-inch overcut, and what we have done is taken Phase 2 areas, and we have broken them up based on depth of contamination. So, in Phase 2, there are 45 acres that have a 12-inch depth of contamination. There are 9 acres that have an 18-inch. There are 66 acres that have a 24-inch and so on.
If we use the approach that was used in Phase 1, EPA's Phase 1 approach, we would dredge to the cut line. So we are dredging with a 5-yard bucket. A 5-yard bucket can take a 16-inch cut. That is the biggest cut it can take. So, in an area where there is 12 inches of DoC, that is one cut. We can take over that one cut.

Based upon our analysis of the Phase 1 data in high-confidence areas, we think in half the area, we would have to take another cut. So, based on Phase 1, we actually would have 1.5 cuts here. We would have one cut over the entire 45 acres and a second cut over half the 45 acres.

In EPA's approach, with a 12-inch depth of contamination, you cut 9 inches past that, so you take a 21-inch cut. Well, you can't take a 21-inch cut in one bite because you can only take 16 inches in one bite. So you have to take two bites. So EPA's cuts to the cut line are two, and then we just track it through. When we get to 24 inches, that is two bites with the 16-inch bucket and another half-a-bite or one bite over half of the 66 acres. In EPA's case, they have to go to 33 inches. That is three bucket bites.

We are also assuming that whereas in Phase 1 we had cuts for residual, that EPA's overcut is perfect, that there is no need for any additional cutting. So this is sort of in favor of the over-dredging and saying that it is perfect; there is no additional need for cuts.

Well, if you work through this whole analysis and you do a weighted average by area of how many cuts you take, this approach, if we follow the Phase 1 approach, on average in high-confidence areas would take 2.3 cuts.
PANEL MEMBER: Hey, John, can you clarify something for me?

MR. CONNOLLY: Yes.

PANEL MEMBER: Do you really mean bites to cut line, and in the bottom, are you talking about the average number of bites?

MR. CONNOLLY: Yes, yes. These cuts to DoC are bites.

PANEL MEMBER: Okay. So a cut would mean we are going to a certain elevation. A bite is the number of grabs to get to that elevation. Right?

MR. CONNOLLY: No. Well, I am using "cuts" and "bites" synonymously here.

PANEL MEMBER: Right. But that is a confusion.

MR. CONNOLLY: Two cuts, two bites. I am meaning it takes two bites of the dredge to get to the DoC.

PANEL MEMBER: All right. Because you are interchanging "bites" and "cuts" and you're --

MR. CONNOLLY: Yeah, I apologize.

PANEL MEMBER: Okay.

MR. CONNOLLY: I am using them interchangeably.

So the average number of bites in Phase 2 would be 2.3 based upon our Phase 1 experience.

With the overcutting, as weighting all of these number of bites, the average number of bites is 2.7. So EPA's approach, even if it were perfect, would force more bites than the original approach. In Phase 1 areas, based upon the area and the size
of the bucket, a rough estimate is that to take 2.3 bites over the entire Phase 2 area -- that
is high confidence -- is 466,000 bites. EPA's approach, 2.7 bites, is 541,000 bites. EPA's
approach would result in about 80,000 more bites -- 75,000. Trying to do math in my
head. So it doesn't do what EPA expects it is going to do. In fact, it does the opposite. It
forces us to take more bucket bites, not less bucket bites.

The other issue here is clean sediment or compliant sediment, not
necessarily no PCB, but PCB low enough that we wouldn't have to dredge it. One way to
look at that is to look at our experience in Phase 1. So this is high-confidence areas in
Phase 1, and we have accepted CU-1, which we have always done -- we talked about that
in February; it's kind of an oddball -- and CU-4. The reason we accepted CU-4 here is
because we actually started redredging before we hit the original cut line, and so the
statistics there aren't apples to apples or anything else.

But in high-confidence areas there, we are looking at the amount of
additional dredging that had to go on when you hit the cut line. So we hit the cut line.
How many of the residual cores that we took after that said we had additional stuff below
the cut line? In high-confidence areas, if you follow the probability plot here, almost 60
percent of the residual cores we took when we hit the cut line, there was nothing
underneath that required additional dredging.

There was another 20-some percent here that required 6 inches of
dredging, and then some that required a lot more dredging. The highest point here is
another 50 inches of dredging.

But taking a 9-inch overcut here, which is what this horizontal line is,
would say that for 85 percent of our experience in Phase 1, we are taking more sediment
that we wouldn't have had to take otherwise. This is sediment that would not have to
come out that would come out with EPA's over-dredge proposal.

**MS. HOLLAND:** John, 15.

**MR. CONNOLLY:** This proposal is really meant to try to get this stuff, but it doesn't get this stuff. If you dredge over 9 inches, you are still going to have to go back and redredge anyway to get this stuff.

Using Goldilocks, too deep 85 percent of the time, too shallow 15 percent of the time, just right none of the percent of time in high confidence.

If we go to low confidence and look at the same thing, in low confidence we weren't right initially as often as we were in high confidence, but about 38 percent of the time, the residual cores came back and said nothing underneath. You can see where the 18-inch overcut is right here. So, overall, 18-inch overcut in low-confidence areas would have been too deep 72 percent of the time, would have been too shallow 20 percent of the time, and just right about 8 percent of the time.

So there would have been a lot of clean sediment if we had applied this approach in Phase 1 that would have come out, and I mean clean as compliant.

How much in total? We have made an estimate, and in making that estimate, we have taken the Phase 1 experience, separate high-confidence and low-confidence area, divide the residual cores into four categories: at locations where we couldn't get a core, there was nothing left there, it is hard bottom; locations that were compliant at the design cut, locations that had 6 inches of material at the design cut, and
locations that had greater than 6 inches of material.

   Let's assume, then, that the over-dredging, which is 9 inches in
high-confidence areas, doesn't do anything in abandon because you can't get anything
there anyway, but the areas that were compliant, those 9 inches are extra material that
wouldn't have to come out.

   If we had 6 inches left, there's 3 inches of material that's coming out that
wouldn't have to come out. If there is greater than 6, we assume that what was coming
out shouldn't come out anyway, and so you are not paying any penalty.

   But if we have got 9 inches of material that shouldn't have come out
because of compliant and based upon the Phase 1 experience we think in Phase 2 there
are going to be 124 acres that come back compliant, that is 150,000 cubic yards of
material. And the 6-inch category, 3 inches extra, over 100 acres, is 40,000.

   We go to low-confidence areas. In a compliant area, the full 18 inches of
over-dredge is material that wouldn't have to come out. That happens to 31 acres. That
is 75,000 cubic yards. Where we had 6 inches left, there is 12 inches of material coming
out that shouldn't have to come out. That is over 37 acres and 60,000.

   Total all this up, and 325,000 cubic yards of material would be dredged
that would not have met the criteria to be dredged. 325,000 cubic yards is over a year's
worth of dredging, a huge amount of time and effort for essentially no environmental
benefit, material that is coming out of this river that wouldn't have to otherwise come out.

I have got about 10 minutes left.

I will just quickly remind you of the proposals that we have made. In
revising the standards, we have taken the approach that the first and foremost thing here
is protect the remedy benefits, that whatever standards we settle on, those standards must
protect remedy benefits. We have got to account for the relationships among the
standards, how one standard affects the other, and the standards at the end of the day
must be practicable.

You all provided us a definition of practicable, and so we have just
reproduced it up here. Essentially, it must be something that is reasonable and effectively
can be implemented. It is not research.

The keystone in our view is the limit on the load. We believe because the
load has a negative impact on the Lower Hudson River, as demonstrated by EPA's
modeling, has a negative impact on fish in the Upper River, that when we determine what
that load should be, so that we minimize the negative impact to the Lower Hudson River
and minimize the loss of benefits in the Upper Hudson River, that we set that as a firm
load.

Right now EPA is proposing to set the load limit as a control standard.
We operated Phase 1 almost completely under the control level. We didn't stop dredging.
We made efforts to try to reduce resuspension. They were largely ineffective. We kept
going.

The load standard, if it is only a control level, is meaningless. All it says
is, "GE, you must now start writing reports, documenting what you're doing to try to
reduce resuspension, but keep them going."

So, EPA's proposal, the load standard is not a standard. It means nothing.
It means try your best but keep going. We think that that is environmentally irresponsible, that if we want to protect the benefits for the river, the load standard has to be a firm standard. You cannot just hit it and keep going.

In our view, the limit to the Lower Hudson River that accrues a benefit by about 2036 has to be less than 1,200 kilograms, 1,200 kilograms with no impact from redeposition. That redeposition is going to make that number ultimately less, and that there needs to be a limit for the Upper Hudson River to protect the benefit to the fish in the Upper Hudson. We really want to hear from you guys on our ideas about how to do that. We don't have a number for you.

It's important that we all keep in mind that whatever load we are tracking, that includes the full-year net load because of what redeposition does and the expression of that load after dredging ends.

Changes to the residual standard, we don't think over-dredging makes a lot of sense. Phase 1 showed us that in high-confidence areas, when we dig to the cut line, we have taken out almost 90 percent of the PCB inventory, and what is left is very little PCB, and efforts to try to get it are pretty inefficient. So we think dredge to the cut line in high-confidence areas; sample to decide whether it is a backfill or a cap. You can see the backfill and cap facts here.

In low-confidence areas, dredge to the cut line and sample. When we sample, the goal is to convert a low-confidence area to a high-confidence area. It avoids this arbitrary over-dredge that takes clean material out. It says dredge to the cut line, sample, and now you have some educated understanding of how much additional
dredging is necessary, not a blind 18 inches. It's, "Okay. Here, I've got to go another 6 inches. Here, I got to go another 12. Here, I got to go another 24," and then you cut again. Well, now you have converted low confidence to high confidence, and we have shown that when we do that, we get basically the same result as in a high-confidence area. We get almost all the mass out. We are left with 5, 7 percent of the mass that we then have a difficult getting in subsequent dredging passes. So, after the second cut of low-confidence areas, sample to decide whether to backfill to cap and move on.

Stop dredging when we hit hard bottom, either hard clay or rock. Don't continue to dredge, which we had to do in Phase 1.

We believe, based upon the precedent set in Phase 1, that you could backfill over 3 parts per million if it satisfied a 20-acre average, and the work that is done in other sites, particularly Fox River, about what kind of cover you need, that it is appropriate to set a limit a 3 parts per million, not 1 part per million, for backfill, that we should be able to backfill over anything that is as high as 3 parts per million.

Changes to the productivity standard. We don't think this project should continue on more than the 5 years that it was slated, because the longer the project goes, the longer we wait to get the benefits of the project, the more impacts we have on the workers, on the community, on everybody, the longer this project goes.

We heard you guys in February that this should be a remediation project, not a dredging project, and that remediation is tracked by areas remediated, not volume removed, and so we believe that the standard for productivity should be expressed in terms of remediation, areas remediated rather than volume.
I showed you that there may be an issue here of being actually able to
dredge the entire Phase 2 footprint and stay under whatever load standard we set. We
think there is a way to do that by the dredge areas based on their contribution to the
things we worry about, PCBs in fish, PCB load to the Lower River. Identify areas that
we maybe call "high-value areas," areas that have the greatest contribution to fish and to
load. Target those areas first. Maybe divide the dredge areas into high value, low value.
Start upstream, work through all the high value through the entire river. See if you can
do that under the load limit.

We also think that we should continue to comply with the 500 ppt
standard. We just don't see any reason to raise that, in spite of the fact that the water
supplies are now off-river water. There are other reasons to keep that number.

We think we need to maximize the effectiveness of the dredge passes and
not spend time in inefficient residual redredging and keep the project on a period of 5
years.

MS. HOLLAND: John, 5 minutes.

MR. CONNOLLY: This idea of prioritizing dredge areas, does it make
any sense? We think it does because, just based upon our understanding of the biology
and chemistry in this river, we know that the PCB levels in the fish are basically driven
by bioavailable PCBs in habitat areas, and we know that the load to this river is driven by
the areas with the highest surface sediment concentrations, which happen to be the areas
that are recovering more slowly.

So, if you are going to seek high-value targets, we have a framework to
look at, and I will show you an example. Suppose we just consider dredging habitat areas. What benefit would we get by just dredging habitat areas? Well, we can use the model to evaluate that example, and here is the result.

What we are comparing here is dredge the entire Phase 2 footprint, which is the blue line, against the green dashed line, which is dredge all the habitat areas within the Phase 2 footprint.

What the model indicates is that you get most of the benefit to the fish by dredging the habitat areas. So you could declare habitat areas to be high-value areas that you would go after in order to get that benefit and stay under the load limit. That is just an example. That is not a proposal, but it is just to give you guys some understanding that you can sort of prioritize dredging in order to get the benefits.

So, in conclusion, I think we and EPA agree that the standards have to change to preserve the remedy benefits.

We believe strongly that there need to be firm protective limits both in the near-field to protect the Upper Hudson and at Waterford to protect the Lower Hudson, that we need to optimize the remedy to ensure that we can get the benefits if the load standard precludes us from dredging the entire footprint.

Preserve the 500 concentration limit, eliminate inefficient redredging, and retain the 5-year dimension.

Thank you.

**MS. HOLLAND:** Great. Thank you very much.

So now we have a 15-minute break, and then EPA will give their
presentation, and then we will have our lunch break.

Thank you very much. Coffee back there.

[Break taken.]

**EPA Presentation**

**MR. CONETTA:** I was planning on doing, I guess, a short intro.

**MS. HOLLAND:** Can you pull that up a little bit towards you, and increase his volume?

**MR. CONETTA:** But there's some things I think we need to sort of address after GE's presentation just to set or give you EPA's perspective. There's some differences of opinion on data and the evaluation of the data.

I think one of the first things we want to do is welcome you back. We are appreciative of your efforts and your time. It is a difficult situation. We have two differing opinions on data, and at some point, I am guessing you guys are banging your heads against the wall, as we are.

[Laughter.]

**MR. CONETTA:** That sort of goes to some of the issues that were inherently involved when we look at the data and the uncertainties and what actually is occurring.

First thing I wanted to start off with is you guys have the charge. I think it would not be unfair of me to say that most of what GE is trying to address goes to this little blue box, which is not the purpose of the charge. There are important issues that we will look at and evaluate, but a lot of it goes to the benefits of the remedy and/or the
remedy and redoing the remedy.

You have asked a lot of questions. We have tried to answer some of them in our addendum. We will try to answer some more today. Hopefully, we will get to all of them; otherwise, in Q&A, hopefully, we can answer all of them as best we can.

One of the things I think that we need, obviously, your input on is on the performance standards, can they be met consistently and simultaneously, as we have recommended changes and so has GE.

GE's recommended changes, this is the first time we have seen their load number in their evaluation. We have not seen their modeling. They are partially correct when we have approved a model. That was the hydrodynamic model. We have not approved nor seen GE's revised model, fate and transport, or how they have set up their loads. I think we have had discussions with them about trying to submit additional data on that. We will surely look at it. Models are useful. They are tools.

There's a lot of uncertainties in models, and I think we are pretty comfortable with the analysis we did. Ed Garvey will get into that, as will John Kern, about how we set the load, what we think it needs to be.

There are certain things I think I also wanted to touch on. There was a comment made about sacrificing the benefits to the Lower Hudson. That is completely untrue. Okay? The analysis we have done shows that even with the load -- and we will get into this -- the impacts to the Lower Hudson are no different than what the remedy envisioned in the analysis.

John Connolly showed you that nice graph about fish tissues. Ed will
show it to you as well. He will also show you and talk about -- he talked, I believe, about
Poughkeepsie and the Lower River. The interesting thing is that as bad as things went
supposedly in Phase 1, the river water, the water surface concentrations at Poughkeepsie
were the same as baseline. So I think a lot of our thought is that while the model is
interesting to look at, what impacts are you really having? And that is some of what we
did in our analysis to go forward and set the standards.

I am going to just go through the slides, so I can remember what I wanted
to talk about. Obviously, I want to give you our perspective. We think it was a
successful beginning. We have learned a lot. I think we probably have learned a lot
about what maybe not to do and what maybe to do better.

Redistribution, big issue. I don't think we disagree that there is
redistribution. I think we disagree with the overreaching impacts that GE has sort of
developed for it. We have looked at all the data as well. The TSS doesn't show us that
there's sediments moving. The sediment trap data, all that data, core data, is information
that Ed is going to get into a little closer. Do we think there is redistribution? How can
there not be? It is dredging. But what is the extent? We don't know that.

We will certainly look at trying to develop a way to better understand it in
Phase 2, but, to suggest that it is as bad as it was in the last presentation, I think is a little
overreaching. You might suggest that ours is underreaching, but I think we have looked
at the whole dataset as well.

Fish tissue impacts. We are not surprised that there were fish tissue
impacts in the dredging area. I think we expected them. Everyone expects dredging
impacts to have impacts on fish. I think we had it in our previous presentation last week.

Marc Greenberg did a very good analysis on fish tissue impacts. I think the one thing
that is lost in all of this -- and GE has sort of -- John, I'm sorry -- put in a slide at the end
about the impacts to fish.

Once you have gone past that location, those fish will start returning back
to normal. There will be a sequential dredging operation upstream. There will be
short-term impacts. We have seen it at other projects. We have also seen it go back
down. We have seen it at Cumberland Bay. We have seen it on the Hudson River. We
have talked about this. It is not a surprise. They go up; they will go back down. We
expect that. The long-term benefits of the remedy far outweigh those short-term impacts.

Calculations of load. Obviously, we have differences with GE. We have
calculated the load the way it is defined in the standard, the 550, the 750, the 300 GE has
thrown around. Those were not calculated that way.

Interestingly enough, one of the ways they calculated their net seems to be
different than the way it is discussed in their model, i.e., the baseline loads tend to
increase as you go from Thompson Island to Waterford. They did not take that into
account when they did their analysis. We did. We did, and we did our analysis the way
the standard was meant to be.

The next point here about water concentration, obviously baseline after
the completion of activities, we have some disagreement with I think what John is setting
it as well.

I think backfill and dredging operations did not cease until September 4th.
There is a lot of boat traffic. There is a lot of vessel traffic moving down. To suggest that that has no impact on redistribution or what you are seeing in sediment traps or cores is, I think, a little oversimplified.

No measurable impacts to the Lower River. John pointed out how the model shows and compared things, like the 40-to-60-percent increase. We have looked at that data. I don't know if Ed is going to speak to it. I think he will. There were no major impacts and differences at the outlying Troy station. Ed is going to give you a better handle on that than I did.

The one piece I think we also will point out is that the baseline for 2009, while it is tiny, the baseline concentrations up at the Feeder Dam were actually higher than the previous 2 or 3 years. That had no impact from dredging. We are talking about minimal PCB concentrations compared to what's downstream, but it shows that there might be something else going on. Do we expect that dredging was a major part of it? Absolutely. But there's something else going on.

Water concentrations in the Lower Hudson are the same as baseline, and we think that is very important. I think I said this before when we were talking about the fish impacts to the Lower Hudson and sacrificing. We are not sacrificing anything. We believe very strongly that the project needs to go forward and be done to its full extent.

The interesting thing with this piece is that both GE's data -- we will show you all the data, and you can make your determinations. There was a piece where -- a couple pieces that I wanted to hit.

Thompson Island. John showed two graphs with the higher concentrations
during 2009 post dredging, but, interesting enough, if you go over just a couple thousand CFS, which is a lot, you get a point that is right up there.

The other point with this high flow sampling, which has been lost in the discussion here, is that the only station that had high flow monitoring during the baseline monitoring program was Waterford. The other point that gets lost is that station was a manual station up until this year. We have a lot of issues right now after looking at the data from the automated station that causes concern and caused us to scratch our head. We certainly don't think you can make a lot of those decisions that may be impactful without re-looking at the data and doing some diagnostics on the station and the automated stations. We will need to do that.

One of the things that kind of leaves me speechless here is when you listen to the discussion, there is no talk about room for improvement, and I can't understand it. I look at the project. I look at the data. This is the first time EPA has done it. We had standards. We know they need to be changed. There's some adjustments. I believe this is the first time GE has done this project, and I believe this is the first time the actual dredging contractor had done and conducted a project of this size. Don't tell me we can't do better. We think problems are manageable.

We, interestingly enough, used a statistician, John Kern -- I think he may speak to this -- to look at and to help us evaluate what other impacts certain operations may have on the dredging project. We obviously think that boat traffic was important. We had CU's open all summer. Do we expect that to happen in Phase 2? Absolutely not. We want to close those CU's quickly, but there is a way to get there that gets beyond
what GE says, and we can talk about over-dredging a little bit in a second.

GE seems to imply that by our streamlining the residual standards, we are
going to make them go out there four times. Our intent is to get in and out of there
quickly. We want to do it with as much data up front and close those CUs quickly. They
have impacts to load, and you have boats going over. We had 10 CUs open all summer,
and you had boat traffic going over exposed inventory areas. That has an effect on PCB
centersations in the river. It is not as simple as flow and mass removed.

Our field oversight report, which we, I think, added after the first final
report, has a pretty concise and clear explanation about areas that we think we can do a
lot better in. We have actually sat down with GE. We have talked about a bunch of
those. We think a lot of them are appropriate, and we think it will help the design going
forward.

This last piece keeps coming up, about schedule, an extension of schedule
of 5 years. We have already delayed the project 3 or 4 years. To suggest that another
year or two on the tail end of doing a project would have adverse impacts to the benefit is
just not very sensical to me.

This gets to one of the questions about Phase 1 and Phase 2, how can you
pro-rate it. One of the things that occurred this year is that we had higher-than-normal
flows, much higher. They were maybe the second or third highest year on record. I
forget what it is exactly. That impacts load because load is, basically, concentration
times flow. If we had lower flows, we would have had lower loads.

Is that something that is controllable? No. But you can maybe control
your operations to dredge in higher concentration areas at different times.

The extent of wood debris, I believe and I think GE will agree to this, that we both would expect there to be much less in Phase 2. We dredged probably the worst areas in this first year, and to suggest that we can't do better and that the loads will be worse, again, to us doesn't make sense.

DoC was consistently underestimated. Now, this has become a sore point between us and GE, sort of. I didn't want to waste a lot of your time on it because I think it is a discussion for EPA and GE to have on how do you address your uncertainty in DoC. It needs to be addressed.

I don't know of any other dredging project -- and you may -- that has no uncertainty addressed in terms of an overcut, and to suggest that an over-dredge would make us do it longer and take more bites, again, to me makes not much sense.

I think the biggest thing for us to do here is to come up with a way to figure out what the appropriate overcut is. We have thrown out 9 inches because we have got an analysis that I believe we will get through that shows that 9 inches makes sense. Does it need to be adjusted? Maybe we can do that for high-confidence areas.

GE has thrown out 400,000 cubic yards. I think my answer to that would be -- and, again, I'm sorry to waste your time on this -- that that is a high end number. We would expect to be able to refine the dredging process as we go along. They can do it on a year-by-year basis to do either additional sampling to address uncertainties. We believe that while we have talked about an 18-inch overcut and they show that nice graph, most of those low-confidence areas are debris areas and bedrock, and if you didn't
dredge below that area, you were likely in bedrock. And if you hit debris, you needed to
get through the debris. That was pretty clear from Phase 1 that the clean sediments were
under the debris. Not a surprise.

We have NAPL releases that we have some disagreements on, how much
of an issue it is. Ed may speak to this a little bit more.

Limitations on scow unload. We talked about this the last time. We also
had a paper in our addendum that sort of addressees the issue. There is no way to do
more than they have done this year unless you change the scow unloading procedure.

They need another unloading station.

The extent of bedrock and clay, it is going to be a lot less in Phase 2 than
it is in Phase 1. Do we think you need to be dredging over bedrock over and over again?
No. But you need to have a process in place to make sure that you actually have hit the
bedrock in all areas.

We took a while to get that in Phase 1. It worked. It will work better in
Phase 2. We can talk about what changes need to be made.

There was a comment or one of the questions about capping, and GE
supplied information. We didn't really look at it too much.

I think one of our concerns is that if you look at Phase 1, there was an
awful lot of capping, and that was predominantly due to the fact that we did not estimate
the DoC correctly, and then the navigation channel had to close. To us, the fact that we
had to cap as much area causes concerns because the OM&M plan that has been
submitted and even the scope that we had talked about did not envision 25 to 35 percent
of areas being capped. We have done some analysis that will probably bring that number lower, if you look at our report.

This last one, open CUs, I think is very important. So one of the things I mentioned before is that you have got boats going over CUs that are open for all summer. How can you not have an impact?

The other piece and the last one down here is the multiple river locations, and there was a reason, but, if you think about it -- and I am just going to point here -- we are not going to be doing that in Phase 2. We had dredging up here, and we had dredging down here. You had an input coming from here. You had an added input coming from here.

Phase 2 will not be this way. It will go sequentially downstream. It is much different. Do we know what the impact is of having those two separate input sources? No, I don't. I don't know that anyone does, but I think it is a real issue to think about.

The one piece -- and I am trying to remember whether I talked about this -- about the high flow sample monitoring, we did talk about the BMP. The one piece that came out -- and I think Paul may have mentioned it -- the BMP program was very careful, while we wanted them to go to the bottom, not to hit the bottom because of not wanting to get any sediment bedload.

We will show you very shortly that those automated stations, especially the two that are on the bottom, are pulling in data, pulling in probably water concentrations that are affected. Every one of those stations is possibly affected.
The last piece I want to sort of -- give me a second.

[Pause.]

MR. CONETTA: Ed, why don't you start coming up. I am almost done anyway. I will remember it at the closing, if I don't have it now.

Ed, I think, is going to pick up where I left off. Thank you.

MR. GARVEY: All right. It is still "good morning."

Room for improvement. A couple of conclusions that we drew is that problems are manageable, and I think some of the statistical analysis that John will present in a little while will make that point well.

The correlations with boat traffic, exposed area, bucket efficiency will indicate the capacity for improvement, and, in fact, we show enough statistical correlation. We can actually estimate the kind of scales of improvement that we can get from them.

Residual standards will be streamlined and simplified. The idea is to quickly get through the process of reviewing an area, decide what needs to be done, and moving on, rather than spending a lot of time discussing boundary areas, edges, whether or not the numbers are adding up correctly and making sense. So, again, the idea here is to simplify and streamline the process between.

Anyway, the EPA field report also identifies other areas for improvement, and we think together, these will all serve to reduce loads relative to the amount of mass removed, but, ultimately, EPA is also committed to extending the schedule, to the extent necessary, to keep loads down to a reasonable level and keep water column...
concentrations down to a reasonable level during the project.

There's been talk about a couple of changes in the standard that we are proposing here. This is the standard change in the Federal drinking water supply number. We were talking about before, if we had any exceedance of 500 nanograms per liter, it required a shutdown, and that has happened about two or three times during the dredging operation. It also had a slowdown at one point.

We are proposing to use the 500-nanogram-per-liter threshold as a trigger to require changes but not as a shutdown. The reason that we are going to do this is the EPS is proposing to pay for the water at the public water supply, and I will show you a diagram of that in a minute, but, basically, the towns of Waterford and Half Moon currently take their water from the river. Rather than keep this, because the remedy is important, we are going to put those water supplies on an alternate water source during the dredging operations.

In addition, we are going to talk about proposing to change the control level for loads to a 350-nanogram-per-liter-type threshold for load, as opposed to the lower loads that we talked about that we have listed here.

Resuspension. The standard is protective. This was the standard beforehand, the requirement that water column concentrations had to stay below 500 nanograms per liter in anticipation of delivery of water to Waterford, but, basically, EPA is going to pay for Troy water. So, essentially, this requirement for the short-term concerns is taken care of, and so there is no need to keep things absolutely below 500 nanograms per liter, but, if we can use it, we can keep the operation moving, even if we
have exceedance of it and make changes to improve the operation.

The other change that we are proposing to the standard is the monitoring stations. We are proposing that the load standard be exclusively posed at Waterford, not the stations upstream. Therefore, in addition to that, in addition to using Waterford as the primary load concern, because we are dredging a lot of the Upper Hudson River -- and, again, the original focus of this load standard was for loads in the Lower River -- it was anticipated that loads would translate, by and large, through the Upper River. That was the historical observation, that loads entering the river at Thompson Island were delivered to Waterford and then some. It typically increased. Whether we saw Allen Mill event or we saw other baseline monitoring, loads increased to Waterford.

The load decreases that we have been observing in the first phase of the operation are new to us in terms of observations. Nonetheless, we think that since the primary purpose of this load standard was to protect Lower River, we are going to set the standard at -- we propose to set it at Waterford and make these numbers.

This is equivalent. These load concentrations are 39 kilograms per year, total for Tri+, and 117 kilograms per year total. I am going to focus primarily on Tri+ loads now, rather than talk about total, as a standard. The other part of this is to drop the total PCB load standard in and of itself and just focus on Tri+. The reason is that we are tying that more to risk. There are no mono and di body burdens in fish in the Lower River or, for that matter, in the Upper River. Essentially, the fish are only Tri+ PCB concentrations. So we are going to focus on controlling the material that fish bioaccumulate, staying focused on risk to the human consumption of fish.
PANEL MEMBER: Ed, these last two, I don't think we saw those in your Phase 1 report. They are new to us, then. Correct?

MR. GARVEY: Yeah, they are new. That's right.

PANEL MEMBER: Okay.

MR. GARVEY: So why do we think we can do this? Well, this is the model run on the upper here, on the upper slide here from the original performance standard. The blue line here represents a 350-nanogram-per-liter scenario, and you see that each of these scenarios, whether they load 600 per day or 350 nanograms per liter, within short order, the completion of dredging is around 2011 under this scenario but 2015 or so through the MNA curve and 2018 or '19, we are down to the curve and with no resuspension at all.

[Pause.]

MS. HOLLAND: Do you want to use the handheld?

[Pause.]

MR. THOMPSON: You just got to understand us West Coast folks are jumpy after everything we see read in the paper about what's going on in New York recently. Any explosion makes us nervous.

[Laughter.]

MR. GARVEY: All right.

So the upper graph shows the impacts that we estimated with the performance standards in the original form.

This lower graph represents the performance standard impact as we
propose it now, and we note that the important point to take home in both of these slides
is that very soon after the resuspension of dredging, that, in very short order, basically the
dredging here is completed in the year 2016. Before 2020, we are at the MNA curve.

I need to point out here that this was just run to see what the recovery
would be back to the MNA curve. We don't have a revised forecast curve for this, but
this was run just to see how long it took to get this back to this point. If we, in fact, run
these models with the remedy, the improvements to the remedy -- that is, lower loads to
Lower River -- we would, in fact, see these points go through the MNA curve and down
to the resuspension. There is no resuspension scenario, just like they do here. You see
the blue line crosses through the MNA curve here. We would expect these to do the
same in very short order.

Yeah.

MR. BRIDGES: So I just want to understand. I just want to understand
this lower curve.

MR. GARVEY: Sure.

MR. BRIDGES: So the blue line says additional 1,800 kilograms total
PCB what?

MR. GARVEY: 600 kilograms Tri+ over baseline during dredging.

MR. BRIDGES: Resuspended?

MR. GARVEY: Delivered at load to Waterford.

MR. BRIDGES: Load.

MR. GARVEY: That's delivered at Waterford to the Lower River. That
is not at the dredge head. That is monitored at the Waterford station.

MR. BRIDGES: The figure on this hard copy is kind of garbled to axis.

So it is mean Tri+. This is in fish tissue?

MR. GARVEY: This is fish tissue concentration, yeah. Both of these are mean fish tissue concentration.

MS. HOLLAND: Todd, are you done?

MR. BRIDGES: Mm-hmm.

MS. HOLLAND: Okay. Thanks.

PANEL MEMBER: Ed, you don't mind if --

MR. GARVEY: Sure.

PANEL MEMBER: Is there any improvement in this model, or is this using some of the original models?

MR. GARVEY: This is using the Farley model which is a mechanistic model, PCB transport from Lower Hudson, and then this is using the FISHRAND results. We didn't run the FISHRAND model directly. We interpolated existing runs to approximate these values. The precision is within about a 1-percent agreement. So we didn't re-run it. We were actually going to do that, but, basically, this is the Farley model rerun or Farley model run of increased loading conditions at Waterford to get the geochemical parameters forecast, both sediments and surface water, and then taking the FISHRAND results, interpolating them to represent the fish body burdens here.

Okay. The panel requested information on "evidence that supports a description of confidence that experiences and data developed from Phase 1 can be
extrapolated to provide confident predictions about conditions relative to performance standards in Phase 2.'

This one, you got to help me with, Ben, a little bit because I wasn't planning to talk about this slide. I had forgotten about this one.

Anyway, we have prepared a whole series of things on this. I think that we are going to put together information that shows that we can be confident about extrapolating what we learned to Phase 2 based on -- again, to a large extent, based on the models that we developed and particularly the empirical model of the various dredging factors. Hopefully, our talk will address this.

Phase 1 was designed to do the following, represent the range of conditions anticipated in Phase 2. So we didn't just dredge the northern end of the Thompson Island Pool. We also dredged at East Griffin Island area, representing a large pond of very fine-grade sediments, the intention being that we would capture both the spectrum of materials that we might be dredging, the differences in bottom thickness or bottom conditions, clay, bedrock, and the like, the presence of debris and sediment characteristics.

So we think that the overall suite of conditions that we saw in Phase 1 will give us a good bearing on what we can anticipate seeing in Phase 2. We don't really anticipate seeing any particularly new conditions. There may be different distributions than what we saw on Phase 1, but we should have seen the range of conditions that we are going to observe.

So it will be practicable to consistently and simultaneously meet EPA's
performance standards for Phase 2. Resuspension is shown to be controllable. With a number of different parameters, we think we can correlate and make improvements.

The adjusted load standard for a more realistic loads for PCBs of Lower River, they still generated acceptable outcomes; that is, the fish tissue concentrations are not impacted for long periods in the river. We are not really sacrificing the no-resuspension scenario. We are quickly attaining it soon after the dredging is completed.

We have provision for alternate water supplies downstream to avoid the automatic shutdowns. So that should help productivity, to be able to keep the operation going more smoothly.

Addressing scow availability is going to make a big difference in productivity as well because we think a lot of time is spent or wasted waiting for scows, and that can be avoided.

Finally, increasing scow loads, simply reduce vessel traffic and dredging time and correspondingly resuspension essentially by loading the scows a little bit fuller, which should cut down on the boat traffic, which we showed pretty well to correlate with boat miles traveled.

Some more points on that, the residual standard was effective at minimizing residuals and undredged inventory. In fact, it worked very well. We were able to identify a lot of problems, that had we not had this in place, we would have had a lot of inventory left behind.

In fact, we did not have a lot of sites that had a lot of residual layers, so
show later only about 35 percent of all the nodes dredged actually had a residual layer
that had to be addressed.

Overcut will address DoC uncertainty. Recognize that we have
certainty in the depth of cut and hopefully speed the closure of CUs.

All right. So, to begin, we presented to you --

PANEL MEMBER: You skipped two.

MR. GARVEY: Skipped two. That's it. I thought so. Thank you. All
right.

We have prepared in the addendum six main topics. These are listed here.
These are provided. I am going to cover material from all six, between John and myself,
but not in the order that they are listed here. We started with the modeling runs and then
kind of placed the emphasis on the more important things that we think are in here, but,
basically, these six topics are what's in the addendum, an update, if you would, to some
of the analyses that were done before or some further expansion.

So, to begin, then, with forecasts of dredging-related impacts and related
risk, we have talked about this already, but estimated rate of recovery under MNA, the
idea here is to say, well, how fast is the river recovering. We have seen a lot of different
estimates of the rate of recovery, and we worked pretty hard in this effort to come up
with some estimates of the rate of recovery.

We had a very long half-life or rate of recovery that was attached as an
addendum in the original analysis. We revised it to look at water column loads with
time, but, basically, estimating the rate of recovery, the MNA half-life, if you would, we
can use estimates that we have to come up with an optimistic estimate of the half-life, an
optimistic rate of the recovery. So it gives us like a lower bound as to what we can
anticipate a break-even point is or I guess, in upper bound, what a break-even point might
be for loads.

So we are going to do an optimistic estimate of water column Tri+
recovery at about a 10-year half-life, and I will show you the basis for that in a minute.

You actually saw this slide before because John Connolly put it up here,
but, basically, this is the estimate. This is a flow-weighted average concentration with
time. The upper points here are based on USGS data. The lower five points here are
based on GE's BMP data program. But the half-life is about 10 years. This is one
estimate of the half-life. Of course, you can get an uncertainty band about that. We
actually used that uncertainty as part of our forecasting, taking that into consideration.

Anyway, this is one observed half-life.

We also looked at the surface sediments.

MR. MAGAR: Ed, I'm sorry to interrupt. Can you step back?

MR. GARVEY: Sure.

MR. MAGAR: Since this was critiqued before, can you just explain what
a flow-weighted average is or how you arrived at those numbers?

MR. GARVEY: Yeah. Basically, we're using something called an
"AutoBeale Integrating Estimator" of load. It basically stratifies your data into flow
regimes and time regimes.

Solomon, you probably can answer this better than I can, if you don't
mind.

**MS. HOLLAND:** If you are going to answer, use the mic, please.

**MR. GBONDO-TUGBAWA:** We used the AutoBeale Estimator. My name is Solomon Tugbawa.

The AutoBeale Estimator gave us the annual load each year of the water column concentrations at Waterford. You have to account for the relationship between concentration and flow and concentration versus time because, if you just run the analysis on load, you get a half-life of 99 years, depending on how you calculate your loads. So we said let's normalize, let's take out the flow impacts on the load and normalize and get a weighted average concentration, and that's what we did.

So we calculated the annual loads. We divided that by the total volume of water past the station each year and essentially get an average, weighted average concentration, and that is the concentration that we brought in at that time.

The other way you can do this, the AutoBeale Estimator gives you a stratification that optimizes the load calculations sooner. At the end of the day, your mean error is minimal. If you decide to do it manually and say, okay, let me divide this into different flow regimes, zero to 15,000, 15,000 to 30,000, based on 30,000, you essentially end up with the same half-life.

So we didn't see that much of a difference by dividing the thing into the different flow stratifications. We just allowed AutoBeale to optimize the load itself and then used the total volume of water to estimate the concentration.

**MR. THOMPSON:** Is this graphic and that explanation in your report to
us, in your addendum to us?

MR. GARVEY: Yes.

MR. THOMPSON: Okay. Thank you.

MR. BRIDGES: I have a quick question, Ed.

MR. GARVEY: Yeah.

MR. BRIDGES: Maybe when you go through, it looks like there is more data that relate to this, but I am very interested in you describing what or how in your use of data provides an optimistic forecast and what you mean by that.

MS. HOLLAND: I would say the in-depth answer, if you want, if it is not later, that might be better for after lunch.

PANEL MEMBER: Sure. Well, I mean, I know that you have another series of slides here. So, if you can help me understand that while you work through that, that would be helpful.

MR. GARVEY: Well, we use the term "optimistic" to mean that the system is recovering very fast, that this is a line of evidence that suggests that the system is recovering quickly. If you use an alternate line of evidence -- that actually is my next slide -- it suggests that the rate of recovery is slower than this, and if you use the other third line of evidence, you might find an even slower rate of recovery.

So we selected among the faster rates of recovery for the river and basically labeled that as an optimistic one; this is what is going to happen if the river recovers in a fast manner. If the recovery is actually slower than this, then our break-even point is going to occur sooner in terms of the loading scenario that we are
talking about.

Does that make sense?

So here is an alternate estimate of the half-life. This is actually based on the 1991 to 2003 through 2005 data comparison of surface sediments. Both datasets represent areas of the river bottom. We compared composite samples collected in 1991 with mathematically composited samples from the 2003-to-2005 time frame, with an estimate of the recovery of the surficial sediments of the river as opposed to the water column loads, which is what you saw in the previous slide, and here we get a half-life of about 15 years, a confidence limit between 10 and 32 years. So this is a less optimistic rate of recovery. We chose the more optimistic one in terms of our forecast.

This analysis, I don't think we have this one in there. Right, John? This didn't make it into the amendment.

MR. KERN: Correct.

MR. GARVEY: Okay.

PANEL MEMBER: Okay. Well, I have a question about this because I don't really understand what the table is. So you are inferring a change in surficial concentration based on age dating or something?

MR. GARVEY: No, no, no. I'm sorry.

We took the 1995 nodes, we took the 2003-2005 nodes that were closest to them, and compared the averages on a local basis. So each composite might have eight nodes in it. So you have a mechanical average of 1991. We took, essentially, the equivalent of those eight nodes from 2003 to 2005, created a mathematical average, and
developed one pair. There were about 80 to 90 composite samples collected in 1991. So we have, basically, an average comparison of 80 to 90 pairs of co-located samples, 15 years apart, 14 years apart.

So, if you look at the rate of change, the average value of change between 1991 and 2005, you see that the concentrations have come down a little bit more than half since 1991 -- or about half, actually, since 1991, so you get about a 15-year half-life.

We have more slides that I can show you later or John can show you later that support this further. We can go into details with it, if you like. But, anyway, this would be a less optimistic estimator of a half-life.

So, if we then integrate the half-life, if you would, and forecast forward in time, we take our 10-year half-life, say that the river's loads and concentrations are declining with about a 10-year half-life, and then account for hydrodynamic variability, year-to-year variability in flow as well as in year-to-year variability or possible variability in our forecast curve, you get the gray domain shown here. This is, essentially, the range of the MNA loads with time. This is a Tri+ load. This is the range of what we think the Tri+ load range would be with time.

The red area represents the scenario of a 500-kilogram load over baseline loaded during the dredging period and then watching its recovery, assuming that as a result of dredging, we get about a 60-percent reduction in the MNA load, so loads to Waterford.

This scenario here, then, this area in red basically shows that somewhere between 25 and 50 years, we are going to overlap and overtake the MNA curve with
relatively high probabilities. It is about 50 percent within 25 years, and it is about 95 percent within 50 years. The MNA curve has more load to low river than our remedy.

**MR. THOMPSON:** So this does or does not assume that or, if you will, zero out the remedial areas from the overall transport?

**MR. GARVEY:** It doesn't.

**MR. THOMPSON:** But are you accruing any benefit --

**MR. GARVEY:** Yes. Yes, it does.

**MR. THOMPSON:** -- in this model run?

**MR. GARVEY:** Yes.

**MR. THOMPSON:** Okay.

**MR. GARVEY:** This model run takes into account the fact that in the Thompson Island Pool, you are going to actually reduce the average surface concentration by about 85 to 90 percent. So that assumes, then, that we are going to get an 85-to-90-percent reduction in the load generated by the Thompson Island Pool.

So that is why this red curve here dropped. It was much flatter. The red zone here is much flatter because we are getting much less loads as a result of the remedy. So we are taking the full benefit of the remedy in that curve, as approximated by surface area concentration reduction.

**MR. MAGAR:** Ed, can you help me --

**MR. GARVEY:** Sure.

**MR. MAGAR:** -- figure out where you get the numbers, 25 to 50? Where do those drop out of this curve?
MR. GARVEY: It is in the bands in here, if you would. In other words, these are probability distributions. This is a Monte Carlo analysis, and so about 25 years past the completion of dredging, the probability is a 50-percent probability that -- I forget the way to describe it exactly, but, basically, 50 percent of the runs that we did fall below the MNA curve 25 years out; 95 percent of the Monte Carlo runs fall below the MNA curve 50 years out.

MS. HOLLAND: Ed, I am a little concerned that you may not have time to get through all 70 of your slides --

MR. GARVEY: Okay.

MS. HOLLAND: -- because I just went through everything. You are about 45 minutes into your presentation.

MR. GARVEY: Okay. Very good.

MR. FUGLEVAND: You can feel free, if there are questions, there will be a question-and-answer period.

MR. GARVEY: Okay.

This is the inverse of that, just to show you the benefit in a more direct sense, as opposed to the overlapping scenarios. This is the forecasted or the interpolated load that we have for the data prior to 2009. This is how the loading scenario would go. This is a 500-kilogram load over a fixed baseline, and the reason that this is a band is because they have a variation of flow. You have a certainty in your forecast curve here, your MNA curve, so it ends up generating a band of conditions, but post dredging, this band of conditions gets a lot narrower -- there is the benefit I talked about, Tim -- as
opposed to the MNA curve here, which is the gray area here.

You can see post dredging that we estimate that the majority of loads are well below the MNA curve going out into the future.

Predicted fish tissue impacts to the Lower River. We used the Farley model/FISHRAND combination to compare impacts in the Lower River. We ran 600 and 800 kilograms Tri+ load simulations, again, because that is what ends up in the fish.

We compared with versus MNA as forecast by HUDTOX because we did not have at the time a forecast curve for the remedy itself, but we were looking to see how fast we can return to the MNA curve, how long was the disturbance in fish tissue concentrations caused by a 600- or 800-kilogram load. So we are really characterizing the upper end of what we are proposing in terms of the load standard, which is 670 kilograms.

The net impact of fish tissue are minimal beyond the dredging period, and so those two curves again I showed you, now a little bit of animation, this first vertical line here is the end of dredging. The second vertical line is when the upper bound curves, in the case of the performance standard and in our case here, reach the same trend as the MNA forecast curve.

All right. The point I make on this basically is that almost regardless of the scale of the loads to the Lower River, because the Lower River is already pretty contaminated in and of itself, it is hard to make a big impact. Between what is already in the sediments themselves and between what losses naturally occur to transport, to gas exchange and the like, there aren't long-term impacts of fish tissue concentrations in the
Lower River.

To further examine that from a different perspective, we looked at water column concentrations in Poughkeepsie. This is General Electric's data. The colored dots, the dark colored dots, the blues and greens, are the baseline period. The 2009 water column concentration to Tri+ in Poughkeepsie are the red ones. They lie well within the distribution of baseline conditions. We saw no impacts during the first year of dredging in the Lower River, despite the magnitude of the load that we did see coming over to Waterford. So this already is evidence to suggest that we are not going to have a big impact on the Lower River.

This is John.

MR. KERN: Thanks, Ed.

MS. HOLLAND: Introduce yourself as well, please.

MR. KERN: I am John Kern. I have a small consulting firm, Kern Statistical Services, and I am contractor for EPA.

We are going to do a little statistics. We have got a very large dataset. It is multivariate. We have got a whole host of processes that were measured. Many more than 28 variables were measured. We looked at approximately 28 that represent a wide range of the potential processes that might be influencing resuspension, and the objective of the analysis was to try to identify components of resuspension that we believe are potentially manageable, that would provide us windows into the types of things that should be improved in order to reduce resuspension, also understanding that we need to maintain the ability to meet the
productivity standards. So those are kind of the overall objectives.

We have kind of a basic equation here. It is basically a log of concentration in water. It is postulated to be some function of -- and don't read too much into these symbols. Essentially, Y is a function of several axes, and we are going to estimate the constants, $K_1, K_2, \ldots, K_n$, to get an idea of the proportionality between water concentrations -- that is the deep-ended variable -- and input variable.

Some of these might be concentration terms. Some of these might be bucket counts. Some of them might be distance traveled. So the units on these things vary. If this would say distance traveled, we would have a constant here that has a unit something like concentration divided by mile or concentration per mile, that kind of thing.

This is a fairly typical multiple variable type of an analysis. One of the challenges is most of the 28 variables or several of the 28 variables are either derived from bucket count data or combinations of bucket count data and other data or they are potentially proportional to the amount of mass removed. So you can't just sort of throw all of the variables in a regression and pop out the answer. The interrelationships between the variables violate the assumptions of a multiple regression analysis.

So the first step that we took was to do what is called a "factor analysis" to try to group the different variables, and, in fact, what we find, I will describe these. I recognize that these are not very legible, but what these represent is groups of variables that tend to cluster together and are interrelated with each other, and I will just describe them very briefly.
MR. BRIDGES: John, can I just back you up a second?

MR. KERN: Sure.

MR. BRIDGES: Maybe it is in the report, but I don't see it in the figure. Could you just describe how you initially selected what variables you would actually even consider?

MR. KERN: Well, I picked almost everything that was measured, and so I am not claiming that I have an exhaustive list. Maybe somebody has some variables that I am just not aware of, but our process was, okay, everybody involved in the project, tell me as much as you can about variables that you think are likely to be associated with resuspension, let's get them in the database, let's link the different data sources together. That's a lot of work. A lot of people worked on that to help develop that for me. At the end of the day, I've got about 28. I mean, I can run through some of them.

MR. BRIDGES: So, in the supplemental report that EPA sent, is there a list of these variables with their intentions?

MR. KERN: Yeah. Yeah, there is a complete list.

MR. BRIDGES: Okay.

MR. KERN: Just to give you some examples, I have got, say, bucket count total, dredge distance, flow at Fort Edward, small boat distance, scow velocity, total area of CUs open during dredging season, barge distance, dredge velocity, temperature, small boat velocity, scow velocity -- so you've got boats, you've got velocities, you've got distances, all those things that potentially could be important --
water depth, concentration that the boats are driving over and the integration of those and so forth. So that gives you an idea.

In this first run, what we are interested in is trying to find groups of variables. The groups need to be independent in order to put them in the regression analysis, and what we find is we came up with about five here, groups that were important.

The first one was things related to volume and mass removed and bucket filling rate, and this bucket filling rate is kind of an index to efficiency and how much spillage of sediment is happening. That had explained about 37 percent of the total variation in water column.

The second group here was the area of CUs that were open during the dredging season, and that was also weighted by the concentration of the residuals over the period of time that they were open. That explained about 10 percent of the total.

Concentration and flow, weighted, open CUs. That is related to the open CUs, but we also weighted by flow and concentration as opposed to just concentration, turning it more into a load term. A couple more percent there.

Here, we had vessel distance, and, again, flow comes into this factor. That explained about 10 percent. That one is intriguing to us because we know that we can change how vessels operate out there. So that is a potential management variable.

Then, another one here, vessel distance and velocity comes in separately, without flow.

One more point, the magnitudes of these things indicate the amount of
variation explained, and if they get outside this sort of shaded band, they start to
becoming meaningful. You can notice a lot of the variables are not of any substantive
information. So one way to use this is to look at the variables that have peaks that jump
outside this kind of plus-or-minus point for band. Those are potential mechanisms to put
in a more descriptive model that is not just based on factors.

So here is the outcome.

MR. FUGLEVAND: Quick question. Could you back up?

MR. KERN: Sure.

MR. FUGLEVAND: Could explain on the table up top where you show
the percent contribution? We have 37, 10, 2, 10 and --

MR. KERN: Correct.

MR. FUGLEVAND: That adds up to about 60 percent?

MR. KERN: That's right.

MR. FUGLEVAND: Where is the other 40 percent?

MR. KERN: Unexplained.

MR. FUGLEVAND: Unexplained, okay.

MR. KERN: That's right. This particular model is explaining
approximately 60 percent in total. Okay?

All right. So here is the fitted model, and I will explain this a little bit. I
have got two such graphs. The dots represent data, and those are measured water column
concentrations at the Thompson Island Dam. The blue line or the solid line, if you can't
tell what color it is, that is the fitted model, and then the faint or gray or dotted line,
depending on what you can see back there, those are upper 95-percent confidence limits for the model.

Loosely, what you see here is that, in general, we are tracking the fitted concentrations reasonably well through most of the time period. This is the beginning of the season before dredging has really started, all the way through the end of October.

You do see that we are missing some of these peaks. What that suggests is that we have got probably kind of too general of a model or we are missing some of the mechanisms that are explaining some of these individual excursions, and, of course, that is really what we are interested in.

So, at this point, this is kind of what it is going to look like if you have got about 60 percent of the variance explained. The other 40 percent is this random fluctuation about the model, and, in particular, we started looking at other mechanisms that might explain the peaks.

This is a second model. What we did is we took the factors that we identified. We pulled out variables of interest, and we constructed -- I'll call them "drive variables" or individual variables that look more like mechanisms -- built a new model.

What you notice is a couple of things. Qualitatively, we are hitting things a little tighter. We are hitting these sort of peaks in early August, early September, and we are also starting to hit these later years a little bit tighter. We have improved the R² only slightly. It went from 60 percent to about 68 percent, but that was enough to catch some of these individual situations.

The question is how did we do that or what are the new variables that we
put in. Here they are.

You asked the question about where is, kind of, the remainder of the $R^2$.

There is also a situation where all of the variables don't necessarily add up to the total $R^2$, and that is very common in a multiple regression. In this case, you have got 19 percent that fits in that situation. It is called "explained jointly," and what that means is the variables covaried, and so you can't split them out independently.

The largest component is the term we called "mass removal efficiency," and what that is, is it is the mass removed times the bucket filling rate. So it is an attempt to merge the amount of spillage with the concentration of material that is being spilled.

One thing that is important here is this is also related to mass removed, and it could just be a pure surrogate for mass removed. We checked into that. You guys will want to read about that a little bit. We showed that this efficiency variable is superior to just mass removed alone.

**MR. BRIDGES:** That is an example of a derived variable.

**MR. KERN:** That's right.

**MR. BRIDGES:** I looked in the report, and I don't really see any place where all of your variables are defined. There is a lot of acronyms there, and I think it might be helpful if we had a listing of all those.

**MR. KERN:** So we could improve that.

**MR. BRIDGES:** Yeah. Well, just so that we can understand what it is you did.

**MR. KERN:** Okay. Yeah, I agree. I think that is a point well taken.
Other variables here. One of them is mass removed in CU-18 inside the sheet pile. This is an interesting one. We shouldn't really see a signal related to activities inside the sheet pile. That is the purpose of it. We will talk about that.

Another one is tug traffic associated with servicing CU-17 and 18. It turns out that the tug traffic back and forth from CU-17 and 18 up to Lock 7 was actually a better predictor than in the mass removed out of that unit.

Tug traffic for backfilling. Notice here, we have got a period of time in October when there is very little dredging going on, but the backfilling is ramping up. What we found is this tug traffic was an important predictor, whether or not you are doing backfilling or if you are doing dredging.

This gets us into a realm where we can start to talk about cause and effect. When we have got a single variable that operates in the same way under two different sets of circumstances, it is likely that that is a real process variable that is driving a cause, as opposed to just a surrogate for mass removed. That is important.

Another one that came up is scows in queue. This one seems kind of counterintuitive, but what we learned from talking to some of the field folks is that -- and, again, this is a little speculative, but I think it is important to think about -- the thought process is that as scows back up at the unloading station, which we definitely know they did factually, scows become unavailable to the dredging contractors. The dredging contractors may have slowed down and essentially nibbled, underfilling the buckets, waiting for another scow to show up, the thought process being if you fill your scow too fast and there's no scows available, you are going to have to sit idle, and the thought is
that may affect the --

MS. HOLLAND: John?

MR. KERN: Yeah.

MS. HOLLAND: You are at one hour, and you are nowhere near halfway through your pile of slides.

MR. KERN: Okay. Thank you.

MS. HOLLAND: So you may have to skip some.

MR. KERN: I will.

MS. HOLLAND: Okay. Thanks.

MR. KERN: I will skip through.

This is a scow traffic variable. So I am going to plot some of the variables of interest here, and what you notice is that as the blue dots are scows waiting in queue, their value is 1, 2, 3, 4, 5. Up to 5 would be waiting. What you notice is that the red is volume.

Essentially, before these excursions, what you have is volume removed dropping off. At the same time, you have got scows on queue increasing. So the thought process there is that this may be due to this nibbling that starts to happen when there is no scows available. If this is proportional to mass, we ought to see this excursion happening over here. It is a couple of days ahead, actually nearly a week ahead of the event. There is not that much lag in the travel time.

I mentioned CU-18, inside the sheet pile. We have these holes cut in the sheet pile.
MR. THOMPSON: John, can I make a quick note, please? This is just to EPA. At least some of us didn't get those last two slides in our presentation.

MR. KERN: Okay.

MR. THOMPSON: So, if somebody will just catch that for us?

MR. KERN: That's right. We put those in. We accidentally took them out last night.

MR. THOMPSON: Oh, okay. Thank you.

MR. KERN: So we can supply those.

MR. THOMPSON: Thank you.

MR. KERN: Yeah. Thanks a lot. Sorry about that. I should have mentioned it. I will keep going here.

So this graphic shows water elevations, and this particular dot is the day on which this photograph was taken. What you can see is a couple of things. One, it looks like the water level is maybe half-a-foot below the window. You can see here now if we move up 6 inches above the elevation of the window itself, the flow is above that on several of the days when we have got a couple of things happening.

Notice here, we start to get activity in CU-18 here. We have got activity here and here. The water levels are above these windows. We have got free access of water exchange. The water concentrations behind the sheet pile were frequently above 20,000 and were recorded above 100,000 nanograms per liter. So our thought process is that we have got oil, heavily concentrated water, kind of flowing in and out of these things at the water surface interface, and then, essentially, it is a direct feed or like an IV
source almost.

I am going to jump quickly. This is the same information. This is CU-18 activities. This is actually water column loads. In this, you can see what is explaining those peaks in early August, early September. There is a strong association.

This variable is barely active through the period. They only moved about 400 kilograms out of that area. Whereas, they moved 2,600 kilograms out of CU-17 and 18, outside the sheet pile, but we don't see this correlation. So we really think there is quite a bit happening here.

How to get better. What we are suggesting here is that there are process variable settings that we have observed where two things are happening. There are periods of time when the resuspension is high. There are periods of time when the resuspension is low. So we broke these out. The left box is going to be high resuspension periods, right box is low resuspension periods, and these are the covariates in the model.

So what you see is when we are in the low resuspension time, most of these box plots tend to not overlap. In other words, there's differences in these variables during the time when they had poor performance and when they had good performance. So what we are suggesting is you ought to be able to take the distribution of these variables and other related variables that there are probably surrogates for and set up for Phase 2 dredging using those practices.

These right boxes are representing what we would start to call "best management practices," and there's a lot of detail here. Someone needs to sit down and
really work through what you do to get it to work that way. We think that is very, very
doable.

One last point, this one is flow. What you notice is you have high flows --
or I should say you have high and low flows during both high resuspension periods and
low resuspension periods, and we think that is an important factor. This isn't just a
flow-driven issue.

I think I better quit and leave that up for reading.

MR. GARVEY: That is the summary that John just put up there. Let's
move on.

Topic 3. Redistribution of contaminants during dredging. This exercise
here was largely an examination of how strong the evidence was for quantifying the
amount of redistribution that was occurring during dredging. EPA certainly recognizes
that this is occurring. The question is really the qualitative, the way it was done.

We note the following lack of baseline information. The approved RAM
QAP required GE to collect baseline data prior to the onset of dredging. That didn't
happen for various reasons, I won't go into, but suffice it to say that we don't have
baseline data for sediment traps.

There were 34 traps deployed, traps retrieved but not analyzed, as we
understand it, for the May 14th event, sampling event.

So there isn't baseline information that is basically directly representative
of the period just before dredging that was baseline.

GE also used push cores to look at this, and this is a dataset that is
probably used more extensively than it really should be. GE did push cores in the vicinity of the sediment traps as well as adjacent to SSAP core locations. The pre-dredging sampling design was flawed. By selecting four locations that were biased low, it made apparent increases likely. So, basically, you are getting a convergence towards the mean. If you bias your sampling, look for very low points, and co-sample them, in all likelihood, you are going to get higher values than you did the first time you went out.

Notably, of the six locations where they actually got samples, five of them were higher, but that is not statistically significant, given the small sample size, getting five out of six higher. But the other point to note is that there were 27 cores attempted or sites visited. Only six yielded sediment. So, in terms of these sites, examining for redistribution of sediment, they were unsuccessful in finding any or finding any sediment that they could sample for in 21 out of 27 locations.

Basically, from this information, we draw the conclusion that the data are not adequate to support GE's conclusions regrading sediment distribution. That is not to say that we don't think there isn't any, just that we don't think we can quantify it the way GE has.

This is just an example of one of the sediment trap deployments. This is down near the southern end of CU-18. What you see here are these blue -- these red diamonds -- I'm sorry -- the red squares -- here and here. These little lines that are all through here, this is the boat traffic that took place in and around these buoys, where these stations were located during their period of deployment. So this is based on GE's
navigation system where they had locations of all the various boats moving around, and so this is the movement of all the boats over here. Basically, this area was used as a training basin for a lot of tugs operating in CU-18 and CU-17 area.

So, again, this suggests that this is due to dredging them itself may not be appropriate. It may be the rates of resuspension inside a turning basin, but we don't know that it is really reflective of the whole dredging operation.

**MR. BRIDGES:** Just as a point of clarification on that, the movement of scows or associated vessels is a part of a dredging operation.

**MR. GARVEY:** Absolutely. Right.

**MR. BRIDGES:** So it is not just bucket impacting bottom that generates resuspension. Everything associated with the operation could be responsible for resuspension.

**MR. GARVEY:** Right. But our concern here is whether or not this is reflective of an average condition representing loads coming down from a dredging operation. I am not suggesting that these are not measurements of suspended matter due to dredging-related activities. I agree with you.

Moving on, Topic 6, underestimation of the depth of contamination and its impact on the project. This was a couple of different investigations that we did here.

John, you are up soon.

**MR. KERN:** Yep.

**MR. GARVEY:** I am going to talk about this one very briefly. This is Topic 6A. We tracked the history, if you would, of the individual nodes for the
post-dredging coring sites. We find these three, what we think are these three important observations.

Of the 445 locations that were cored during the Phase 1 remediation, they may have been cored multiple times, but there were only 445 locations. Only 35 percent of those locations required a residual layer at any point in the process. Basically, regardless of how many times they were sampled, only 35 percent of the locations had a residual core layer. The other 65 percent of the locations had no evidence of a 6-inch removal, did not require a 6-inch removal. Either they were compliant, they required inventory, or they went directly from inventory to a compliant node.

Yeah.

**MR. FUGLEVAND:** In how many cases were they compliant because they already had three prior passes?

**MR. GARVEY:** But they weren't 6 inches. They might have had three passes, but they weren't -- in other words, any pass of 6 inches is in the 35 percent.

**MR. FUGLEVAND:** Okay. Thank you.

**MR. GARVEY:** It would have required a foot, 2 foot, but it was a 6-inch. We just bend all of the 6-inch passes and called it a "residual layer," whether it was or not. In fact, this is an upper bound because we can't tell a 6-inch residual from 6 inches of mischaracterized DoC, but we lumped them all together. You still get only 35 percent of the nodes.

We also looked at the number of inventory passes, and we noted the following; 42 percent of the nodes required two inventory passes or more. So, almost not
quite half, 42 percent, two-fifths of the locations required at least two inventory passes,
the initial one and then one more. By an inventory pass, it means a pass of at least a foot.
And 20 percent of all the nodes required three inventory passes. The residual stem is
working well here because it is characterizing the inventory, but the fact remains that the
DoC is the reason that we are going back for inventory so many times.

If you combine these two pieces of information together, the point on the
bottom here is that if we had had a 6-inch of overcut added to these two, to the passes,
about 68 percent of the nodes -- 68 percent of the cases, the 6 inches of additional cut
would have been removing contaminated material. So this is, basically, this tracking, if
you would, of the individual nodes directly supports EPA's overcut proposal.

MR. KERN: Thanks, Ed.

So depth of contamination is something we haven't talked much about, but
it is a big issue. We know that there was a lot of redredging. We know that there was a
lot more inventory found than what was expected. Most of that is related to a
mischaracterization of DoC.

Briefly, we had extensive discussions about DoC, how to model it, how to
hedge against uncertainty, how to estimate uncertainty.

DoC arguably was both inaccurate as well as imprecise. We know it was
inaccurate because we end up with much more inventory than what we anticipated. That
is all DoC-driven. The imprecision, I am going to talk about. We haven't really proved
that through the model, but we are going to talk about that as well.

Understatement that DoC caused problems with redredging, caused
problems meeting productivity standards, caused problems meeting a resuspension
standard. It is a central piece that needs to be fixed, so to speak. We think this can be
corrected.

I am going to skip this one. We can talk about this at another point. I
want to get a little close here.

I want to talk about the types of errors that we have got. One of them is
called "nugget effect." What this is, is it is random error associated with uncertainty at
the locations of cores that we can't nullify. We can't explain it. It is not spatial variation.
It is measurement error. It is a combination of errors that occur at the lab, natural
heterogeneity of the sediments, and other factors such as processing error, mixing in the
bowl and taking a scoop and not getting that homogenized well. All those things go into
nugget effect. We believe it is 9 inches, and I have got an estimation here that I am going
to show.

We have got model uncertainty. What that is, is we are going to try to
interpolate between the cores at unsampled locations. The true elevations are someplace
in this red band, so to speak. We estimate that typically by some sort of a statistical
procedure. EPA would do that with Kriging analysis. GE elected to use a deterministic
interpolator. They don't provide estimates of uncertainty, largely. We discussed that,
though, and I think there is agreement over what we think the magnitude is.

The next one is cross-validation error. This was something that was done
by both GE and EPA, and I think we largely agree how this worked out. The idea is you
drop a core. You try to predict at that core location, and you get an uncertainty band at
that by comparing what you estimated to what you ended up with, and I want to try to get
the values on here. Here they come.

So the model error based on the Kriging analysis that EPA did, we believe it is about plus or minus 12 inches. So that is uncertainty at unsampled locations, and it is an estimate of that magnitude.

Cross-validation errors really are an empirical way to get the same thing. So they tend to be larger, though, because when you do it, you are reducing data density. So, because you pull that core out, you are going to overstate this model error.

In the analyses that GE and EPA did, we came up with about plus or minus 14 inches on the cross-validation errors. We would expect that to be close to the model error but a little bit larger.

MR. FOX: John, did you truncate this dataset at all; in other words, did you have low- and high-confidence cores, cores that had poor recoveries? You know, is this all the data?

MR. KERN: The things I am going to talk about in the next slides are going to be nugget, and this is going to be confidence 1A cores only. So this would be an optimistic view of the nugget. It is the best we could do, if we had all complete cores.

MR. FOX: Then, for the other errors, is that the --

MR. KERN: For cross-validation, I think we did restrict to type 1A, but I am not positive. I could check that. I believe we did.

MR. FOX: Thanks.

MR. KERN: This was a collaborative analysis where we did this. GE
supplied us with the errors. We analyzed them, and they analyzed them. As I recall, we
came in pretty close.

I want to talk about my estimate of nugget effect. This is strictly Type 1A
cores, and what we have done is we have identified pairs of Type 1A cores -- we call
them "co-locates" -- that are within approximately 20 feet, no more than 20-foot
separation between co-locates.

Typically, these are between 8 and 18 feet. That is the typical distance in
this dataset, and I can produce about 255 cores.

On the left is the histogram of the difference in DoC estimates of the
contamination, and what you see is that the majority of the differences are between plus
or minus 20. This is a direct estimate of nugget effect. This says if I put two cores next
to each other, how different are they, and you can see, for the most part, we are between
plus or minus 20.

This right-hand plot is a plot of the normal probability plot of those
differences. You can see it is relatively straight. We don't need to do any fancy stuff.

We don't need to log transform. This is really simple analysis.

Here is the estimates. We did this by sediment type. If I am in silt, that is
mostly what we are trying to remove, those are the depositional areas, I have got a nugget
and a fact of slightly over 10. If I look at sand, I am slightly under 10; gravel, a little
over 8. You can see there's very little variability among sediment types. So here is the
overall average. That is about 9.5, and that is what we believe the nugget to be.

What that means is no matter how much sampling you do, you are always
going to have this fuzz of plus or minus 9 inches. Perhaps it can be refined somehow by changing, like your sample processing methods or perhaps the use of duplicates in the sampling procedures. Short of doing that, you have got plus or minus 9 inches you got to deal with to hedge against that. This is partly where this idea of over-dredge comes from. We need to hedge against that plus or minus 9 inches. That is where that comes from.

The other question, the 14 inches of interpolation error, keep in mind, at the cores, we are at plus or minus 9. In the field, we are not much worse, plus or minus a foot. So, really, to increase data density, it probably isn't going to be the most efficient thing to do, but fixing the incomplete cores is probably going to be a huge thing to do. So, if we are talking about additional sampling in investigations, it is fixing incomplete cores. Whether that should occur up front or after you have already dug, we have got opinions about that, but I am going to keep going.

MR. THOMPSON: John, real quick?

MR. KERN: Yeah.

MR. THOMPSON: When you did this analysis, even on these cores that were considered to be complete, did you account for at all the fact that almost all the cores had maybe, at best, about 70-percent recovery? So, in other words, is percent recovery built into your analysis?

MR. KERN: Good question. I didn't look at the recoveries. This is a dataset that was processed before I got it, and I don't know that nobody looked at recovery. It is possible that these were corrected for core recovery. I don't know whether they were or not.
MS. HOLLAND: That might be a question to look into after lunch.

MR. KERN: Yeah.

MR. GARVEY: How much time do I have left?

MS. HOLLAND: Forty minutes.

MR. GARVEY: Great. That's fine. Thank you.

So we are going to look at water column loads during and after dredging.

This is a topic, you have seen some information that GE presented this morning on this. I am going to talk about our take on the data, looking at all the data that's available, and explain what EPA's position is on this.

This is the water column concentrations, basically, at Thompson Island station. Post dredging by enlarged period begins 12/1, extends to April 6th here. You see these red triangles here represent the data collected after dredging.

With the exception of these, this is about a 9,000 CFS flow event. This is a 23,000 CFS flow event and another 18- and 20,000 flow event, one right after the other. In the absence of these flow events, concentrations at Thompson Island station are within the realm of what we have, but we have very little in the way of baseline data here. So we were extrapolating from early December to late March. We don't have any blue dots in here at all. So we really don't know how this looks, but suffice it to say, connecting the two dots in the end would lead you to believe they had a lot of excess loads.

These issues here, these points here, I am going to talk about separately. While they are certainly above the baseline band here, we have reason to think they are
suspect.

The same thing for Schuylerville, and you have seen these plot as well already, but, again, this is the range of baseline loads. This is a high flow event, but even if this one -- I think John Connolly pointed out this one is 19,000 CFS, but then some of these are not. These are more normal flows. In fact, at Schuylerville, there has not been an extensive high flow monitoring program. There have just been a limited number of high flow samples that happen to serendipitally hit a part of their routine sampling event, unlike these events here where GE went out and sampled every 6 hours as part of a high flow event. You don't have that kind of data here at Schuylerville prior to the dredging operation. So we have a little bit of a mismatch here in terms of the kinds of information. You don't have a sufficient frequency of higher flow data in here to characterize this kind of an event.

Anyway, we see again the blue points here and the red points here representing the baseline and the post-dredging period, by and large, are about the same, with the exception of this event in January and this event in March and again in April. Finally, we look at Waterford, and we see Waterford here. All of the data fall within this envelope, with the exception of that point and a couple of points here. So, again, the baseline data, the post-dredging data, post-December 1st data, not post-November 1st but post- December 1st data, are falling within the realm of baseline concentrations.

We started December 1st here on purpose because there is a lot of activity in November related to backfilling and the like, and given the correlations that we saw
between boat traffic and resuspension, we did not consider November to be anything close to baseline. There's far too much boat traffic related to backfilling in November to say that, okay, we should be at baseline concentrations. On the contrary, given the correlation we saw between boat traffic and water column concentrations, November is not part of the baseline period.

Let's talk a little bit more about high flows at Waterford and Schuylerville. This is the range of all high flow events collected under baseline. We are finding high flow here is above 14,000 CFS, so we have concentration here on the vertical, flow on the horizontal axis here. So, for high flow events, we are not restricting them to a period of time because at high flow events, you are scouring the bottom. It really doesn't matter that much whether it is April or whether it is November. The high flow event is going to pick up particles. The particles are not changing with that great extent seasonally.

So what we see is that that range of red values here at Waterford fall within the range of blue values that we have from Waterford representing the baseline period.

These three points, however, I am going to talk about separately in a minute, and we consider these very suspect samples, and I will show you why.

One thing to point out as well is this is the maximum observed value post June 1. This is the maximum value observed during all of dredging, and all of the red dots, if you would, fall well below this threshold, with the exception of these three. And I would argue that we are not likely to see a water column concentration post dredging downstream, 40 miles downstream, that is going to exceed conditions when we are
actually dredging in the river. That is not something that makes a lot of sense.

This is a similar plot for Schuylerville. I mentioned before Schuylerville does not have a lot of baseline high flow monitoring. It was not sampled in the same fashion. These, again, are 6-hour composite samples, by and large, collected over a 5-day period.

Here, you see that these concentrations fall above this band, but, as I will show you in a minute, we think that these have been compromised. We can't say how much. Certainly, there is a correlation here between flow and concentration. So there is something here about increased concentration with flow, but we don't know how much it is and how much of this is excess over baseline, if you would.

This suspect sample, I will show you, I will discuss in a minute as well.

This is some of the intakes and the fouling. Hopefully, you can see this picture. This is an intake in there. This is all plant matter that was on this screen when it came up out of the bottom. This is basically acting like a kite when the river flow picks up. It is going to pull this thing. It has a buoy on it to keep it above the bottom, but with this much material on this thing, when the water kicks up, this thing is going to fall over into the river. The whole thing is just going to get pulled down as a result of water friction.

We see that on this one. This is another intake here. This is the No. 3 intake.

Four of the five intakes at Thompson Island were found in this fashion.

Here is another one. This is No. 4. This is the kind of intake we are
taking a sample from. I don't consider this to be acceptable in terms of intake. This is not something that is going to give you a reasonable measure of the water column. Look at the amount of mud coming off of that intake. This is not going to give you a reasonable measure of what is going on in the water column.

**MR. BRIDGES:** Ed, just a thought that occurred to me, there have been other high flow events in the river.

**MR. GARVEY:** Right.

**MR. BRIDGES:** This kind of fouling has never happened before?

**MR. GARVEY:** They have not had this kind of a system deployed over the winter. This plant matter is the winter freeze that causes the aquatic vegetation to lose its upper stalks and come floating down the river. That is what this kind of material is. This is all SAV that is freed over the winter, so we think that this is just material that has accumulated sometime between November and April when these were pulled. These were cleaned in November and then pulled out again in April. So, sometime in that period, these intakes get compromised.

**MR. CONETTA:** Baseline is manual.

**MR. GARVEY:** Right. Oh, thank you, Ben.

The other point to put out is that these automated samplers are only deployed as part of Phase 1 dredging. During the baseline sampling, by and large, we didn't have automated samples, with the exception of Schuylerville, I think, about a year beforehand.

**MR. CONETTA:** They did not do high flow sampling monitoring for
baseline at the station.

MR. GARVEY: Right.

So we have got four out of five intakes at Thompson Island found like this, what you see here.

This is an intake at Schuylerville. This intake has been -- the screen snapped off. The intake is clogged with material. So the question is, well, if it clogs completely, then maybe it is a good thing because it stops working, but if it only clogs partially, that is not what happens, and what was it about the event that did that to that intake, when did that occur. These samples are being collected on a relatively frequent basis. This could have been done during a sampling event. It could have happened in January. It could have happened in March.

This is mud coming out of the second intake at Schuylerville. I don't know how well you can see this, but this is really muddy water as compared to the much clearer water in the river. This is backflush water. These lines over the winter collected a large amount of sediment, which laid in the tube and got washed out when they did the backflush. So that is two intakes at Schuylerville.

This is a third intake at Schuylerville, also with a backflush problem, not a screen clog, but the line has got a lot of mud in it.

So, again, we don't know when these intakes become compromised, but I would consider these to be a valid intake system.

MS. HOLLAND: Ed, 30 minutes.

MR. GARVEY: Okay.
All right. So, to look at some of these samples, remember I circled before three points at Waterford. This is the normalized PCB concentration in the water samples. You simply take the total PCB concentration divided by the TSS, it gives you an effective particle concentration, if you would. The simple assumption is all the PCBs are on the suspended matter, but that is not the point. The point is just to see how PCBs in suspended matter relate in the water, in the samples at Waterford.

What you see is the vast majority of samples at Waterford, when you are above 10,000 CFS, they lie below about 2 ppm, in my scale here, except for these three samples. These three samples are at almost an order of magnitude higher than those. They just happened haphazardly, and I will show you that in a minute.

Look at the same thing at Thompson Island. We see an even greater span. Here, we have got almost two orders of magnitude variation in the concentrations, and it normalized the suspended matter. So high flows, total particulate, up above 10,000 CSF, this whole domain here. These high-concentration samples in the red and orange are showing us a very unusual total PCB to TSS relationship.

If we now look at when these events occur, the vertical axis is the concentration, again, for Thompson Island. In comparing Thompson Island versus Schuylerville, this is the flow. This is the hydrograph for the March event. This is March 23rd to 28th, and these are the individual measurements at Thompson Island and then again at Lock 5. This is the distance between these two stations of 6 miles and about somewhere between 4 and 6 hours.

So we are talking about tremendous changes in concentration in the water
column, and I have only got 4 to 6 hours to do it.

In particular, one might say, okay, here is the uptick in the hydrograph. There is my first rise. Maybe I have got suspension due to high flow. Maybe this is dredging-related resuspension, but this material never shows up at Schuylerville. None of these samples would suggest this kind of magnitude. So I have got to go from 2,500 to something under 300 inside of 6 hours. Geochemically, we don't have a mechanism to get that much solids and PCBs out of the water column. In fact, it would apply to all the PCBs that are on the suspended matter, and you would have to settle them all out, but, in fact, we see that discontinued, extremely high levels at Thompson Island through the whole period here.

We see one uptick at Schuylerville. It turns out that sample is actually 6 hours ahead of that sample. So this sample is not the driver for this point. This sample might be in theory, but then this one never shows up. That is a value of 13,000 nanograms per liter. We have never seen anything like this during dredging. So, again, I would argue how can you get this kind of concentration in the water column when you don't have boats, you don't have dredge spoils, you don't have sheens, you have nothing. You've just got the river flowing. This doesn't make any sense. In light of the fouling that we see at the intakes, we would consider this data to be invalid.

If you look at the same thing in Schuylerville versus Waterford, again, we have some unusual values. Schuylerville seems to be relatively well behaved. Most of Waterford seems to be relatively well behaved, except for these guys. Again, we get upticks not related to the hydrograph. We got a big, big spike. Concentration at
Waterford goes to 1,800. We haven't seen a concentration over 200 since June 1st. We get a value of 1,800 on this day, and it doesn't correlate to anything at Schuylerville. So where did this come from? I would suggest this is probably a fouling event at Waterford that we don't understand well.

I will draw your attention to these two points as a possible line of evidence. These two points were collected following a 24-hour period where there was a pump failure at Waterford in the intake system; 24 hours, they start the pumps back up. The next two samples appear to be compromised, and, in fact, these are the two samples plus this one, that had the really high total PCB to TSS ratio. Yet, all the rest of these blue dots give us numbers less than 2 ppm. These three are up in the 10 to 20 to 30 ppm level. I would, again, reject these as saying why is the river going to generate this kind of material for one 6-hour period. It doesn't match on either side. There is no movement up, and when we follow back down, it is just one spurious spot.

The same thing happens in Schuylerville for just one day. This evidence suggests that perhaps the fouling at Schuylerville was not as bad as it would appear by the pictures, but, given the uncertainty here, we are uncomfortable with it.

If we now integrate loads, this is an integration of loads during Phase 1. We represent the total water column load at Thompson Island, Lock 5, and Waterford. This is total PCB load in kilograms. The blue portions represent baseline. The green represents the net contributions due to dredging, and we see during dredging, we lost about 30 percent of a load between Thompson Island and Lock 5.

This takes about 18 to 24 hours to transit this distance, so you've got
ample time perhaps to settle it out, but we are going to contrast that with the loads that
you integrate at Thompson Island during that 5-day high flow event.

Shown here is the load at Thompson Island. If you integrate underneath
those red dots, that red line with all the spikes in it, you get around 300 kilograms a load
at Thompson Island. We have a 90-percent decline in something under 6 hours and 6
miles. This doesn't make sense, given the evidence for fouling at Thompson Island
basically says the Thompson Island data can't be relied on.

If we remove those other spurious points that we noted at Waterford and
Thompson Island and Schuylerville, we know we get a very consistent level of load
between the two stations, and, in fact, 29 kilograms is well within the range of baseline
loads. This is a June 2006 high flow event at Waterford. It is a little bit higher.

What was the flow rate of this one, Solomon? Is it about 25-, 30,000?

MR. GBONDO-TUGBAWA: Greater than 25,000.

MR. GARVEY: Say again?

MR. GBONDO-TUGBAWA: Greater than 25,000.

MR. GARVEY: Greater than 25,000, as opposed to the 22,000 CFS
event that we had in March, but, nonetheless, this is a baseline. Note it is quite high.
This 29 kilograms doesn't appear to be particularly out of line with that number. Last one
on this.

How much time do I have?

MS. HOLLAND: You have 25 minutes.

MR. GARVEY: Oh, we're fine. Okay, great.
Post-dredging loads at Waterford have a baseline fingerprint. I am going
to show you a series of three slides comparing baseline dredging and post-dredging data
and look at the relationship between the fraction of Tri+ PCBs and the total PCB
concentration in sample.

You see during baseline that, typically, your concentrations are relatively
low. The ratios tend to be between .3 and .8, but as you go to higher concentrations in
the water column, the ratios tend to be relatively high, the implication being as you are
getting these higher concentrations, you are probably suspending surface matter that has
not got a lot of dechlorination.

During the dredging operation, we dug up material that was quite
concentrated and generally highly dechlorinated. So you see, in general, here the
opposite relationship that you have. Here you have lower ratios, and as you go to higher
concentrations, the ratios get lower still. So, when we get to these higher concentrations
of 100 to 150 nanograms per liter, we are looking at ratios of a fraction of Tri+ around
30, 40 percent. That means these are highly dechlorinated sediments resulting from
dredging and dredging-related activities where you are digging up very hot sediments
that have had a fair amount of dechlorination.

Contrast these two patterns, then, if you would, with this one. This is the
post-dredging period. This includes the March data that I just showed you at Waterford,
excluding the three spurious points I talked about a few minutes ago, and what you see is,
again, they lie within this portion of the pattern, with the high-concentration samples of
ones over 50 or 100 nanograms per liter, They have the high ratio or high Tri+ ratio that
is characteristic of the baseline period, not characteristic of the dredging period.

So, if we were resuspending dredging-related PCBs, we would have concentrations and patterns out here. Finding this kind of material here suggests that we are not resuspending dredging-related materials.

We conclude from this that we are not seeing dredging-related loads continuing to the Lower Hudson. We had certainly during the dredging operation, but, in more recent months, the pattern, the fingerprint, if you would, of the PCBs that are entering the Lower River are those commensurate with the baseline kinds of patterns, not the patterns that have evolved from dredging.

Just to conclude this discussion on baseline loads, low flow concentrations have largely returned to baseline. High flow concentrations have returned to baseline at Waterford. We can't really say what's happening at Schuylerville and Thompson Island with confidence.

High flow data at Thompson Island and Lock 5 are suspect, at best, and a geochemical fingerprint identifies the recent concentrations as baseline, as the last slide I just showed you.

To conclude, then, with the technical summary of what we presented this morning, we have revised load standard. Our models of the Lower River impacts of the revised load standard suggests that there is no long-term impacts.

What we still need to do is to quantify by modeling what the risk reduction will be to the Lower River, allowing for the benefit to the remedy, which we did not account for in those curves. We only took them to MNA. In fact, we have to take
them to account for the recovery curve, so, in fact, there will be a benefit beyond what I showed you on those curves. So, even if we have the large releases we described, we anticipate a benefit in short order upon completion of a few years after dredging.

Temporal trend, sediment and water declining at about 10-to-15-year half-lives. So we have recovery rates that are consistent with some of the historical observations as suggestions of the rates of decline, but those numbers play into important calculation, the break-even point, if you would, and they are accounting for the uncertainty in both the water column trends and the variability in flow. We expect that the load would return a break-even point somewhere between 25 and 50 years out from completion of dredging. That is, again, a pessimistic view of the dredging and an optimistic view of the MNA forecast.

When we look at the resuspension model, we see that we can identify variables that predict the amount of resuspension that is going to occur. We think we can manage some of these process variables and reduce the amount of resuspension that is occurring.

Finally, just the last two bullets here on this one is that low flow concentrations return to baseline, high flow as well at Waterford.

Then, finally, on the last part of the technical summary, DoC uncertainty, the DoC characterization going into Phase 1 was both inaccurate and imprecise. It needs to be addressed. This is a very important variable. We think that this is the key to success in Phase 2 to a large degree, is getting DoC correctly characterized and accounting for uncertainty.
DoC affects just about everything about the standards because you end up dredging more or more frequently, more bucket passes. Productivity is slow because you don't close the CUs as fast. The local uncertainty in a nugget is basically the primary variable that we need to be cognizant of, and then, finally, the incomplete cores that are pervasive throughout the areas probably need to be addressed in Phase 2 as part of the operation.

**MS. HOLLAND:** Ed, those last two slides were missing, I think, from the panel's packet.

**MR. GARVEY:** Yes. I apologize. Yes, they were. Those got slipped in this morning. We couldn't get them before they went to the printer. At any rate, we will get those for you quickly, though.

Monitoring diagnostics. Recognizing all the problems that we have had with the water column data and recognizing some of the observations of Phase 1, such as the presence of an oil phase in many of the areas of the operation, we think that the oil phase needs to be characterized, needs to be sampled, analyzed, got to get its physical as well as chemical properties.

I know there is some information on that so far, but I think it needs to be more extensively done. Some of the information on its chemical properties, we don't have much at all as to a pure oil phase -- sorry -- we have some information on its physical properties. We don't have any information on the specific chemical properties.

Far-field composite samples are not yet suitable for high flow monitoring, at least not have the winter, and it is not clear how best to resolve this. We think that we
are going to need to do dissolved and suspended matter and NAPL samples, basically
split samples at far-field stations to characterize loads properly, and then we are talking
about we would like to see discrete far-field samples be added to the mix of monitoring
to add confidence to composite samples that would be collected as part of Phase 2.

With that, I will turn it over to Ben.

**MS. HOLLAND:** Ben, you've got 15 minutes, thereabouts.

**MR. CONETTA:** I think we will be pretty brief at this point.

One of the questions, I think, was how to address uncertainties. I think
you all had a question about that. These are some of the thoughts we had.

Obviously, overcut to improve PCB capture on the first dredging pass, we
think it is important to having a successful project to get as much of the PCBs out in your
first pass. We don't want to be out there more than one or two passes, just like GE
doesn't, but we want to get out the mass. It is very simple -- maybe not that simple. I'm
sorry.

More comprehensive post-dredging sampling. One of the points -- and it
goes to what GE has recommended -- in areas where we haven't defined a DoC or
hopefully we will get a better definition of DoC, we still want cores to depth at least 2
feet to make sure that we actually have the DoC addressed.

Flexibility in the Phase 2 schedule as volume estimates improve. We
really don't know how much volume or mass we are going to remove. We both have
guesstimates at this point. We could be as low at 140,000 kilograms. It could be as high
as 200. My expectation is it will be below 200,000.
We have an alternate water supply that has been supplied for the Towns of Half Moon and Waterford. We have talked about this before. Ed has. It goes to the 500 ppt. One of the principal reasons for the 500 ppt and why we are not discarding it completely was for the protection of those public water supplies. We've addressed that.

Resuspension monitoring diagnostics. Ed discussed this a little bit. I believe we will also need to do some more diagnostics during dredging. I think we have enough questions about the automated samplers may be different layouts possibly from having the lines or at least the intakes going from the top down as opposed to from the bottom up, in which case it wouldn't bet set at high flows or even other instances getting bed sediment load in the bottom.

So those are things I think we need to talk about with GE. Obviously, anything that we do, we need to sort of evaluate with perhaps samples as well. Those are all diagnostics we think we need to do going forward.

Ed mentioned the oil phase study.

As an adaptive management approach for operations, I think our approach -- and I expect GE's approach is the same -- is that after every year and even hopefully within the year, as issues come up, as they undoubtedly will, we will try to look at them and try to adapt as we go forward.

Inefficient Phase 1 dredging practices. I am going to go over this one. Maybe we will talk about it later at the Q&A. I have got to talk to Ed about this.

Improving Phase 2 dredging practices. More traditional dredging approach, aggressively cut to DoC in overdepth, overdepth based on, obviously, our
dredging precision and the precision of DoC definition, minimize bucket drainage.

While we tried to do it and at times they had bucket decanting, obviously we think that impacts a number of issues, even, in essence, redistribution.

Some of you all or I think the group asked about the sediment remediation guidance. I think GE has weighed in on this as well. We right now are in the remedy implementation. We are beyond a lot of the issues in the guidance. We think we are consistent with the guidance, and we are not here to reopen the remedy.

The adaptive management concepts, we think are pervasive throughout the project. We need to continue to do those. We think that is a concept that will continue.

We have extensive new analysis of the modeling, previous models, both EPA and GE, GE's previous model. While we used EPA's in our remedy decision, GE's model also under-predicted, and if you have looked at the data and you have looked at the uncertainties, your half-life even at 10 years, being optimistic, could be as much as 20 years. There is an uncertainty there.

We have tried to assess the causes of resuspension. I think John did a pretty good job. I think there is more work there to be done.

The remedy does have a combination of remedial actions. It is not just dredging. It is dredging. It is monitored natural recovery, and there is a component of capping as well. We tried to minimize the capping. We will still continue to try to do that. We think the standards in our recommendations are still consistent with this.

We have got an extensive baseline remedial and post-remedial monitoring, and it is implemented, ongoing, and planned, respectively. In essence, one of the
priorities in the remediation guidance, I believe, talks about that extensively. So we are
going to continue doing that as well.

One of the other issues that we decided to talk about briefly, but just in
passing, is sediment management principles. Control sources early. We are still
controlling some of the sources. That work is ongoing, upstream of where the dredging
is occurring.

Develop and refine and conceptual site model. We are actually learning
more and more each day about the site. So we are refining our understanding of the
system.

Use an iterative approach in a risk-based framework. We still continue to
look at risks. We have looked at it, and we are going to continue to look at risk. It is not
something we are going to politely close our eyes to.

Carefully evaluate the uncertainties associated with the site
characterization and site models. Obviously, there is a lot of uncertainty with the models.

We also have monitoring data, and after sediment remediation data, we
will be collecting sediment data. So that is consistent with those guidelines as well and
principles.

I think just a couple of closing statements on our end. I think EPA feels
very strongly that the project needs to proceed, and it needs to proceed at the
recommendations we have made.

Principal benefits of the remedy will only be achieved if we take the mass
out. GE has proposed -- and I am not quite sure what they proposed as well -- either a
quarter of a remedy or a half-a-remedy. That is not going to get our benefits. We have looked at risk. We have tried to address the risk values. The initial standards also looked at some risk to the Upper Hudson as well in terms of monitoring and what releases. I think it is in the modeling portion. I think it had a 350-nanogram-per-liter release. We think that is important for you guys to look at. There are some risks evaluated there. Those showed minimal impacts, as did apparently the 500-nanogram-per-liter release over the life of the project. So some of that work is already there. We are still going to refine our understanding of that, though.

I think that is it. We appreciate you listening to us. I am sure we have a lot of questions. Unfortunately, as I think we've showed, there's two sides to the data, and I don't know what's right. We need to figure it out. That's, in essence, the problem. It is not going to make your job easier, I understand.

MS. HOLLAND: We have about 10 minutes left in this segment. I kind of herded you guys through.

MR. CONETTA: Can I just add one other thing to address?

MS. HOLLAND: Oh, sure.

MR. CONETTA: Ed addressed a lot of the BMP monitoring. I can't stress enough that the baseline monitoring was not designed during 2004 and '8 to capture high flows at the other stations. So the data is there. We don't know how good it is because you have seen what the intakes look like, but there is no real comparability.

We do agree with GE that as flows go up, concentrations go up. We agree with that. We have seen that before. We still agree with it.
One of the comments that Todd had mentioned about redistribution and dredging-related, we don't dispute the dredging-related redistribution of boats. It is part of the process, but I think one of the points that we would like to point out is that this is an active river system. There are boats crossing up and down the river at all times. There is an active navigation -- canals when they open up, I forget when they -- early May, you have a lot of boat traffic. There is redeposition, irregardless of whether we are dredging. That can't be lost in this process, as we go forward.

I think I am done. If you have any questions or --

**MS. HOLLAND:** Yeah. I was just going to say, since we have a few minutes and I sort of tried to herd you guys through your clarification questions, if you have some additional clarification questions for any of the three EPA presenters, we can do some of those now, and then we will come back to questions after lunch.

**PANEL MEMBER:** I vote lunch now.

**MR. HARTMAN:** Body language seems to suggest that.

**MS. HOLLAND:** Okay.

**MR. CONETTA:** All right. Thank you.

**MS. HOLLAND:** Oh, is that Greg? Did you have something?

**MR. HARTMAN:** No.

**MS. HOLLAND:** Okay. All right, great.

**MR. CONETTA:** Thank you.

**MS. HOLLAND:** Thank you very much.

**PANEL MEMBER:** Don't think, Ben, you are off the hook. We got
MR. CONETTA: I may not be able to answer them, though.

[Laughter.]

MS. HOLLAND: Before anybody leaves, I just wanted to remind you that we need our public commenters to sign in before one o'clock, and some of you signed up "maybe." If you don't come down and put a "yes," then a "maybe" doesn't count. We need a "yes." So please do that before one o'clock.

Since we are ending a little early, do we want to come back about 5 minutes early?

[No response.]

MS. HOLLAND: No? Okay. We will just stick to the schedule. We'll give you guys a little extra time.

So, thanks, everyone. We need to reconvene at 2:15 this afternoon.

[Luncheon break taken.]

Panel Deliberations

MS. HOLLAND: The next segment on the agenda will be an hour and 15 minutes, and the panel at this time will be asking questions.

We figured maybe the easiest logistically is for you folks just to stay seated where you are. You will have three microphones over here and three over here, two of which are these with cords, but you can pass these lavalieres around.

Glen in the back is controlling. So, if something is not working, raise your mic, so he will see it. They all have numbers on them, just in case.
So we have everybody here? Okay.

So, Paul, I think, had some introductory remarks for this session. You need to turn the table on.

**MR. FUGLEVAND:** Okay.

So, as just a way of a little bit of background, when we met here last February, we had our first Introductory Session. I walked away from there thinking that the panel's charge was to find a needle in a haystack, and after this morning's presentations, the haystack just got bigger.

So there's, again, new information. We got addendums in the last week or so, and so what we are going to do this afternoon is we are going to primarily focus questions from the panel, especially during the first hour, on the presentations this morning, just to understand those better. In some cases, those questions may evolve just into broader topics, but we will be asking questions.

We don't have a specific focus on EPA versus GE questions. They are going to be more questions from the panel on issues that are on each panel member's mind. So there may be a series of questions that all go to GE or EPA, and it is more in line with our just wanting to pursue the issues rather than just ask questions back and forth.

I do want to comment on one thing. When Ben made comments this morning after GE's presentation, he said a lot of the information presented this morning from GE was outside of the Charge Question. We talked about that at lunch, and I think the panel members all feel that all the information is helpful for what we are charged to
do, and, particularly, one of the Charge Questions, No. 3, is would we recommend anything that was being identified we don't think can be implemented. So having background that was presented this morning also helps us address that third Charge Question, if we are going to recommend other things.

Then, finally, Charge Question No. 2 is for us to review the recommended changes to the standards and if we see whether we think they can be implemented or not. One of our challenges is to get the recommended changes nailed down.

Late last week, we sent out to SRA -- and they were to forward it to EPA and GE -- our interpretation as of last Thursday on what EPA and GE's recommended changes were, and we have asked SRA to forward that to both of you today in a Word document. If you could, we would like you to use our document, redline our document, so we can see exactly your changes but from our base, so that it will be easier for us to assimilate and then, if we could, if possible, get that in the morning, because tomorrow we begin deliberating, and that is one of our questions, is deliberating on the recommended changes. So having that would be helpful.

Again, Steve is, I believe, e-mailing it to EPA, and then they can forward it on. Steve will also have it on a thumbdrive.

That is my basic introductory comments. Now we are just going to open it up to panel members, and we are going to try to give every panel member some time to ask some questions. So I guess we are going to start with Rick Fox.

**MR. FOX:** Ben, this morning, you mentioned that it is EPA's goal to minimize capping on this project, and I was wondering if you could elaborate on that
little bit, especially the basis for that statement.

MR. CONETTA: Well, thank you for the opportunity.

By minimize capping, I think what I mean is we have got a capping component in our remedy in the standards. That is if you encounter bedrock or inventory that you cannot remove. We are still sticking with that.

I think the original estimates for capping when we had first put together the ROD was about 8 to 10 percent. We were at 25 percent, where we think a lot of that had to do with the end of a navigation season and the depth of contamination issues that we encountered. We think we can do a lot better than that.

Obviously, we don't plan on having GE and the dredgers to dig up on bedrock in Phase 2. We have learned a lot of things from Phase 1, and we would carry that forward to Phase 2.

MR. FOX: Thank you.

Just a little bit of a follow-on to that. You mentioned when you were talking about EPA's strategy that this is a combination remedy, and it just seems that revision of the residual standard is one of the considerations that EPA is making and GE is recommending. I am just wondering if there should be some consideration to when we have a good DoC and limiting the dredge attempts. I mean, that is sort of one of the conclusions that we are going to deliberate on in the next couple of days.

MR. CONETTA: I am not going to speak to where we might get with GE. I think our intent is to do this in a pass or two, if we can. We don't want to be out there the whole year in the same CU dredging over and over again, but part of that is that
we need to know what the DoC is to make sure either we can get it or we can't, and we don't have that knowledge right now.

**MR. FUGLEVAND:** Paul?

**MR. SCHROEDER:** I guess my question is going to go to perhaps both GE and EPA, but, in particular, I would like to have an idea of what you believe the improvement in resuspension can be.

John, you kind of talked so fatalistically, as 3 percent is going to be lost and there is not much we can do about it, while I think EPA was showing us, with their statistics and statistical analysis regression, that there are probably areas of improvement.

Do you have any projections at all as to how we can change the resuspension, such as would your residual standard proposals, that we close a lot faster? What kind of effect do you think that would have on resuspension?

**MR. CONNOLLY:** We think that having the CUs open could contribute to resuspension, but our analysis indicates that the real driver is PCB mass removal rate.

**MR. SCHROEDER:** What did you say?

**MR. CONNOLLY:** PCB mass removal rate.

So that we expect some improvement if we can close CUs faster, but we don't expect a dramatic change.

With regard to other opportunities, we worked hard all during Phase 1 because we were exceeding the control level very quickly during the project and then exceeded it for the remainder of Phase 1.

So, for the entire year, we were making lots of efforts to try to reduce
resuspension. We weren't able to do much with the things that we were trying.

We took a look at some of the things that EPA is proposing. As I indicated, we don't think that overcutting is going to reduce bucket bites, so we don't think that that is really going to help us all that much.

Vessel traffic, we think is part of the story but not a big part of the story.

In the statistical analysis that we saw there, vessel traffic is actually a pretty small part of the variance that they ascribe. So I think even EPA's analysis doesn't show that vessel traffic is a dominant factor, although perhaps during backfill, but, at that point in time, there is very little left in their statistical model, other than backfill and the vessels at that time.

So we suspect we can work around the margins, that we might be able to reduce it. Instead of 3 percent, maybe we can get it to 2.5 percent, but we don't see an opportunity to really drastically cut resuspension rates.

MR. CONETTA: I will take a little stab at this.

Obviously, we agree that there is probably more than 1 percent at the dredge head. There are other factors, but we think John's analysis showed that you can adjust things and make things better.

We think this was, in essence, a worst-case scenario. We were in some of the most difficult areas in three different locations of the river. We had three different inputs. We don't even know what kind of impact that had.

Apparently, from John's analysis, you can tell you had a little spike. Out of the window, it seemed like the levels went out. If you don't have that unit working
down there, your levels are not going up. So what kind of additive impact did that add to the resuspension rates at the far-field? We think there is definitely room for improvement.

In terms of the bucket bites and depth of contamination, I think over-dredging, in and of itself, we think it adds benefits to the remedy. It will get your levels down lower, and to look at it in terms of the way I think GE presented it today is a little hard for us to understand.

A 12-inch cut means you are going to do a 6-inch overcut or two bites, but that is not the whole story. I don't know if you can look at it that way.

We can't still make heads or tails, a lot of the bucket bit information, about how many cuts were in a lift. We are still having trouble working through that. We have been trying to work through that.

Ed, do you want to add anything else?

MR. GARVEY: The other part of this and one of the reasons we spent the time on it was to look at the impacts downstream. To some extent, we almost feel like, yeah, there is the concern to keep things down to a minimum, but we are looking at a relatively small pulse in a system that is pretty extensively contaminated already. I am talking about a release to the Lower River.

Because these pulses are so short-lived based on the mechanistic model that we ran, it is kind of like, well, it would be better not to release more than we had to in MNA, but, really, the remedies, the benefit to the remedy in terms of fish tissue recovery, human consumption of fish and the like, come about almost regardless of how
big that load is. That is not to say that we should just not worry about it, but you saw the
vagaries of the two curves that we are talking about. The MNA curve has got a lot of
uncertainty when you start to forecast it into the future, and we are trying to figure out
where does our remedy fit.

It doesn't answer your question directly, Paul.

MR. SCHROEDER: No. I'd like to get back to my question, then.

[Laughter.]

MR. SCHROEDER: Which is that you went through and did a statistical
analysis to determine where the variance or relationships are. Did you evaluate further
how much you could change those parameters that were affecting it and what kind of
impact that would have?

MR. CONNOLLY: A couple things. The first question is we have
identified factors that show a signal of water concentrations. That means there is
association there. Some of them look like they probably could be justified as cause and
effect. The boat traffic is one that we can pick out where we see it with and without
dredging going on. So we think there really is something there.

I want to point out, though, that these $R^2$ shouldn't be mistaken as
estimates of the percent contribution to load. They have nothing to do with that. An $R^2$
could be high because a variable is well-quantified, but you may have very little response
in the water column if the relationship is flat.

So the next step is to look at these mechanisms that we have identified and
start to look at a more mechanistic model of each one of those; for example, how much
crop wash is happening at particular water depths, what are the concentrations we're
driving on, and start to build up the load estimates. All we have done is establish
correlation with flow. It is pretty hard to argue that if you are driving over 6 feet of water
with a tug that you are not mixing up some sediment.

The other thing I would say is how to change these things. One thing that
could be done easily in terms of the tug traffic would be to stop using tugs during
backfill. There's other ways to get the material out there. I think that is something that
might be looked into. That would reduce a high percentage of the tug traffic. However
much that is contributing, you can basically cut in half.

**MR. MAGAR:** Can you elaborate, then, on that? How are you going to
get the material out?

**ATTENDEE:** At the Fox, we are slurrying it. So we are using hydraulic
pumping to move the material out. I know that is a limitation to take material -- or to
take dredging material back, we don't have the water capacity, is my understanding, but I
don't think that is a limiting factor in terms of sending clean material out. So you could
eliminate trips with the scows out to where the stuff is being spread.

**MR. GARON:** Your name, sir?

**MR. HAGGARD:** John Haggard.

A couple of things here. It went back to something Todd said earlier,
which was you really have to view all the activities on this project together. To get cubic
yard of sediment out, we need out, we need to have barges. We need to have tugs. We
are not going to be able to get the tugs with the backfill. We are going to have to use it.
It is an interesting idea, but it is really complete redesign of the approach, but it is not just
about what is happening in bucket.

I think what we have been able to see when we have gone through the
analysis is we were able to see some minor improvements by best management practices.
Best management practices had been implemented before we started the project that we
knew we were going to do and then on the fly if we made changes as necessary to try to
make improvements.

What we have seen so far is that there is no low-hanging fruit here. We
are not able to identify something that is going to make things better with any kind of
reasonable certainty, and, frankly, hope is not a strategy here. We have gone out. We
have done a lot of work. We have collected a major, massive amount of data, and we
have learned a lot.

The residual is one area where it may help. Being able to get in, move
efficiently, close out areas, reduce the number of bucket bites, get the bioavailable PCB
mass out very efficiently, we believe is the right way to go here. So, hopefully, we can
have some discussions about whether or not that is more palatable than trying to chase
after small amounts of PCBs and having an inefficient project.

**MR. FUGLEVAND:** You got it, Paul, all your questions answered?

So, Todd?

**MR. HAYES:** Do you mind if I follow up on Paul's question directly?

**MR. FUGLEVAND:** You know, I think because we asked both of you,
we will go ahead, go ahead and follow up, but what we are going to try and do is stay
away from rebuttals because you each have an hour on Thursday, but I think go ahead
now and follow up. But, in general, we still try to stay away from rebuttals.

**MR. HAYES:** Well, this is not really intended to be rebuttal.

One thing that wasn't pointed out so far in terms of improving the
resuspension rate is there was quite a bit of time, it appears from what I can tell, the
project spent trying to get a very fine depth, and so the dredge did spend a lot of time
getting buckets that didn't have a lot of material in it. We know that the loss rate, the
mass loss is very similar, no matter how much gets in the bucket. So I think that sort of
drove from the depth of contamination issue.

So, if that is resolved and then we take a more traditional approach or to
go ahead and get that, then we will have more bucket volume per grab. The likelihood
the resuspension rate will go down and could be quite substantial, how much it goes
down.

So that is one thing that just hasn't been mentioned. There is quite a lot.
If you look at the bucket data information, there are a lot of those buckets that have very
small amounts of settlement, and it came back to they were trying to beat this depth of
contamination line, and then they found out there is more inventory, so they went back
and did it again and again. So that is the part to me that could be improved the most in
terms of the practical operation.

**MR. FUGLEVAND:** Don, do you want to give your name for the
record?

**MR. HAYES:** Yes. I am Don Hayes, University of Louisiana.
MR. FUGLEVAND: Then anybody who speaks, just because it is being recorded, when you speak, if you could give your name first, that would be helpful for the written record.

So, Todd?

MR. BRIDGES: Yeah.

So my question, I guess, to EPA at this point concerns the resuspension and standard. I guess what I am going to ask for -- there was one slide that I guess is an attempt to encapsulate the standard. It was the last one in our packet, which you all didn't go over, but I would like to ask somebody to kind of review that with this in mind.

The experience in Phase 1 was that you had considerably more release down river than expected. So I am very interested and concerned about how you are going to control that release, which you all refer to as load, in Phase 2, so that you don't have a three- or four- or five-fold higher release than you expect or hope for in some fashion.

So I am interested in hearing EPA articulate how the revised load or resuspension of load standard is going to be used to ensure, ensure that that doesn't happen.

MS. HOLLAND: Todd, who are you addressing?

MR. BRIDGES: EPA.

I pretty much understand the proposed resuspension standard that GE is putting forward, I think, but I remain considerably fuzzy about how what EPA has proposed, standard, how it would be implemented and, furthermore, how it will ensure
that you don't have a repeat of the Phase 1 experience where you end up getting considerably more load down river than desired.

MR. GARVEY: Well, there's two things about that, Todd.

MS. HOLLAND: Ed, could you repeat your name?

MR. GARVEY: Sorry. This is Ed Garvey.

The first one is that we propose to have two levels within there. That is both a control and evaluation level, if you would. In addition to the simple load numbers, we are also looking at using 350 nanograms per liter as a threshold to require improvements to be made, slow the operation down, whatever it is, basically have 350 nanograms per liter or approaching these kinds of load numbers that we talk about there. EPA can require basically GE to slow down and make improvements or just make improvements and the like.

So the first part, I guess the first thresholds are action thresholds to actually do something, but I think if I understand your question correctly, you are asking what happens if you get to 120 kilograms in a year, now what. Is that a fair statement?

I am not sure we have worked every last detail out as to what EPA would do. There is enough fuzziness in the forecast, for instance, to suggest that we have some leeway as to what the recovery date is, but it is also not a carte blanche to just, well, okay, we will just raise it again. I don't think that is the agency's intention, but, honestly, I don't think we have a scenario, unless, Ben, you know better.

MR. CONETTA: The only other piece I think I would add to that is that while those numbers are there, they are also sort of ratioed in terms of the amount of
dredging you are going to do per year, but had we thought about what happens when you
hit the threshold at the end or the 120 for the year, I think from what we have seen in our
thought process in terms of the resuspension and the data that we have seen, the 1-percent
resuspension rate seems to be very amenable at Waterford. We were close to it at
Schuylerville. And depending on how Phase 1 relates to Phase 2, it may be also
attainable at Thompson Island.

Those numbers, at least the final numbers, are based on a 1-percent.
While we think that is the level, our goal is to do better, and we think we can do better.
A lot of that depends on how much mass actually we have and how much we actually
have to remove. Those numbers could be lower.

**MR. BRIDGES:** So I hear you saying, if I can summarize what I think I
heard Ed say, is that you are kind of still working it out.

You know, if I extrapolate Phase 1 experience -- I know there is some
disagreement about the number, but let's say you got three times more load than expected
-- that sort of implies that maybe you were at your previous load limit a third of the way
through the dredging.

So, if you are a third of the way through your first year of Phase 2 and you
get to 116 or whatever it is, what are you going to do?

You see my train of argument here is that nobody wants a situation where
you get to the end of year five, and you are four times above the limit you intended to get
to -- or year ten or whatever.

So I guess this begs the question in my mind. What would EPA consider
to be an unacceptable amount of load, and what would be the basis of that? Honestly, I am not sure how you derive a load or a resuspension standard without being able to set some, you know, "this is it," you know, this is the limit on the load.

**MR. GARVEY:** Well, I can tell you, we've --

**MS. HOLLAND:** Ed, I'm sorry to be a pest, but names?

**MR. GARVEY:** Oh, every time. Okay. Ed Garvey.

I can tell you that one simple way to say too much load, some level of release would be unacceptable, is if we were able to demonstrate a risk to downstream users, to fish and human consumption at some point in the future downstream, and we haven't been able to demonstrate that.

We have actually run the Farley and FISHRAND for about 50 percent more than the 800 kilograms per day we talked about this morning. We just ran it to see what would happen, and we still can't get significant deviation of that impact bumped more than a few years beyond the completion of dredging.

So we are kind of hard-pressed to say we can't easily come up with a risk-based number that says you really should stop this because beyond this we get a risk. We get more load than we might have released on the MNA, but it has no environmental consequences as far as local risk is concerned. So we are kind of coming back to it from an engineering perspective saying what is a reasonable amount of engineering, what is a reasonable amount of loss, and we saw in Phase 1, losses at Waterford that were less than 1 percent. So we achieved what we are setting this thing at, so long as we defined the load at Waterford.
So we are not defining a load standard that is actually higher than what we observed in Phase 1. It is what we observed in Phase 1 to a large extent, actually a little bit higher than it was. We got about six-tenths of a percent, seven-tenths of a percent load at Waterford, and we are setting it at 1 percent. At this level of loss, we don't predict a risk or an impact to fish and human consumption downstream.

So we are saying, okay, you manage to do this good, we want you to do better, but, if we come back at the end of the day, we have released 1 percent to the Lower River, we are okay with that, so long as we can convince and be convinced that the engineering approach was sufficient to keep things under control and to a minimum in terms of losses, but it is really hard. We haven't been able to find a scenario.

I suppose we could run our mechanistic model a lot higher and see how much farther we can go, but I don't have an answer for you now. I do know we ran it 50-percent higher than the 800 kilograms. We had 1,200-kilogram scenario and still didn't get significant risk or significant impacts to recovery, recovery time.

**MR. BRIDGES:** I think I understand what you are saying your approach is, but I would have to assume that it would not be considered reasonable to have an infinite load scenario, right? So somewhere between zero and infinite is where the number is, I guess.

[Laughter.]

**MR. BRIDGES:** What I hear you saying is you have yet to perform an analysis which allows you to identify what the number is between zero and infinite, which brings me back to my question.
If you can't establish what the load limit is or what the release limit is, I am not sure how you derive a resuspension standard or at least one that is consistent with the logic that is presented within the originally published Engineering Performance Standards from 2004, which go into some considerable detail about the implications in terms of fish tissue and such associated with that standard.

I will leave it at that for now.

MR. MAGAR: One has to ask whether a resuspension standard, then, is necessary, if it is that --

MR. BRIDGES: Well, it is sort of what it implies, I guess.

MR. FUGLEVAND: I just want a follow-up question, and this is just helps me understand standards.

In the original Engineering Performance Standard for resuspension, I have got 22 kilograms per year on Tri+ PCBs. Then it went from there, from 22 up to 39, was modified for Phase 1, I think based on maybe the mass you removed. Now you are proposing -- is it 122? Is that the number that I see in the table?

MR. GARVEY: Yes.

MR. FUGLEVAND: So, to me, that somewhat reinforces the comment that Todd was making. It went from 22 to 39 to 122, and it is not that the science has changed, or is it because models were uncertain? It is somewhat concerning that now you are recommending a number to the nearest single digit, 122, where we seem to have gone from 22 to 122 in a period of just a couple years. Maybe you could speak to how that happened a little bit more and just to follow up on Todd's question.
Then, based on the uncertainty that has led us to that five-fold difference, is the uncertainty gone, or is there still uncertainty remaining on what it could go to?

**MR. GARVEY:** Well, I think when we first put the performance standard together, we were faced with trying to come up with a risk-based analysis that said don't go above this threshold, this is a risk-based threshold you definitely don't want to see, so that is the place to stop.

I mean, the simple one was the 500 nanogram to water concentration because we had downstream users that would be impacted. So that was one of the main components of the standard. In fact, that was a limiting step during various points in last year's operation.

But, with the load, we were hard-pressed to show a significant risk downstream, and at the time the standard was written, there wasn't very much data on the nature of resuspension and the scale of loads, and this was written in 2003-2004 time frame.

So, at the time, engineering-based evaluations that we conducted with various dredging engineers and the like suggested that 1 percent of solids was a reasonable plume, that you typically didn't -- you had a hard time -- actually documented loss was much more than 1 percent of solids because the downstream plumes would typically dissipate relatively quickly, and the kind of material we had, we had a mix of 50 percent sand and silt, roughly. So we anticipated that with that kind of mixture of material, we would see the solids -- we would be unlikely to lose much more than 1 percent.
Given that, we assumed the PCBs would be on the solids and, therefore, that was the vector for their release, we said, okay, then 1 percent of solids means 1 percent of PCBs, and that is kind of where that came from.

Since that time, certainly there has been literature and other things published that suggest that in the very near-field, you can get several percent losses and the like, and, certainly, we have also had it in the data that has been collected, evidence to suggest that PCBs coming off of these solids much, much faster than kinetics would govern. We have seen, essentially, equilibrium within a few hundred feet of the dredge head based on some of the near-field samples that GE collected.

The studies that we have seen on PCB kinetics and even some of the sampling that we have done, the changes in PCB kinetics suggests more like 8 to 12 hours to reach equilibrium between particle and water. So we have got a mechanism that releases PCBs in the kinetics are all -- not screwed up, but they are not operating the way literature data would have suggested.

So we are coming around full circle in this. We are not able to show a risk to these losses to any great degree. We have got engineering estimates that said about 1 percent of solids seems to be about right, and I don't think we have got any data that says yet that that solids estimate is wrong. And we had in Phase 1, the ability at least to meet 1 percent at Waterford, with the intention of trying to lower that with further best engineering practices.

So we are kind of putting all this information together and saying this is still an achievable goal, and this is still a reasonable goal, but that number would go up if
you told me the inventory was going to be 300,000 kilograms instead of 200,000 kilograms, but I don't think we are going to come back and say that.

**MR. MAGAR:** Can you clarify the basis of what you are saying when you say that you are hard-pressed to see a change in risk? What is your basis of that or your understanding of no net change in risk?

**MR. GARVEY:** What we are looking at to assess risk is we are looking at the recovery curves. We have for the Lower Hudson -- we have forecast curves of no resuspension, fish improvement, as a result of the remedy. Okay. That was run in the original performance standard.

What we did in this scenario here was just to see the uptick relative to the MNA curve because that is what we could put together mathematically at the time, but we just looked at the uptick to how fast you came back to the MNA curve because, essentially, that is a measure of the time when the fish are going to be above the ideal circumstance of dredging the Upper Hudson with no resuspension.

So what we are seeing is that within 3 to 5 years of completion of the dredging, fish tissue concentrations are back on the recovery curve. It is still going to take a decade or two for those fish tissue concentrations to begin to achieve the remedial goals of whatever it is, a half a ppm, a tenth of a ppm, to allow certain numbers of fish meals per day, per year.

I don't know the exact dates, but the idea is that the time for the fish tissue to get to the tissue recovery point under the no resuspension scenario might be 10 years, let's just say in my example, and by dredging and releasing this material, you still get to
that point within 10 years because you have rejoined the ideal trajectory curve within 5.

MR. MAGAR: Do you refer to, for example, this figure?

MR. GARVEY: Yeah.

MR. MAGAR: Just to be clear for the record, you are saying that you both are coming together at around year 2020.

MR. GARVEY: Right.

MR. MAGAR: Then beyond 2010 and '20, none are doing better than MNR at all.

MR. GARVEY: There's two figures there. If you look at the upper figure, the upper figure is the original performance standard diagram. That's not what we read. So that is a lower level standard. There is a lower level loss, and there is a deviation between the MNA curve -- it is the green dashed line there -- and the recovery curves.

In the forecast that we ran just for this exercise, it was just to see how fast can we get back to MNA because we were still working through what we might think the recovery curve would be for the Lower Hudson because we hadn't yet figured out what we are going to have for an Upper Hudson load. We didn't have a recovery curve, a new idealized recovery curve. So we are just looking to see the period post completion of dredging is only a few years, 3 to 5 years.

So, by knowing that we get to MNA in 3 to 5 years, we can presumably, if we actually included the improvement from the remedy -- so it is not just go back to where the MNA curve was, but, in fact, go to where the improvement was because of the
remedy in the Upper River -- we would still get there within 3 to 5 years because, in very short order, it drops through the MNA curve and drops to the curve below.

One thing that is important to understand here is that the remedy for the Lower River was just intended, just to slowly -- I mean, the impacts of the remedy in the Upper Hudson for the improvements in the Lower River were not -- it is not with the intention of making grand improvements in the Lower River but rather just to speed it up in terms of its own natural recovery by discontinuing the load from upstream, basically source control.

So what we see is that even though we have a release from the dredging, within 2 to 3 years, we are back on the best scenario for source control for the Upper River. That is really the point, not that we don't have any improvement relative to MNA. Those were just example runs to test to see how fast we would come back to that curve.

**MR. FUGLEVAND:** So, Ed, kind of following that same question again, I am just trying to understand. So, right now, I think the number is around 120 kilograms per year, and there is no risk seen downstream from that release.

If you doubled it or tripled it, have you run the numbers? I guess you said you went up 50 percent and saw no release. Is there any reason not to increase that load until you see a risk?

**MR. GARVEY:** There is no reason not to do the exercise you suggest, no.

We start to talk about losing much larger fractions of the material to Lower River. There just is the question. Besides the models, there is just the person
sitting back there saying, "Do I really believe this calculation?"

MR. BRIDGES: Well, I guess, you know, in Phase 1 you wouldn't have believed perhaps that you had any basis for thinking you'd have three times more load.

MR. GARVEY: Right.

MR. BRIDGES: Now, I understand that you have got Phase 1 under your belt. So maybe now there is less reason to believe that you would have such a significant deviation from expectations, but you have already had that happen once. So it would seem to me that it is not a fairy tale sort of scenario, that it is actually something within the realm of recent experience.

I don't mean to interrupt, Paul.

MR. FUGLEVAND: I guess we will move on to another question.

Victor, do you have a --

MR. CONETTA: Can I just follow up on that?

MR. MAGAR: Mine is a little more of a mechanistic question right now.

Both teams have spent a great deal of time, clearly, going through and processing this vast amount of data, but I think we are challenged when two very different interpretations of the data come out.

I can appreciate some of the differences in interpretation. It is even more challenging if we are not sure if you even agree on the data.

So I will bring in an example. I am looking at EPA Slides 48 and 49 and GE Slides 36 and 37, which I think plot the same data. One is on a log-log curve, EPA's. One is on just a regular Cartesian plot, but we are plotting for Schuylererville or
Waterford. Oh, I should say 37 and 38 for GE’s, and that is Schuylerville and Waterford, respectively.

It would look like a much smaller dataset on the GE dataset, just a fraction of the data. Is this just compressed? Are these diamonds just overlaying each other? Are there entirely different datasets, or are these not really even comparable? I guess that goes to both.

And then it comes to the question of what is a more appropriate way of representing this, and I think we can make that determination, whether the log scale is meaningful or just the Cartesian scale is meaningful, but I want to see if you are even working with the same data.

**MR. CONNOLLY:** I guess I will answer for GE.

**MS. HOLLAND:** John, give your name.

**MR. CONNOLLY:** John Connolly. I will answer for GE.

What we have chosen to do is make comparisons for the same period of time within a year, so that we restrict the data to, in one case, just January; in the other case, we were looking at the high flow data, just the baseline data in March-April.

We do that because there is a very strong seasonal signal in the Hudson. So that in the wintertime, the baseline levels are very low. In the summertime, they are much higher.

So, for example, the baseline levels in the wintertime at Thompson Island Dam might be 10 nanograms per liter. In the summer, they might be 50 nanograms per liter, so five times higher.
MR. FUGLEVAND: John, one clarifying.

MR. CONNOLLY: Yes.

MR. FUGLEVAND: You said there is seasonable difference. Is it for the same flow, it could be five times difference? Is that what you are saying?

MR. CONNOLLY: Yes, for the same flow.

MR. FUGLEVAND: Okay.

MR. CONNOLLY: Five times difference.

Now, that is what we refer to as the diffusive load. It is the load coming out of sediments that is not related to resuspension.

Then, if we get a high flow event, we get additional load associated with erosion, but that additional load is coming in on top of this base. Because we have got a different base at different times of the year, you will see different responses in high flow events at different times of the year.

So, in order to make it as close an apple-to-apples comparison as we can, we do the comparisons for the same time of year only. So all of our comparisons only have data for the same time period, which is why it is less data than you see on some of the EPA comparisons.

MR. GARVEY: Okay. So, to speak to the structure of the figure you are looking at Victor, we would maintain that -- and, in fact, we advocated for that at the beginning -- that there is a strong seasonable signal to the water column concentration under base flow, but as flows arise and you begin to get into resuspension effects, we see more of a convergence of concentrations that we don't see, that a high flow in April is
really very different from a high flow in September, so long as the magnitudes are comparable.

When we start to talk about events that occur once every 2 to 3 years, your dataset gets really thin if you are looking at 25,000 CFS events, which is a one-in-3-year-type return frequency. So that your chances of having a high flow event in April in one 4-year period or 5-year period and then having one during the dredging period and they say I can only compare April to April, because that is when I have to have the high flow event, doesn't work.

So that is why we included all of the high flow data in that graph. So that is why we have many more points is that ours includes high flow data under the baseline condition, regardless of which month it occurred in.

**MS. HOLLAND:** Would you state your name again?

**MR. GARVEY:** Ed Garvey.

**MR. MAGAR:** John, when you are parsing this data, is the period that you are looking at, then -- it sounded like you said April. Is that going to be at the higher end or the lower end? Because that would suggest whether or not your data is going to be at a more or less conservative comparison to much higher concentrations. That is the point you are trying to make, that the concentrations went up.

**MR. CONNOLLY:** Yes. When we are restricting it to March-April data, we are looking at a period of time where we are nowhere near the maximum base flow levels. So, if you look at this in the summer -- so, for example, if you plotted on here the high flow event that occurred in July, end of June, early July 2006, the baseline levels
will be higher.

MR. MAGAR: So one could take from that, that there are -- well, if we see that there are increases in the load because of the dredging, that those increases or the differences might be very seasonable. Were those differences compressed in summer, or is everything proportionally higher? I would assume that you have looked at the summer data, and you have probably looked at every month of data.

MR. CONNOLLY: We have looked at every month of data, but, unfortunately, we don't have a post-dredging dataset now in the summer months.

But I would suspect based on this that the differences will not be as striking as you see here.

MR. MAGAR: Right.

MR. CONNOLLY: But they should persist.

MR. FUGLEVAND: Is that it, Victor?

MR. MAGAR: Yeah.


MR. HARTMAN: Okay. I've got a couple of softball questions here.

Neither presenter addressed the new volume estimates that came out in your last reports we got. I would just ask maybe both sides, what is the impact.

Starting with GE, what is kind of the impact on your new volume estimates; that is, like what is the time to complete the project? What other difficulties does that additional volume create?

MS. HOLLAND: Give your name again, please.
MR. HAGGARD: John Haggard.

There is uncertainty on the volume estimate, and as John had gone through, one of our big concerns has to do with the over-dredging and the amount of material that is going to generate.

We are pretty comfortable that it is going to be at least about 300,000 cubic yards if we follow the 9- and the 18-inch overcut.

Given what we had seen, what we were able to accomplish in Phase 1, that is going to be well over a year of dredging, and so that alone is going to create a lot of uncertainty and extra time, as we had mentioned earlier, unnecessary effort to get that material out.

I am not sure that goes exactly to your question.

In addition, obviously, that is going to impact resuspension and load. I do think there are these collateral impacts on taking the material out, but it is going to be more volume if we have to over-dredge again, which is going to translate into more time and more resuspension.

I hope that addresses your question.

MR. HARTMAN: Well, yeah, most of it. But what basically are you looking at? You are holding the 5-year plan? What is your present thinking on that?

MR. HAGGARD: Yeah. Our proposal is to maintain the 5-year schedule, and that is what EPA had committed to the communities to get the project done in 5 years and try to eliminate the impacts to the community, so that duration of time, we support the 5-year project.
MR. FOX:  Can I ask a question?

MR. FUGLEVAND:  Go ahead.

MR. CONNOLLY:  I have a follow-up. John Connolly.

MR. FUGLEVAND:  Just a second.  Do you want to go ahead, Rick?

Rick had a comment first.

MR. FOX:  You may be going here, John, but my question is, given the uncertainty in the DoC and the experience of Phase 1, how do you feel that impacts the volume of dredging, assuming that we had somewhat similar Engineering Performance Standards, not what you are proposing?

MR. CONNOLLY:  We have made estimates of that, extrapolating the Phase 1 experience to Phase 2, and have put together guesstimates of how much volume we think we may encounter.  It is on the order of 2.4 million cubic yards.

But I think the big issue, getting back to Greg's question, in terms of time, how long it would take to dredge that, it is our view that what will limit the rate at which we can dredge is PCB load, and that if we are trying to get a project done in 5 years that is a 2.4-million-cubic-yard project, we may not be able to accomplish that, not because we couldn't build a facility that could process that much material or put enough dredges in the river to take that much material out, but because we think if we dredge at that rate, we will put enough PCB in the water to below the annual load standards and force us to a slower rate of dredging.

MR. FUGLEVAND:  So a follow-up question to that. We talked just in earlier conversation with EPA, the possibility of increasing the load. Let's say the load
standard quadrupled. Now all of a sudden, we don't have that constraint anymore on productivity. What is your perspective from the Phase 1 experience, productivity, if you were constrained by load?

And kind of Greg's question, the volume has now grown to 2.4 or whatever the number is -- we have heard 2.8. We have heard 3.2. If you were to dredge the remaining material, how many cubic yards per year is that?

And from a productivity perspective, if the load standard increased, what is your perspective on it?

**MR. CONNOLLY:** If load didn't matter, then we are constrained by the improvements that we can make to the processing facility.

I would like John follow up too.

**MR. HAGGARD:** Yeah. I think what we have looked at and some of the changes that could be made to the processing facility, could we get it up to 75- to 100,000 cubic yards a year if you weren't worried about load at all -- a month -- I'm sorry. Yes, we think we could during the dredging season.

**MR. HARTMAN:** So, on the volume, you estimate the 2-point, whatever the number is. How does that back out to production per month, production per season?

**MR. HAGGARD:** You know, the 2.4 -- I mean, I think Benny summed it up earlier where we are not certain what the real mass and volume is.

One thing that we do know is that when you look at the uncertainty of the information we have in Phase 2 areas versus Phase 1 -- John, correct me if I am wrong -- in Phase 1, we had about 40-percent high-confidence areas and 60-percent low
confidence. That has flipped in Phase 2. So, Phase 2, we do have better certainty.

One of the things we keep coming back to and I think just from a practical standpoint of how do you contract, how do you get this done in an efficient way, one of the things that we would like to be able to do and we think it makes a lot of sense is to move through the residual standard and be able to say we know we can get 90 percent of the mass out in two very efficient cuts from a contracting standpoint. From an environmental standpoint, for certainty in how we design, what we need to do, boy, that adds just a tremendous amount of certainty and really does deal with a lot of uncertainties that we're dealing with.

MR. FUGLEVAND: So, then from a productivity perspective, kind of the current volume estimate you have, you say with some better certainty, you could do that in 5 years if the load standard was removed?

MR. HAGGARD: Theoretically, we could.

We think we can get it up to about 75 to 100 cubic yards a month, and what's? We have about 120-day, so 4 months. That would get us up to about 400,000 cubic yards a year.

MR. HARTMAN: Good. That is what I was looking for thanks. Here is a question.

MR. CONETTA: Is that also for EPA?

MR. FUGLEVAND: Greg, you asked EPA as well, I think.

MR. HARTMAN: I'm sorry. I'm sorry, guys. Get a reply from you.

MR. CONETTA: Just for a moment, I will try to answer.
MS. HOLLAND: Can you give your name again?

MR. CONETTA: Ben Conetta.

The interesting thing about the volume estimates that we are at now, they are actually back to what the ROD estimate was. So it is not an increased volume. A lot of our overcut is based -- or a lot of our estimate is based on that additional material that was not dredged out. So that over-dredged material we keep talking about is really basically almost included in that, mostly, if not all.

One of the things we can talk about in terms of the over-dredged material is let's get a better estimate of DoC. I think we are all for getting in and out in two passes. We would like to do it in one in most areas. We have no problem with that.

We think it has a very serious and a very strong impact on resuspension if we can get it out in one or two passes.

The other piece, we have our analysis that we added in the addendum about scow unloading. Even minor tweaks to that, if you added another unloading station, we could probably meet what you need to meet to get the project done.

We are not beholding to the 5 years. I would think in most remedial projects, the schedules are important, but they slip sometimes. This one slipped quite a few times already. So we think if it needs to go beyond a year, whether it be for productivity issues or maybe we have to slow up some dredging because of resuspension, I think that's important for us as well because, if we need to slow it up for resuspension, that will help guarantee the benefits of the remedy.

The last piece on -- I think that's it.
MR. FOX: I have a follow-up question.

I find it amazing that with the problems that we had with the coring data that we are not moving toward a proactive determination of DoC before we dredge. It just makes so much sense to me whether it's high-confidence or low-confidence area; it is certainly more in the low-confidence areas because I think even the standard for that, what we are calling high-confidence areas, may add some error into some of these areas or CUs where you have some pretty thick cuts.

And to me, a perspective of doing a good job of constraining DoC, John Kern presented the information saying that the data density is reasonable and good, and I think that would give us a situation where we could get into a one- or two-cut process and get through it quickly.

And further, we wouldn't -- because I also don't want to agree with a prescribed overcut on the dredging as well. So that is just my perspective on this. I am probably cutting the head on this, but it just is amazing that we wouldn't proactively determine the DoC.

MR. FUGLEVAND: So do you have a question for either party?

MR. FOX: I guess not.

[Laughter.]

MR. FUGLEVAND: Again, it would be interesting to hear from both EPA and GE on why not a proactive coring program before you start dredging.

Ben?

MR. CONETTA: Ben Conetta with EPA.
I don't know if we have to get John in, but I think there are high-confidence areas. I think John mentioned that even in those high-confidence areas, the nugget or the uncertainty is 9 inches.

Rick, just to go back, we are not prescribing over-dredging just to prescribe it. I mean, there is an uncertainty here that is not addressed, and if you don't address the uncertainty, you can't get the project done.

We are all for doing this proactively. We think --

MR. FOX: You don't know, though. You don't know because you really didn't take a crack at it.

On the Fox River, we hit pretty well on some of this stuff when we got the density right and the depth of contamination pretty close.

One comment that you made about over-dredging, usually over-dredging, from the experience I've had, is an allowance for the dredger that they get paid, so that they can ensure they hit a target elevation. It is usually not a prescription.

That is kind of where the line gets difficult for me.

MR. CONETTA: Okay. I understand that.

I mean, there were some tight tolerances out there, and if you look at the data --

MR. FOX: I have lots of comments on that too.

MR. CONETTA: You would be hard-pressed to say whether you were at the line or below the line, but I think some of that uncertainty needs to play into that DoC, in setting the DoC.
I think for the high-confidence areas and going forward, there's probably things we could do if we sat down together -- and, hopefully, we will after the peer review -- to figure it out a little bit more closely.

We are not adverse to having infill sampling at low-confidence areas. We are looking at that a little closer. Again, a lot of those low-confidence areas to us are probably bedrock areas, you may not be able to do better, or they are probably debris areas, and we need to know about them.

I cannot from my perspective say that I would want to go into this blindly without knowing that. I think we need to know it at least from a yearly perspective, if not total.

**MR. CONNOLLY:** Rick, I think we agree with your perspective that if we could go in there and sample ahead of time and figure out what the DoC is in low-confidence areas, that would be helpful.

The problem that we've got is that with the technology that we use, in most of these areas, we have made multiple attempts to try to get down below the contaminated layer and have not been able to.

So, whether or not we can develop a --

**MR. FOX:** John, do you feel that is due to debris strictly, or is it sampling issues, assuming no debris?

**MR. CONNOLLY:** We are uncertain. We are sure it is, certainly, debris in some areas. It may be hard bottom in other areas, and there may be some third reason as well.
But we are not certain that we can get a technology that we could use at a rate that we would need to do collect enough cores to be able to eliminate the uncertainty. 

But what we do know from Phase 1 is if we dredge to the cut line in low-confidence areas and then sample and develop a new cut line underneath that, we then do pretty well.

So one way to deal with the uncertainty is take off the top 2 feet or whatever it is to get to the cut line and then try sampling, and we seem to have much more success at that time. So that is an alternate way to think about this. It doesn't get you out of the box before you start, but it may be a way for us to get around our inability in the first instance to get to clean sediment, so we know where the bottom of the dredge is.

MR. HAGGARD: John Haggard. Just to add a couple things.

I am not sure what data density you are used to looking at, but we have cores on 80-foot centers throughout the river. They are really pretty decent data density.

In some of the areas, we did have recovery problems where we go back and retry, but I think we are maybe getting lost.

Yes, there is uncertainty, but it did not overwhelm us. We were able to manage the uncertainty, and I think, as John had alluded to, we went in and were able to, in most places, resample and on the second time through did very well.

So I think we have a better understanding of the uncertainty. There were a couple of the CUs, they were debris flows, right near the Old Dam, CU-1 in particular.

We don't think we are going to run into quite -- as we move away from the Old Dam
location, we are going to move away from those areas. We see that in the data we have in Phase 2 areas. So we have a reasonably good handle.

If there are better ways to sample, certainly we want to look at those, even if it is during the residual process where we go forward now. We are looking at some other techniques to use, so we will certainly work with the agency if you have ideas that we should consider.

But, again, I think it is not completely uncertain. We have a pretty good grasp of where the PCBs are. We were not overwhelmed by the depth of contamination issue, contrary to what you may be hearing from EPA.

We did have issues. We dealt with them. We moved on. We learned a lot. And I think the things that we proposed are really going to be improvements. To be able to go in, get these areas, close them out, that is going to help us control the load here. Ultimately, it comes back to the load. Can we keep that load down? We think we can by the approach we were talking about for residuals.

**MR. CONNOLLY:** Just a statistic that might help you, after the second pass in Phase 1, 90 percent of the areas had no longer had any PCB inventory. So, after two passes, we were down to uncertainty really having an issue for us in only 11 percent of the area in Phase 1.

So, as John said, it was not an overwhelming problem.

**MR. FUGLEVAND:** In reading the documents, you certainly get the sense that it was overwhelming, and one of the perspectives is if you look at all the COs that are open -- and the impression we got from both presentations is they were open
because of uncertainty on DoC. So, although you mustered the forces to make it happen, it still resulted in leaving CO areas open.

It is kind of like the issue of you take and cut your arm open and then wave it around in a diseased room for 3 weeks. You have a higher chance of an infection than if you put a Band-Aid on it right away.

So the sense we have is that leaving this thing open, anything we can do to close it sooner -- and you have spoken to the same thing -- and so part of it almost seems like a contradiction. It says we have to close them as soon as possible, but you are saying what we are going to do first is we are going to open them up, and then go through this 1- to 2- to 3-week process to go in and see how much we have to go further.

So we ask ourselves, is there any reason, less debris down-field, improved sampling techniques, to fill in the data in places, so that from a cost perspective, if nothing else, the contractor is through once and done, rather than have to mobilize?

So it almost feels like a double message, and I know that is not intended, but you can see how we could misconceive that. I don't think opening it up and then sampling is a way to close it maybe the fastest.

So, if you want to respond -- and let's give Ben a chance as well. So, if you both kind of want -- this is an important issue for us. I think it is for you as well, this DoC issue, recontamination, opened areas. It all seems to tie together, and we are wrestling with it just like you. So I think some discussion on it is helpful for us as well as you.

MR. CONNOLLY: Right. And I think the technology exists. I think
you can get good cores.

**MR. HAGGARD:** Again, if there are -- John Haggard here.

If there are ideas that we have for going in proactively into areas, low-confidence areas, as an example, to better delineate up front, that certainly allows us to get in, get out, close that scab, as you say.

Part of what we learn, though, is we need a more efficient, for lack of a better phrase, bureaucratic process of going through, interpreting data. This is an enormous amount of very interesting data that allows a lot of people to -- for a very long time, unfortunately. That doesn't help the speed of the process.

So, if we are able, if we have simpler rules, we have better determination, we have better certainty that we can be done and not go after small residual amounts of varied non-bioavailable PCBs, I think that is where we all want it to go.

**MR. CONETTA:** Ben Conetta with EPA.

We think it is a very big impact, obviously, as you all do. We do not want those CUs open all summer again. They have very definitive impacts probably that we haven't quantified yet to the loads.

We, as GE would like to do, would love to get out in one or two passes, but we need to get there in a reasonable scientific way to understand what the DoC is and adjust that and go in, make your cut, and then sample again and see if we have gotten what we need to get out.

I think the analysis on the residual node locations that we put in our addendum sort of looks at while residuals seem to be the issue that I think GE keeps
saying is constraining them, we looked at it from the point of it allowed us to get the
inventory out that we needed to that wasn't identified.

    So there is a story there that needs to be balanced, and we need to figure
out what the best answer is. We want to get out in one or two passes.

**MR. HARTMAN:** I got another one, another question.

**MR. FUGLEVAND:** Greg?

**MR. HARTMAN:** Just another quick question. I am not sure what page.

I believe it is page 38 of your presentation. Page 38, you identify the locations of a
residual air removal.

**MR. CONETTA:** Yes.

**MS. HOLLAND:** Is this in EPA's presentation?

**MR. HARTMAN:** Yes. EPA's presentation.

I know I think this would probably be better answered by GE, but the
question I have on that is, how was the decision made to dig the 6 inches or another 6
inches? Is that 35 percent? I interpret that as redredging determined that you took a
6-inch sample or you have a shallow sample that you are now trying to remove.

This is your slide. I will ask you first.

**MR. CONETTA:** The residuals were laid out such that after you did
your first round of dredging, you would take a 6-inch layer, and you would push the core
down to, I believe, 2 feet and collect the other segments.

The understanding would have been that digging to your cut line, you
would likely have been no longer in inventory.
So, when we are talking about 30 percent of these areas requiring -- and I think that is what you said -- a residual layer, that was developed by looking at what the core results were, if they were within a certain -- I believe it is 3 to 6 ppm for the 6-inch?

MR. GARVEY: For the 6-inch.

MR. CONETTA: To do the residual level.

MR. GARVEY: Right. This is Ed Garvey.

The criteria to analyze below the 6-inch interval was dependent upon the concentrations found in the overall -- right, I understand, but when you had a residual layer, when you didn't analyze further or you didn't remove further, it was based on the average of the whole CU. So, if the average of the whole CU came out low enough, you might only have to go 6 inches on the samples that were non-compliant.

Other cases, if the average was above 6 ppm, you would have to do -- sorry -- if the medium was about 6 ppm, you would have to do the whole CU. If the average was above 6 ppm, you would have to do a certain number of load, non-compliant loads, and analyze more than one segment.

But I think to try to finalize the answer your question, the definition of a 6-inch layer was that that is all the contaminated material that was identified at the location, and that material had to come out in order to bring the average of the overall CU down to about 1 ppm. So, if the value was too high in the average of 40 nodes, it was the CU to leave it there, and you had to take it out in order to bring the average down.

MR. HARTMAN: Okay. I think my question is just a little bit simpler than that. Simply, was that additional 6 inches dredged based on a post-dredge
sampling?

MR. GARVEY: Yes.

MR. HARTMAN: It was always based on a post-dredge sampling?

MR. GARVEY: Always based on a post-dredge sampling.

MR. HARTMAN: And how much of a sample were you taking when you determined that extra 6 inches?

MR. GARVEY: They were analyzed in 6-inch intervals. So you would have a core 2-feet long, and you had no greater resolution than 6 inches. So it was either 6 inches, don't dredge, 6 inches, 12 inches, 18 inches.

MR. HARTMAN: Okay.

MR. GARVEY: That was the resolution.

MR. HARTMAN: That was it.

Anything different, John?

[No response.]

MR. HARTMAN: Okay. Thank you.

MR. FUGLEVAND: So it is right about 3:30. So, this time, we have got a 15-minute break, to be back at 3:45.

[Break taken.]

Panel Deliberations (continued)

MS. HOLLAND: Okay, Paul.

MR. FUGLEVAND: So we would like to move into a discussion that is more specific to residuals and not just within the dredging footprint, but the near-field
stuff around the dredge itself.

I think, Todd, you are going to take the lead on some questioning there.

**MR. BRIDGES:** Yeah.

So I guess maybe I will start with asking for EPA maybe to clarify or provide some additional information, and then GE can pipe in as appropriate.

As far as I can interpret what the EPA is proposing as a residual standard for Phase 2, the concept of residual is still restricted to basically what is in the dredge prism, either as what I would call undisturbed inventory or undisturbed residuals or generated residuals, something that the dredge did and it fell back in the prism somewhere.

I would have to still declare that one of my primary areas of concern with respect to this project is not so much with what is happening within the dredge prism, even though I understand what the practicality of that is, how much escapes, if you will, that prism, and my rationale, if it is not obvious for why I am concerned about that, is because residual that is generated from redeposition of resuspended sediment that is contaminated could have really long-term effects on recovery rates for the river.

I guess the first part of my first question to EPA is maybe if you could offer some clarification to me as to what your proposal is now or where your thinking is going with respect to the residual standard and whether or not it includes or will include consideration of generated residual, if you will, this residual that is outside the dredge prism through resuspension. I guess you maybe could consider that within the resuspension standard.
You know one specific example of that would be this graph here where you guys redid some modeling on the lower graph on that page 8 of your PowerPoints. Does that modeling scenario include exposure to residual outside the dredge prism? Is that a pathway that is even included within that modeling scenario or not? You know which one I am talking about?

MR. GARVEY: Yes, I do.

MR. BRIDGES: I think the resuspension standard, as currently set up, you basically are concerned about short-term impacts, but if you have significant contaminated sediment that is being deposited outside your dredge prisms, which that area is basically the majority of the river in Phase 2, right? Like 85 percent of the river is outside of your dredge prisms or something like that in Phase 2? So that is a lot of area. Maybe I will stop there for now and see if you can respond to that.

MR. GARVEY: Okay. This is Ed Garvey. Let me respond to two things.

The graph that you have there on page 8, that's the Lower Hudson fish tissue concentrations. There is no dredging in the Lower Hudson. So, strictly speaking, that is all load and, therefore, basically mass that simply spread across the Lower Hudson River Valley.

MR. BRIDGES: So, just to clarify that, you don't expect any particulate PCB to be redeposited in the Lower Hudson?

MR. GARVEY: No, the model has -- it is a mechanistic model, so it has deposition, settling, vaporation. All those factors are in the model, so that the loads that
come over the Dam at Troy are incorporated in the Lower River's mechanisms of solids transported and the like.

**MR. BRIDGES:** Okay.

**MR. GARVEY:** My interpretation of what the model output says basically is that the loads that come over water from the Dam of Troy from the Upper River don't create a large sediment inventory in the Lower River. The majority of them travel through either evaporating or simply carried out with the flow in water.

**MR. BRIDGES:** Can you tell me with respect to this modeling scenario, then, what are the rates of residual generation outside the dredge prisms that are included within this modeling scenario? I mean, are you assuming what --

**MR. GARVEY:** We are talking past each other a little bit. That model is run starting -- it is disconnected from the Upper River. So understand that -- let me just draw quickly a picture.

In the Thompson Island Pool, we are going to be dredging 307 acres and removing two-thirds, I think, of the inventory that we're targeted to remove. Okay. But that model -- oh. In terms of the surface area of the Thompson Island Pool, it is about 60 percent, 307 acres of about 520 or 130 acres of the Thompson Island Pool surface. So about 60 percent of the Thompson Island Pool surface is going to be dredged.

But the scenario you are looking at there ignores all of the processes that occur between Waterford and Schuylerville or, for that matter, Thompson Island. It just says we run the operation in the Thompson Island Pool, let” just say for the moment in the Upper Hudson, so as to deliver 600 kilograms to the Lower River at the rate of about
100 kilograms a year. The 600-kilogram scenario over 6 years is about 100 kilograms per year. So the whole Upper River is effectively disconnected from that model run.

We just set Waterford at 600 kilograms over baseline, plus the allowance for the fixed baseline during the study period, basically setting the loads at Waterford at a given rate for the 6-year period of dredging and then after that letting it simply return to the original MNA curve that we had for the Upper River.

MR. BRIDGES: Okay. So I understand, this includes no generated residual. It is not really relevant --

MR. GARVEY: Right. It is not relevant.

MR. BRIDGES: -- because it is not considered in the modeling scenario at all.

MR. GARVEY: Right, right.

MR. BRIDGES: So back up then to the Upper River.

MR. GARVEY: Okay. Now, in the Upper River, we have -- I mean to recognize that we are -- the focus of the dredging is the Thompson Island Pool in terms of aerial extent and the like.

I realize what you are saying is that we are only dredging 13 or 14 percent of the Upper Hudson's total surface area, so the other 86 or so percent of it is untouched, but, locally, the Thompson Island Pool, we are doing 60 percent of the surface area. So local residual fallout, at least 60 percent of it in theory, is covered by the fact that you are dredging 60 percent of the Thompson Island Pool.

As we move downstream, obviously the percentages drop off a lot. I don't
remember the exact percentage, but I think in the Schuylerville Pool, I think it is around
15 percent, but it is a small number. It is nothing on the scale of the Thompson Island
Pool, and it is smaller still in River Section 3.

So there, arguably, whatever you do spill and does end up outside of your
hole, isn't -- is, you know, spread across the rest of the area. Those areas are large and
the majority of the areas that you are going to impacting, so to speak, are going to be
down there.

The question is with the small scale of dredging down there, even though
you may impact a large area, you may not have a large impact to it because you are
spreading a much smaller dredging volume than losing over a much larger area. So it
kind counter-balances. It is not as if we lose the same percentage. We do the majority of
the loss in the upper most portion of the river in some sense between the dredge head and
the first dam, if you will.

**MR. BRIDGES:** Well, I don't know if I follow you because my
understanding is that the majority of the dredging by volume has yet to happen, right?

**MR. GARVEY:** Yes. Yes.

**MR. BRIDGES:** Right. The majority of that volume mass that is being
dredged is being taken from a relatively small aerial percentage of the river.

**MR. GARVEY:** That's right.

**MR. BRIDGES:** So I guess I still have the same question. Even if your
loss rates, which I guess I don't know if there is any convergence on how much you are
losing -- I guess GE presented a number of 3 percent, so let's say the number is between
zero and 3 for purposes of argument, and if you are dredging 2 million yards, give or take

--

**MR. GARVEY:** Right.

**MR. BRIDGES:** -- that's a significant amount of particulates that are going up someplace --

**MR. GARVEY:** Right. Right.

**MR. BRIDGES:** -- and potentially redepositing on 85 percent of the bottom?

**MR. GARVEY:** Right.

**MR. BRIDGES:** So my question is whether or not EPA expects, has now or is expecting to consider the potential for this generated residual in their standard and how you are going to deal with that.

**MR. GARVEY:** I can tell you that there isn't any provision for it.

**MR. BRIDGES:** There is none?

**MR. GARVEY:** No. There is none. Okay. It is all strictly within the footprint of the dredging prism. There is not any at this point.

Whether or not the agency should consider it is, I guess -- I do not want to speak for Ben -- but there is not anything in there. I guess the only other piece of this is that if you think there is some relationship between where the material falls out and where you dredge it, so that you could say that most of the fallout occurs within the distance closest to the location that you are dredging, and then that is where the advantage of dredging 60 percent of the Thompson Island Pool comes in, is that you are
losing it over areas that you are going to dredge again.

But once you are passed the Schuylerville and Thompson Island Dam, your scenario, as you pose it is, you know, I would agree with you there. I think it makes it over the Schuylerville, to Waterford, to Thompson Island Dam, and this settles. It is going to largely settle across the board. It may not settle exclusively in the area that we are dredging. Even if it a disproportionate settling in the areas where we are dredging, the footprint is still small enough that I think we have argued that those areas outside of the dredging footprint that will be impacted, but that is not being considered.

MR. FUGLEVAND: Todd, can I ask a question?

MR. CONETTA: Just as a follow up -- I am sorry, Paul. Excuse me -- to Todd's question about redistribution, obviously it was an issue that we wanted to study during Phase 1.

We had some studies set up for it. They did not occur, not the way we needed them to occur. We can certainly look at the question. I think it is an important question. We also need to look at it in terms of what is actually being resuspended, redistributed by the dredging process but also in relation to what naturally occurs out in the river. There is a lot of vessel traffic out there that does redistribute sediment. I do not think that we can forget that when we do our evaluation. It is an active river body.

MR. BRIDGES: Right. But, on that point, I guess you are talking about river traffic unrelated to dredging activity.

But the thing that distinguishes a resuspension from dredging as opposed to the regular river traffic is that you are reaching down presumably to layers of
contamination that are considerably greater than what might be disturbed by a passing
vessel under normal conditions. So your potential to influence the surface concentration
profile is much greater, potentially, in my mind.

So I understand what you are saying, but I am getting the sense that right
now the EPA does not really consider this pathway to be significant or important at all
because you don't have a standard for it.

MR. CONETTA: It wasn't part of the standard. It was part of trying to
study and figure out what kind of impact it had or would have. I do not think we are
there right now because the study that we designed was not able to be carried out.

Is it something we can look for in Phase 2 to better quantify? Absolutely.

I think it is important to look at. I am not trying to say we shouldn't do it. The question
is, is what we have done really representative of the redistribution of what is going on in
the river. We have questions about that.

MR. BRIDGES: So maybe just to sum what you are saying, you don't
feel you have sufficient information now to incorporate this into a standard at this point.

So you are hoping that some information will be revealed over time to allow you to do
that?

MR. GARVEY: It was explicitly a requirement in the standard to study
the question that you raise, and GE attempted to do that to some extent. This was the
problem that they didn't deploy traps before and after dredging. So we only have data
after the dredging. They did some additional coring which we would argue didn't address
the problem as rigorously as it needed to be.
In fact, I think we have talked internally about proposing to do such a study in the interim because, in fact, if it is a real problem there is no reason we can't go out and measure it this year. Right? I mean there is no -- nothing magic about having to do it immediately after the dredging. If there has really been a change in the superficial sediment concentrations downstream, it is certainly possible to go down and do it.

So we have talked about it, but the standard did recognize it. But there is -- I would still say that we do not have enough information to set a standard. But we did recognize it and did want to study it during Phase 1. It just didn't pan out the way — it wasn't implemented the way we hoped it would be.

MR. GIBSON: Bob Gibson, GE.

If I could just provide some additional information on the special studies that EPA is alluding to.

You heard from two folks who were not up during the dredging project, and the folks at this table were there every day. The program that he is referring to that we, quote/unquote, did not implement or did not implement properly was being laid out, as agreed to and approved by EPA, in advance of dredging, and we had a situation that we referred to in the February session called "Hudson Luck," where we had a high flow event that occurred the day after we started dredging, and so during that course of a 3-day period, the flows rose. We lost control of a barge, and in the process of riding that barge, the barge moved over the area where the baseline sediment traps were located. And guess what, the next time we went to look for them, they were gone. All right. So, to suggest that we somehow did not collect that data, is inappropriate.
What we do have is a great deal of information, albeit collected based on how things played out, but a good set of data that is suggestive that the issue that Todd is referring to is a significant issue that we need to address. It is not perfectly collected, as laid out in the QAP, but it needs to be addressed, and we need to hear from the EPA as to what they think about the data that was collected.

**MR. CONETTA:** Can I just follow up?

**MR. FUGLEVAND:** Let me ask maybe a question then to help me kind of understand.

When you laid out the dredge areas in Phase 2 and it is not as continuous, what was the primary criteria that was used to identify those areas in Phase 2, the dredge areas?

**MR. HAGGARD:** The criteria for defining the dredge area in Phase 2?

**MR. FUGLEVAND:** Yes.

**MR. HAGGARD:** Similar to what was the criteria in Phase 1. It was a mass per-unit area, so we would sample on the grid. We do mass per-unit area, surface sediment concentrations. If certain levels were triggered then those areas would be defined as dredge areas.

**MR. FUGLEVAND:** And what were the trigger numbers?

**MR. HAGGARD:** The 3 grams per meters cube or squared in the Thompson Island Pool, and then it went to 10 grams per meter squared off the Thompson Island Pool. And then it was a 5, John?

**MR. CONNOLLY:** 10 and 30.
MR. HAGGARD: And 10 and 30 in surface sediment.

MR. FUGLEVAND: And how do those convert to parts per million?

MR. HAGGARD: Let me turn that over to John.

[Laughter.]

MR. CONNOLLY: 3 grams per meter squared is roughly equivalent to having 10 parts per million of Tri+ PCB in the top foot, because 1 foot sediment in 10 parts per million gets you approximately 3 grams per meter squared.

MR. FUGLEVAND: So would you sample the top foot?

MR. CONNOLLY: No.

MR. FUGLEVAND: Was that the compliance depth, or what was the compliance depth?

MR. CONNOLLY: No. We sampled the entire column of PCB. So, when we were computing mass per-unit area, we integrated throughout the entire column of sediment down to clean sediment to determine how much PCB mass sat in that footprint.

So it is the best estimate that we have of the total mass that was there. Because of the low-confidence cores and what we found out in Phase 1, it turns out to be an underestimate of the total that was there, but it is an estimate, and it was the basis for setting the prisms.

MR. FUGLEVAND: So, then you could have, in essence, clean sediment at the surface and highly elevated down a foot, and that would trigger action, if the concentration in total meets your grams per square centimeter basis. So it wasn't a
point of compliance at the surface. It was a mass per-unit area integrated over the full
depth?

MR. CONNOLLY: It was mass per-unit area integrated over the full
depth and/or concentration greater than 10 anywhere in the top foot.

So you could have clean at the surface all the way down to a foot. If you
exceeded 3 grams per meter squared, you were going to dredge it. You could have zero
at the surface and 11 at 10 to 12 inches, and you would have dredged it.

MR. FUGLEVAND: So let me just confirm back. So, if you had a
concentration in milligrams per kilogram greater than 10, probably where you were
taking 2-inch samples --

MR. CONNOLLY: No. We took zero to 2-inch and then either 2 to 6, 2
to 12 or 2 to 24, depending upon location.

MR. FUGLEVAND: So then you would run that analysis, and if you are
over a criteria, that would define it as a dredge area, and is there a second criteria that if
the mass integrated over the full depth was greater, the number, that also triggered a
cleanup area?

MR. CONNOLLY: Yes.

MR. FUGLEVAND: So is there any sense of what were the typical
surface concentrations in the cleanup areas? I mean, what were the types of trends in the
areas where you are digging versus areas that are outside of that?

MR. CONNOLLY: Yeah. We have actually got the numbers.

I don't know if you recall them, John.
We don't have them at our fingertips, but we can look them up. We have got them on the computer, and I can let you know what kind of concentrations they were.

MR. FUGLEVAND: Well, because the basis of the question is that if you have it in a generated residual outside of the dredge footprint, then what would it take to trigger that, converting that into a dredge area, if you were to apply that? I guess I would say if you had more than 10 parts per million outside the footprint, you might say that it could be considered as a possible area needing remediation and probably more likely than a mass because it is just a thin layer.

MR. CONNOLLY: Yes. We have not done that calculation, so I do not know quite how to answer that.

MR. FUGLEVAND: Okay.

So any comments on that? Ben, anything?

MR. CONETTA: I just wanted to know -- obviously, I think we may have touched on a touchy subject with Bob about the sediment traps. I don't think we implied that it was purposely done or it wasn't carried out purposely.

We understand what happened, but the fact of the matter is that the study was not able to be conducted the way we had set it out. That has no effect on GE.

Hudson Luck continues to this day, as Bob says, because we saw high flow samples not longer than 2 weeks ago then.

Ed has got some, I think, numbers for concentrations.

MR. GARVEY: The average of the those numbers of 10 and 10 grams per square meter or 3 grams a square meter and 10 and 3 ppm or 10 and 30 ppm are all
based on Tri+. So let's just make that first distinction.

Inside the Thompson Island Pool, the average concentration in the area that is being dredged is around 20 to 25 ppm Tri+.

**MR. FUGLEVAND:** Is that at the surface or at full depth?

**MR. GARVEY:** That is zero to 2 inch.

The average concentration in the areas that are not being dredged is on the order of about 4 ppm, and there it is zero to 2 inches.

**MR. FUGLEVAND:** What about in Phase 2, the first or second year?

Do you have any numbers?

**MR. GARVEY:** Not off the top of my head.

**MR. FUGLEVAND:** Okay.

**MR. GARVEY:** Actually, I do. It is about the same. It is about 20 to 25 ppm all the way down the river, Section 1, 2 and 3, all about 20 to 25 ppm Tri+. River Section 3, that's a little bit lower, more like 10 ppm. But the River Section 1 and 2, it is about 20, 25 ppm Tri+, zero to 2 inches in the areas being dredged. The areas outside is 4, and then it declines further probably closer to 2 down River Sections 2 and 3.

**MR. FUGLEVAND:** And not being a Tri+ person, is it like a factor of 3 typically, the totals, somewhere in there, 2.5 to 3?

**MR. GARVEY:** Between 2 and 3, yes.

**MR. MAGAR:** What is the area being dredged in acres for Phase 2?

Does anybody know that?

**MR. GARVEY:** It is roughly -- we dredged 50 acres nominally in Phase
1. So I believe the overall footprint is just around 500 acres. So it is about 450 acres, maybe 460 acres.

**MS. BENAMAN:** It is 440 in Phase 2. I am Jennifer Benaman. It is 440 acres, in round numbers, for Phase 2. That includes the CUs that were in Phase 1 that we didn't dredge this year or last year.

**MR. BRIDGES:** Just one more follow-up, then, with EPA on this point. Well, first I think it is fair to say or to conclude that losses or the generation of resuspended particles is not nil, not anywhere close to nil.

So that makes me wonder. So what is the approach? I mean, are you waiting for us to provide sage advice about how to incorporate this into the residual standard, or if we don't -- I just don't know where -- if I take the standards that you have put forward so far and it is not a part of it at all, that implies to me that you don't consider it to be important or significant or worth considering, but I am just trying to understand where your thinking is going. Is it something you intend to address between now and next year you dredge, or you are waiting for us to --

**MR. CONETTA:** I am not quite sure how to answer that right now, Todd.

The simple thing I can say -- or not so simple is that, I mean, I think it is something we need to look at. We agree with you, there is some redeposition.

We looked at the data, though. The TSS data seems very low. Do we know where it exactly went? I think it requires some study on our part and GE's part to come up with a good plan to understand what is going on in the river system. I don't
think we have that right now.

So at this point, I don't know what to --

**MR. WOLFE:** This is John Wolfe.

Todd, I wanted to talk about how this was handled in the modeling that was done for the performance standards.

You were really asking about near-field redeposition of solids and chemicals, and those were explicitly represented, actually the work Don Hayes did with a model that treated the dispersion of solids and chemicals for the first mile downstream of the dredge head.

And then the far-field modeling that was done by HUDTOX, it picked it up at that point as input to the long-term fate transport model. The losses in the first mile were on the order of 75 percent. So those were actually represented. The chemical loss was represented as an input to HUDTOX for those upstream cells.

The issue, then, of monitoring and modeling at Waterford or the other monitoring points is simply a question of where it would be measured. The losses between the dredge head and those monitoring points were not neglected. They were mechanistically represented in some of the modeling output that you saw.

The 350-nanogram-per-liter simulation that we did was part of the performance standards modeling.

My point is that the near-field redeposition was not neglected at all in the development of the past performance standards, and those modeling runs that were done are part of our thinking in moving ahead and thinking about new standards.
MR. BRIDGES: So what you are saying, John, is that it was summed up in the resuspension standard, though it was not explicitly incorporated or --

MR. WOLFE: What was modeled to be seen at Waterford and what has been monitored at Waterford includes the impacts of near-field redeposition.

MR. BRIDGES: So what was the loss rate, then, in that modeling?

MR. WOLFE: It was on the order of three-quarters in the first --

MR. BRIDGES: On the order of what?

MR. WOLFE: On the order of 75 percent in the first mile downstream of the dredge head.

MR. BRIDGES: No, I am talking about how much, how many particles, how much mass of particles that were intended to be dredged were removed from the prism or resuspended and then deposited in the near-field.

MR. MAGAR: Can I try and rephrase it?

MR. WOLFE: Yeah.

MR. MAGAR: What you are asking, Todd, then -- and this is a question I would be interested in -- is we were told now that we have now some better modeling techniques, and we might be able to have a better estimate. What is our estimate of the change in surface sediment concentrations based on this redeposition process?

I think there is a short-term change and a long-term change and there is a near-field change. I would imagine it is somewhat graduated from where you are dredging all the way down to Waterford and beyond, but I think there is a lot of discussion about mass loading in grams per day or kilograms per year or total kilograms.
which are metrics that, in our field, I think you can all appreciate are very difficult for us to work with.

I just have no idea what a 1,000 grams is and how to relate to that, but I could make a determination based on a change in surface sediment concentration of a milligram per kilogram, 10 milligrams per kilogram or some change.

So I would be interested if both of you -- I don't know if that satisfies what you are looking for, Todd -- could speak to that and we have an estimate. I realize there is a limitation once measured.

MR. WOLFE: Well, I remember some of those assumed rates from -- it's attachment D to the performance standards. There was one scenario that released enough to achieve 600 grams per day, export at Waterford, and the release at the dredge head, I believe, was 2,200 grams per day. And as a percent of what was removed, the percentages ran as high as 3, 4, and 5 percent at the dredge head.

MR. MAGAR: Did you guys understand -- I mean, you have got a mass leaving the dredge prism. You take a measured mass at the Thompson Island Pool, a measured mass at Waterford. You have got a loss between those two. If that is settled out and distributed -- and I have done some of these calculations myself, but they are not nearly as sophisticated as a model -- but what would be the net change in net surface sediment concentration because of that? I think that data is there.

MR. FUGLEVAND: I think, Victor, backing up on that, you talked earlier, John, about 2,800 kilograms, I think, being lost in this redeposition in basically the near-field pool, and so 2,800 kilograms, how does that change surface sediment
concentration?

MR. CONNOLLY: This is John Connolly.

We did two calculations. One was if that 2,800 kilograms was deposited in all the non-dredged areas of the river, so clearly a worst-case scenario. It would raise concentrations five times in the top 2 inches.

MR. FUGLEVAND: And five times?

MR. CONNOLLY: Five times what the concentrations are at the end of dredging.

MR. FUGLEVAND: So if the areas are currently four --

MR. CONNOLLY: If the areas are currently four --

MR. FUGLEVAND: -- they would go up to 20?

MR. CONNOLLY: -- it would raise it up to 20.

Now, the areas are not four. They are actually less than four because this is all inside the model. So, by 2016, the model has predicted some natural recovery. So I don't know what the number is, but perhaps it is 2, and so it goes to 10.

The other alternative is we looked at -- suppose all of this redeposited 2,800 winds up in depositional areas, instead of everywhere, so it is now concentrating in a much smaller area, and 30 percent of that gets dredged because we dredge 30 percent of the fine sediments in the river, so that is roughly 30 percent of the depositional areas. So we say only 70 percent of the 2,800 actually winds up in the river in those depositional areas. That raises the concentration of the top 2 inches by 14 times.

MR. FUGLEVAND: So 14 times up to --
MR. CONNOLLY: From whatever we were calculating in the depositional areas at the end of dredging, and I don't know what that number is, but we could find that out. The outcome is that it has a big impact in terms of the average concentration in the areas that it would deposit into.

MR. MAGAR: Can you help me out, John, with that with what -- and if not today, tomorrow -- what those areas are? What would the areas be for --

MR. CONNOLLY: Sure.

MR. MAGAR: -- the depositional zones, what would the non-dredge areas be? In acres or something like that. I ran through this and came up with -- well, I took 34 miles and estimated 200-feet wide and a centimeter of sediment, and I didn't get numbers that were nearly that high.

So, either we are dividing -- we have a much different number in the denominator or we are making very different assumptions, and I realize that that would be -- of mine would be a very simplistic and low-end estimate.

MR. CONNOLLY: Sure. Yeah, we will get you the details behind those numbers. In fact, we can probably get a sheet of paper together and distribute it to you guys, so you can see how we actually calculate those numbers.

MR. MAGAR: And I think I would like with that, too, if we could comment on, then, what is the expectation of a depositional process, if these are depositional areas, and do you have through historical or past geochronological coring that you have done, do we know depositional rates with some reasonable estimate in this river, because I think that is another question of just what is the long-term fate of this
material, as we are looking at things in the first year, but as there are ongoing deposition.

MR. CONNOLLY: The deposition, obviously, as you know, varies everywhere.

MR. MAGAR: Right.

MR. CONNOLLY: EPA took a number of high-resolution cores and radio-dated them, so we have deposition rates at various locations.

That is one of the calibration targets for our modeling, for us to look at our long-term computed deposition rates and how do they compare to the measured values at these locations, and we actually do very well.

The model computes an average deposition rate in the Thompson Island Pool in the depositional areas of about half-a-centimeter a year. So that is sort of a good number maybe just to kind of carry around, but for depositional areas, about half-a-centimeter a year of burial is going.

MR. MAGAR: Okay. Thank you.

MR. GARVEY: I guess I had one more point to offer on that.

MS. HOLLAND: Please give your name again.

MR. GARVEY: I'm sorry. This is Ed Garvey.

Just one of the points to remember is that PCBs don't get added to the bottom of the river as a pure phase. They don't add oil to the particles on the bottom, but the only way to the PCBs on the bottom of the river, basically, is to bring them down with particles. So you bring a solid phase with it, and depending upon the concentration on the solids, you may find that you are not particularly different because you are adding
a half-a-centimeter per year, but you may have additional PCB in that material. but it may
not come in at -- it is not coming in effectively at a pure phase. You are not just diluting
with the existing layer. You are adding it with a layer of solid you deliver, so there is
that additional factor.

I bring that out because, if you remember from some of the slides shown
earlier, where I talked about the average suspended matter at Thompson Island and at
Waterford and at Schuylerville, at Thompson Island and Waterford in particular, at
Waterford you could see that the suspended matter was carried at least from the higher
flow conditions when you would have been depositing material. Let's say some of the
depositional areas was between 1 and 2 ppm, which 2 ppm is the maximum, except for
the three outliers I identified.

So, while you may deliver a lot of PCB to the surface, if you bring it at 2
ppm, because you are bringing a lot of solids along with it, you really haven't changed the
surface concentration all that much.

If you are adding a lot of solids at 2 ppm, yeah, you have increased the
inventory, but you may not have increased the surface concentration.

I am not saying that applies in every example. Certainly, the stuff that is
coming off of the dredge head is not going to be at 2 ppm. But as you move downstream
or if you re-move the material and so on, it becomes more like a regular particle.

**MR. MAGAR:** But, Ed, you have recognized that you have had some -- I
don't know if I got the numbers right -- like 200 kilograms that were lost, that are
unaccounted for. You had a change in concentration from upstream to downstream.
MR. GARVEY: Right.

MR. MAGAR: So, in my understanding, there is two fates of that. It is volatilized out or it's settled.

MR. GARVEY: Right.

MR. MAGAR: I don't know if there is another one.

MR. GARVEY: No, no.

MR. MAGAR: Okay. But even if we are saying that all that settled and we will take this estimate of half-a-centimeter per year, which is a fairly thin amount, then you could have an estimate at least of what the concentration would be.

I mean, I think you have got the numbers now. You have real numbers that we did not have --

MR. GARVEY: Right.

MR. MAGAR: -- several years ago where we were kind of predicting what the mass load would be and kind of -- I don't want to say guessing, but somewhat, you know. So now we have got a real measured loss that went either to volatilize or it went down into the sediment.

MR. GARVEY: Agreed.

And there is a twist to this, which is actually part of the confusion in this or one our concerns or quandary, maybe is the better word, and that is that we don't see solid loads change very much as we move downstream. In fact, we see solids gain during the Phase 1 dredging as we moved downstream from Thompson Island to Schuylerville or Waterford. The solid load increases, yet we lose a fractions of PCB that we are talking
So now where the quandary is, how do I get these PCBs out of the water column. If I am gaining solids, that requires me to exchange, if you would, in some theory, all of the solids.

But there is another quandary to that. The majority of the PCBs in the water column, at least in the near-field, are dissolved, so 70 to 80 percent of the PCBs are dissolved. It is not like I got to get them out of the water column, but I have to get them onto the particles and then get them out of the water column.

So the answer is just not so simple as to where that material went.

**MR. MAGAR:** Do you think that it volatilized then? Is that your --

**MR. GARVEY:** Hypothesis, yeah. But do I have a gas exchange rate that makes sense? No. But we haven't done all the arithmetic either.

But, anyway, these are just lines, just pieces of evidence, I am just throwing out there saying it isn't just easy, okay, I see the solids fall out of the water column, and the PCBs are mostly on the solids, and so, yeah, they can go right out. I have the opposite problem.

**MR. MAGAR:** I think that is fine, and I think a large fraction of this might have volatilized, but then do you have a measure of what an acceptable about of volatilization ir or what --

**MR. GARVEY:** Well, I mean, I guess we have an acceptable level of volatilization to the extent that we are causing undue inhalation risks to people who live along the river, and there was monitoring along the river during dredging. We did see
elevated volatilization in the immediate vicinity of either barges that had oils in them or
some of the isolated areas where there was a lot of oils, CU-18 or CU-3 or CU-4. By and
large, beyond those, we didn't see elevated levels.

But you raise a valid question, and I don't have an answer to say that I
know that it is not a problem, per se, let's say at the next dam down, but the estimates that
we have are, given that we could only see elevated volatilization in the immediate
vicinity of where we had oil sheens, then I would venture to say -- that is, perhaps
speculatively say that we probably don't have it downstream in terms of a human risk.

That would be the only way we would define it at this point. I don't know
if the agency has other ways to look at it, but that is what I am familiar with, anyway.

**MR. SCHROEDER:** We have reported total concentrations for PCBs at
various locations. Do we have equally information provided to us on
particulate-associated concentrations in the water column?

**MR. GARVEY:** I think I should let GE answer that. I know there are,
but they are probably going to answer you, chapter and verse, as to which data files and
where they would exist. I don't know them all.

**MR. CONNOLLY:** As part of the near-field release study, we separately
measured particulate phase and dissolved phase PCBs, and the average concentration that
we measured in that study is something like 35 parts per million on the particles.
The sediment traps average about 65 parts per million on the particles. So
that gives us some sense of sort of the levels we are looking at.

**MR. SCHROEDER:** What do we see far-field?
MR. CONNOLLY: We unfortunately have no monitoring that separates out the particulate matter far-field, so that we can tell what fraction would be on the particles.

We can use simple partitioning calculations, given the TSS and the total PCB concentrations that we see far-field. We haven't done that, but that would be some obvious thing to do.

MR. SCHROEDER: Right. I mean, if we are talking about are we changing the particles that are being transported, are they at the same surface concentrations as we see throughout the pool already --

MR. CONNOLLY: Yes.

MR. SCHROEDER: -- in which case, we don't really care much about them?

MR. CONNOLLY: Yes.

MR. SCHROEDER: And that the real concern is not the loss of the materials in terms of being high concentration, just being the total mass of material being lost?

MR. CONNOLLY: Mm-hmm. That is a very good point.

Now, at Thompson Island and Schuylerville, those concentrations are still fairly high, if you calculate what would be on the particulate material. It is less at Waterford, but I don't know the number. We will calculate it for you and present it to you.

But, by the way, just to give us an opportunity to sort of follow up on
Todd's question, our proposal to deal with this is to use the Phase 1 data to make our best estimate of how much redeposition may have occurred.

To come up with what we think is a plausible scenario for where that stuff would go -- and one, I offered was it will go into depositional zones -- and then given a reasonable estimate of how much might be released in the project, put it in depositional zones, we can calculate, then, an increase in surface concentration. We can use our models to look at the long-term fate of that, taking account of additional burial that is coming in, diffusive flux out of the sediment, as well as additional exposure to the food web.

We can then look at the impact on load to the Lower Hudson and the impact to fish in the Upper Hudson. We can then, using the load criteria, back out how much redeposition you can actually stand and keep yourself under the load criteria along with everything else. And we presented a process to try to perhaps do the same thing for fish, looking at what fish concentrations are doing as you release more and more material, and decide how much of the benefit you are willing to sacrifice and then declare that this is where I will set the load standard in the Upper Hudson near the dredges, and that would incorporate the affect redeposition based upon its calculated impact on the food web.

So that is at least the way that we conceptually think we could handle this in the context of the performance standards.

MR. BRIDGES: I mean maybe, Paul, if I could just kind of cap this, because I think I am done for now on this topic. I don't want to mischaracterize what I
view as the EPA-proposed standard, but the resuspension could be interpreted to be, well, it doesn't matter, I guess, using Victor's words. I mean, it could be infinite, I guess.

And since the current proposed standards for resuspension don't explicitly, at least in my reading, consider this redeposition outside of the dredge prism, I guess I'd conclude that as long as you are following good engineering practice with the operation, that could be infinite too.

But that doesn't make any sense to me whatsoever, and so that is why I am kind of asking where you are going with this.

But this kind of harkens back to another point that I am very troubled about, and that is this frequent reference to the little blue box in the charge, because I am assuming that infinite residuals or infinite resuspension standards is probably not acceptable to the public or anybody else for that matter. So it needs to be something less than that. So I am trying to probe what is an acceptable level for those standards with respect to whatever objectives you are trying to achieve.

It doesn't have anything to do in my mind whether or not the remedy is going to achieve the objective. That is not the point. All through the Engineering Performance Standards, these processes are argued and laid out analytically as a basis for these Engineering Performance Standards.

So, if the panel is being asked to comment on or render an opinion on or put forward an approach to these standards, I assume that it needs to be consistent with some logic that relates those standards to what is deemed to be appropriate with respect to those objectives. So that is my rationale.
If there are sections of the Engineering Performance Standards that I should ignore, because they are outside the scope, then please let me know what sections those are because this kind of argumentation and logic is everywhere within the performance standards that were published in 2004. I think it was a fair conclusion on my part that I need to understand that reasoning or how your reasoning with respect to those matters has changed, so that I can make a reasoned comment with respect to those standards; that is, resuspension or residual.

**MR. MAGAR:** I don't know how far this will go. I am going to follow up with John and what you had suggested with the kind of modeling that you do, which would actually, for my reading, be more helpful in terms of understanding natural recovery.

I think using the cumulative plot is difficult because I think you can appreciate you can have a very high first-year peak that would then buy us that cumulative plot, which, in fact, it is doing for many years and indefinitely.

Understanding the recovery process or where the surface sediments are going to be in 10 or 20 years would be more meaningful. Again, it comes down to kind of this load analysis, then understanding the delta or the difference in total load at Waterford in 10 or 20 years, and especially the cumulative load.

I don't know how we will get that in time to still do our analysis, but that would be more meaningful in terms of monitored natural recovery, and a comparison, where are we going to be in -- I don't know. I mean 25 years seems a long time to wait to catch up to monitored natural recovery, but where would we be at 25 years or 10 years or
5 years?

MR. CONNOLLY: John Connolly.

I think that is a great suggestion, Victor.

What I think would be useful with the models is to use the models to inform us about recovery and sediment concentrations, develop some understanding of what impact is acceptable or not acceptable of resuspension in terms of how it is affecting natural recovery, and then try to translate that back to the equivalent load, so that we have something we can measure against --

MR. MAGAR: Sure.

MR. CONNOLLY: -- while we are dredging.

But the real thing we are trying to protect is the recovery of the river, which I think is what you are getting at.

MR. MAGAR: Yes.

MR. CONNOLLY: I think that is a great approach.

MR. FUGLEVAND: Anything over there, Ben or Ed?

MR. GARVEY: I have one, just one last thought on this. To address Todd's question and in terms of this resuspension outside of the immediate vicinity of the dredge plume itself, the HUDTOX model, when we ran it, was run to the equivalent, as John Wolfe had said before -- this is Ed Garvey -- it was run such that the loads that were generated by this plume model was then input to the HUDTOX model, roughly a mile or a kilometer downstream, and then the HUDTOX model was run from that point forward, and so the deposition within the Thompson Island Pool or within the cells downstream of
the loading cell was then accounted for in the model runs.

In addition, we also ran scenarios and looked at deposition in the pools downstream, and they would have also accounted for -- because it was a mechanistic model, would have accounted for deposition of dredging-related releases generated in midpoint from the Thompson Island Pool, if you go halfway down Thompson Island Pool, in the segments downstream.

Now, we didn't run the scenario at the magnitude that we are talking about now, but we run the equivalent of the 350 nanogram per liter scenario, which is a little bit different from what you might think of now. Basically, last year, we had a very high flow. So we, in fact, had higher loads than we would have 350 nanogram per liter scenario.

But, Bruce, if you can bring up that slide, just zoom it up, just the upper slide there.

It is very similar to the kinds of plots we have been looking at, but this is a scenario in the Thompson Island Pool.

Zoom into the picture. Make it regular page width and get rid of the side of the window there.

**MR. BRIDGES:** We can read it.

**MR. FUGLEVAND:** We can see it.

**MR. BRIDGES:** Yep.

**MR. GARVEY:** Okay. Anyway, what I am pointing out here is that the blue curve, which is the 350 nanogram per liter scenario --
[Pause.]

MR. GARVEY: That is good. Just scroll down a little bit.

Basically, what the point is, is that those curves allowed a loading term in
the Thompson Island Pool that incorporated both solids and PCBs into the water column
at some cell within the model.

So those 27 cells in the HUDTOX model, we would probably pick a point
midway down the Thompson Island Pool and run it as a representative of all the cells in
the pool, so we didn't move the load downstream continuously, but we loaded from a
couple different cells in the pool as representative.

So we are incorporating the concern that you have about near-field
dredging. You can't tell that from here, but my point is that that blue curve had a
mid-pool loading term for dredging, and then it allowed the solids and PCBs to distribute
throughout the river. What we saw was that even at 350 nanograms per liter -- I want to
say it is about 20 or 30 kilograms per year of Tri+ -- we still didn't have a significant
impact in the recovery of the Thompson Island Pool, even with that level of loading and
accounting for solids dispersal within the pool to the areas that were not being dredged.
That is in the HUDTOX model. We still didn't get an impact.

So, to put the performance standard in context from 2002 to 2004, we
thought we were addressing near-field deposition because we had represented the load in
the near-field with the model, in the HUDTOX model, and that is the outcome of that
scenario.

MR. BRIDGES: So I guess the question that remains is, is the
experience in Phase 1 and the data generated through that consistent with what you did here?

MR. GARVEY: That is a fair question, and I can't answer that.

But what I am trying to get at is that there has certainly been thought given to the question that you raise. Whether or not we have the answers for what we observe currently versus what we forecast with the model and merge them, I can say that we haven't done that.

MR. MAGAR: Wouldn't a major driver in a model like this be the capping process in the final surface settlement concentrations that you input --

MR. GARVEY: Well, we turned on --

MR. MAGAR: -- into something like that?

MR. GARVEY: We actually ran the model turning on or turning off cells as we cap them or isolated them as we move through the pools. So there was some approximation to that.

I can't say that it went minute by minute or even week by week, but there was an approximation to shut various cells off to zero as the model was run, but, you know, it is an approximation, as I said. We didn't load every cell individually. As the dredges progressed through it, we would load at one or two cells, or one cell for a while represented the northern pool, then another cell for a while represented the southern pool. Then we would move on to the next reach down, but, basically, we have this scenario where we did look at it, for what it's worth.

MR. MAGAR: But it is all being backfilled?
Sorry. Go ahead, Tim.

MR. GARVEY: Yeah.

MR. THOMPSON: No, finish your thought.

MR. MAGAR: It is all being backfilled, and you have a final concentration after dredging of .25?

MR. GARVEY: Only in the areas being remediated.

MR. MAGAR: Right.

MR. GARVEY: So, in this scenario, this one in particular was only about 250 acres of the Thompson Island Pool. So half of the Thompson Island Pool is not set to anything. It is allowed to run and naturally attenuate. So half of the load is settling into the -- let's assume deposition is the same everywhere for the sake of argument. Half of the Thompson Island Pool is going to get deposition and then be subsequently redredged, and that area is taken care of, but the other half of the pool is going to collect whatever solids were dispersing and PCBs associated with it, and that is just going to be allowed to attenuate naturally. So I am saying that that mechanism is represented in this model.

I haven't ground-truthed it to see how it compares to what we observed this year and so on and so forth, but we did make attempts to address the question that Todd is raising, just not as sophisticated perhaps as one might like to be, but this is all the tools that we had at the time.

MR. THOMPSON: So the question, then, that I would follow up with is, have you or do you intend to run a similar exercise to support the Tri+ of 122 kilograms...
per year or 680 grams per day? Presumably, you would answer the question Todd has raised, if you ran something like this, and said, "Okay. Well, 680 is still going to come in below the MNR line."

So the question is, have you, will you, do you plan to any time here soon run those?

**MR. GARVEY:** We have not. I can tell you that much.

**MR. THOMPSON:** You have not. So it is really hard, then, to say why do you have 2,000 kilograms total PCBs as your project total and 122 kilograms per year.

What is the basis on using equivalent thought process that went into the EPS?

**MR. GARVEY:** Right. I understand what you are saying.

We don't have a model that runs the scenario that we looked at for the Upper River. These are the best or the closest approximations, and this is still shy of that by a significant amount.

**MR. THOMPSON:** I thought 680 was kilograms per day was less than the 350 nanogram per liter line, so as captured in that.

**MR. GARVEY:** It isn't

**PANEL MEMBER:** It's not. Okay. I didn't think so.

**MR. BRIDGES:** It's not.

**PANEL MEMBER:** Thank you, Ed.

**MR. GARVEY:** All right.

**MR. FUGLEVAND:** So we are going to go ahead and wrap up today's session.
One line of questioning we didn't get to that we would like to tomorrow morning is -- we have been talking a lot about what happens downstream of the dredge head. We would like to spend a little bit of time tomorrow talking about not the dredge head but the operator's head.

We are real curious to find out how the guy in the cab, how he got his instructions each day, and let's say we're moving on to a new dredge set, what did he do, how did he know what to do, how long did he do it, when did he stop, how did he decide when to move to the next set, and when he moved to the next set, how did he do it.

If we could spend some time tomorrow, spend some time just describing to us that, and then one of the things that I don't know if we ever received was the contractor's dredge plan, because in the specs, it puts responsibility on the contractor to come up with the details of how they are going to operate, and that might enlighten us as well. We are just curious to find out how they operated.

And then after that, maybe some conversation about adaptive management, conversations you had with your contractor that then got to the operator, that's where we are really curious, what was the operator doing and instructed to do. So that might take a little time in the morning, and then from that point on, we will move into our deliberation.

Opportunity for Observer Comments

**MS. HOLLAND:** Thanks, everybody.

Now we have our public comment period. What we would like to do is ask our folks who are going to be giving comment to just come on up here in the center
aisle. We had six people sign up. We have 7 minutes each.

You will have to excuse me. Some of the names were very hard to read.

So I will probably slaughter some of these, but my first person is Joe Moloughney from the New York State Canal Corporation. If you want to come up.

Then the next person, if you want to be ready to queue up, is Sharon Ruggi from CEASE, if you want to queue up, so that we don't have a delay.

So, again, Joe, give your name for the record and your organization.

MR. MOLOUGHNEY: My name is Joseph Moloughney,

M-o-l-o-u-g-h-n-e-y, and I am the PCB Dredging Project Coordinator for the New York State Canal Corporation. The Canal Corporation has submitted written comments on the Phase 1 reports, which I hope you will take the time to carefully review.

I would like to briefly bring your attention to several topics that are important to the Canal Corporation that are covered in more detail in our written comments.

First, the Canal Corporation has several concerns with the use of capping at the project. During Phase 1, the depth of caps placed within the navigation channel leaves those caps prone to damage from vessels and maintenance dredging activities.

The EPA has proposed placing caps in Phase 2 at 14 feet, which is 2 feet below our navigation depth and with what we are required to maintain. This is an improvement over Phase 1, but the Canal Corporation strongly believes that avoiding caps in the navigation channel altogether is a much more preferable approach.

In addition, we have provided you with a design analysis that shows that
caps placed within the navigational channel may be underdesigned for vessel effects and are susceptible to erosion from prop wash.

Another important issue to consider is that underestimating the depth of contamination is not the only problem arising from low-confidence SSAP cores. Those cores will also result in improperly delineating the aerial extent of individual CUs; in particular, CU-1.

The Canal Corporation believes than an honest reevaluation of the sampling program around C-1 would result in expanding the CU boundaries to include at least the one-half acre of the Fort Edward Yacht Basin that was incorrectly excluded from CU-1.

The evidence from Phase 1 clearly indicates that the areas immediately surrounding CU-1 are likely to contain substantial PCB inventory and, therefore, must be included in the Phase 2 design.

Regarding the Champlain Canal closing date controlling the length of a dredging season, the Canal Corporation is open to discussion about what an alternative closure date might be during Phase 2. However, our concerns remain to be the firmness and certainty of any closure date and that winter maintenance of the Champlain Canal is not adversely impacted.

Finally and most importantly, the Canal Corporation believes that substantially more navigational dredging must be included in Phase 2. There are a number of excellent comments from others that have been submitted for your review that address this issue in addition to those that we have submitted.
The Canal Corporation estimates that there are over 600,000 cubic yards of navigational dredging needs beyond what is planned for remediation in Phase 2. If the dredging of this material is deferred to another entity after the remedy is completed, there will be additional resuspension and loading to the Lower River. It does not make sense to spend 3 days deliberating about load standards and resuspension when the effects of dredging an additional 600,000 cubic yards of contaminated sediment are not included in the discussion.

Thank you for taking the time to listen this afternoon. I would ask you to please review our written comments for more detail on these issues.

**MS. HOLLAND:** Thank you.

And if any of you want to submit your remarks from today, you are welcome to do that as well.

So, Sharon Ruggi, and if you would give your name and spell it for the recorder.

**MS. RUGGI:** Yes. Good afternoon. My name is Sharon Ruggi. That's spelled R-u-g-g-i. I do represent CEASE, which stands for Citizen Environmentalists Against Sludge Encapsulation.

We are a local group from the Upper Hudson who has been involved with the dredging of the Hudson River since the late 1970s, and we have been extremely active in participation.

As I listened to the discussion, I first want to point out to you, as you well know, that yesterday, though I believe that you received the addendum several days prior,
but the rest of us received the EPA Addendum yesterday, and I have certainly had very little time to look at that addendum, but I do know from a cursory look that it certainly contains very highly technical information. The very few days that we have to look at that information and to comment on it is not acceptable.

    I think especially in view of the fact that there is this meeting that will take up 3 days of the given amount of time, it is just not acceptable, and I don't know how you as peer reviewers feel about your time that you have had to look at it, but the original EPA document was released, I believe, about March 8th. We had until April 26th to comment on that, and that contained 185 pages. This is 211, and these very few days is just not acceptable.

    I also want to speak to the 500 parts per million water standard. It certainly seems that EPA wants to throw that out for the Upper Hudson. There are people living in the Upper Hudson, and it is critically important to us that that standard remains.

    We know for sure that there are people taking their drinking water from the Hudson, and while there is tremendous thought to the Lower Hudson, the Upper Hudson is equally important.

    We have a situation where EPA set the standards, and those standards have been violated, whether it be air quality, resuspension. The load was not met, and yet now EPA says, "Well, the standard really doesn't matter." Well, it does.

    The standard was set in order to be protective of the citizens and the environment, so we feel that there has to be a tremendous amount of attention given to
those standards.

There is an awful lot of talk about the 1-percent resuspension. That was critically important as we achieved a ROD, and it was important because we were told that 1 percent would -- and with a real benefit to the river, especially in fish, and so there is no getting around the fact that this additional resuspension has to be addressed. What will be the end benefit?

So these are just some of our concerns. We have submitted comments to you, but in listening to the conversation today, these are real areas of concern for us.

Thank you very much.

**MS. HOLLAND:** Thank you.

Next is Kyle York and then Bob Foley.

Kyle, again, give your name and your affiliation or location or whatever is relevant.

**MR. YORK:** Thank you. My name is Kyle York. I live at 59 Railroad Place, Saratoga Springs. I am, essentially, an environmental journalist who has been following this since day one.

I am very pleased with the evaluation data up to this date, what has been posted online, and very concerned about what we are going to do next on our way to Phase 2. Reviewing everything that I have been able see, I come to one disturbing question not yet mentioned in all the hard work by this group.

The EPA has identified contributing factors to resuspension and productivity and the problems we had in Phase 1. Four stand out: (1) clamshell scows
were not loaded enough; (2) unloading of the clamshell scows created traffic jams; (3) unexpected pools of PCB oil were encountered; and (4) unexpectedly high river flow.

You certainly discovered more problems than that.

I am puzzled here why it is that the changes now being discussed for Phase 2 center on, quote, "relaxing the standards" -- that is what's reported today -- because there is one viable technology which can address four of those issues, something not even mentioned yet at this point, and I can only ask that if we go back to page 1 of day one and discuss hydraulic dredging.

It was in the original record of decision that came out in 2002, and it says there, "Review of successful dredging projects indicate that both mechanical and hydraulic dredges should be considered at this site," and that was taken to heart throughout the whole procedure as it went on and on and on. Excuse me. Fluttering away here.

The EPA's own exhaustive data was then discussed in the advisory committee at length. With this quote from the Clearwater, they posted all their data, and it was taken from EPA, and I will quote it, this again from one of the CAG groups, "With both mechanical and hydraulic dredges are designed to prevent resuspension of sediments, hydraulic dredges are more effective in accomplishing this goal. EPA originally estimated the rates of yearly resuspension of PCBs at 13.2 pounds for a hydraulic dredge and 19.8 for a mechanical dredge. These estimates were subsequently increased to nearly double that amount, but figures still show a significant difference between the two technologies."
Now, this was almost written with incredible hindsight, but it was presented to you in 2002, quote -- from the Clearwater statement -- "Hydraulic dredges avoid resuspension that may occur when mechanical buckets are lifted to deposit sediments into the barge. Hydraulic dredges require fewer barges and tow boats, which would substantially reduce river traffic and reduce the cost for those vessels and their operators."

EPA's own study concludes that hydraulic dredging allows for, quote, "greater removal precision and permits handling of a wide range of sediment types and debris." And that study, by the way, was from Phase 3 report, Book 5, Appendix H, 49 pages.

And the EPA itself seemed to agree when they did up the Engineering Performance Standards. Hydraulic was still in this. They said, quote -- from page 18 -- "Special studies will gather information to develop an alternative strategy in the event of high resuspension, specific conditions to be investigated that may include different dredge types, containment concentration ranges in varying sediment mixtures. Each of these will be studied after Phase 1 as part of the evaluation. When resuspension standards are exceeded, engineering evaluation and implementations are both required."

And that meant the dredge.

Finally, to my last page, I hope I am getting close to seven. Thank you.

And the EPA continued to be aware of the value when we got to 2005, at a meeting of the community active group here at Waterford, August 31, 2005. David King of the EPA presented the Intermediate Design Report, the one I just held up, quote,
"Mechanical dredging is especially good for places with significant debris on the river bottom as in the area under consideration. There may be a need at some point for some small hydraulic dredges, but this isn't expected to be necessary."

And one CAG member commented -- this is my last phrase -- "In our comments to the ROD" -- I suspect this was at Clearwater -- "we recommended hydraulic dredging, and that is what we have been hoping for. I hope we can leave the door open to that possibility."

Given the problems we face right now, I hope that possibility is still open for discussion and will be addressed.

Thank you, all. Thank you very much.

MS. HOLLAND: Thank you.

Next we have Bob Foley and then Manna Jo Greene.

So, Bob, again, give your name and affiliation.

MR. FOLEY: Good afternoon. My name is Bob Foley. I work for the U.S. Department of the Interior. I am here today speaking for the Federal Trustees. The Federal Trustees are working on behalf of the public to protect and restore the valuable natural resources of the Hudson River and services that this great river provides.

We wish to point out that Phase 1 was a well-monitored trial and that there are technical applications that can be improved. We would also want the peer reviewers to keep in mind the final outcome years down the road when the dredging, the backfilling, and habitat reconstruction are
complete. As it appears today, the remedy may leave substantial amounts of PCBs that will be bioavailable. We are concerned that areas of substantial inventory could be left behind by the project and that the river processes will continue to move them.

In that regard, the mass proposed to be capped in GE’s evaluation report -- was mentioned this morning, 3 parts per million Tri+ -- will be protected by a cap designed to withstand a 2-year event.

Under this proposal, this material is destined to move. This proposal is not a stable long-term resolution to the problem. There are other design considerations related to closure of dredged areas; the holes, if you will, that do not provide for a stable river bottom. Isn't this what is needed? A river with stabilized bathymetry, so that the PCB left behind does not contribute to resuspension with every flow event that exceeds a 2-to-5-year event.

The remedy that EPA is implementing is supported by the Trustees who wish to remove as much mass of PCBs as is feasible. The productivity is a concern from the perspective that it is important to proceed with the dredging without protracted delays. The focus should be on reducing resuspension and the residual levels that will be left behind.

If productivity is such that the remedy takes longer than the original plan, the Trustees support such a design which achieves those objectives of the ROD. The emphasis should be to meet the long-term vision of the remedy.

Thank you.

MS. HOLLAND: Thank you.
Manna Jo Greene. Give your name again for the record.

MS. GREENE: Thank you. I am Manna Jo Greene. I am the Environmental Director for Hudson Rivers Sloop Clearwater, and I was one of the authors of the comments just quoted. I also wanted to acknowledge Scenic Hudson. It was Josh Cleland's report at the time that we were quoting.

Clearwater, Scenic Hudson, NRDC, and Riverkeeper have collaborated to offer joint comments. We have also worked with Dr. Frank Bohlen, Walter Frank Bohlen of the University of Connecticut who is a sediment transport specialist, and I just want to very quickly touch on some of our key comments. And I will distinguish when I am speaking on my own behalf.

Number one -- and I am only going to focus on resuspension and a little bit of residual, but number one is that to reduce the inaccuracy of the depth of contamination by performing targeted additional coring prior to Phase 2 -- and I also think, given the extent of the -- and this is my comment. Given the extent of the errors in DoC that the dredge area delineation may need to be redefined and then also to reduce fine grading by using the overcut techniques to remove more inventory, extend the capacity of the unloading more to improve scow availability, consider using shallow draft barges with onboard water processing capability in conjunction with selective use of hydraulic and/or mechanical dredging.

But Dr. Bohlen says this has been done, that you can reduce the water that goes -- that you can actually treat it right on the river, get rid of some of the water, and then bring a -- an essentially partially dewatered slurry back to the dewatering facility, so
selective use of hydraulic dredging.

Increase access dredging where needed. Consider alternative dredge buckets and the use of closure sensors on the clamshells to contain -- because of the woody debris, and then also absorbent mats around the booms preventatively rather than reactively to deal with some of the NAPL and the reduce the scow and tug traffic, especially in shallow areas, and eliminate decanting to the extent possible.

Now I am speaking on my own behalf. I want to just mention a caution about load, and that is to say that -- well, Dr. Bohlen distinguished between immobile residual, which is the residual we think of, what is left in the river after dredging, but he also calls the resuspension a form of mobile residual. And we have a concern about that.

As far as we are concerned, the goal is not just to reduce the levels in fish. That it is important. Clearly, Clearwater cares about the levels in fish. It was our 1993 angler study that made the nexus between human consumption of fish and the toxicity in the water. So we care about that.

But I think the goal is to reduce the contamination in the river. As long as you are dredging, let's get everything that is reasonable out and do it smartly and wisely. We care very much about volatilization and minimizing that.

I also had a little bit of a concern about there is no liberty to be taken because the two water supplies are being protected in Waterford and Half Moon. I think that is a very good step on the part of EPA to pay for that during the entire dredging season.

As you are moving closer and closer to Waterford, it seems to me that the
chances of resuspension moving downstream get greater and greater. So I would keep
the 250 -- rather, the 350 control level as well as the 500 parts per trillion. If you do need
to stop or slow down, stop or slow down. Let's do this well and carefully.

And just two very quick comments on residual. The capping rate was too high. We believe the capping rate was too high. We are especially concerned about the capping that occurred at CU-1. I actually think that needs to be revisited. I think that it was an unreasonable amount of residual that was left, and we also think that when you are capping in a navigational area, the rise should be to a maximum of 14 feet below the surface, not 12. I think that is a very serious problem.

We will have more comments to offer tomorrow. Thank you.

**MS. HOLLAND:** Thank you.

The last person was one that we really could not read, and it starts with two initials, W. W., and it looks like Q-u-i-c-i-l. Maybe there is no organization or address.

**ATTENDEE:** That is me, but I don't want to speak now.

**MS. HOLLAND:** Okay, all right. Thank you very much.

So our public comment for today is done, and you will have another opportunity tomorrow.

So we will see you at 8:00 a.m. Thank you.

[Whereupon, the meeting was recessed, to reconvene at 8:00 a.m. on Wednesday, May 5, 2010.]