ILLINOIS POLLUTION CONTROL BOARD
June 14, 2006

IN THE MATTER OF	)	
	)	
PROPOSED NEW 35 ILL ADM. CODE 225 CONTROL OF EMISSIONS FROM LARGE COMBUSTION SOURCES (MERCURY)	)	R06-25 (Rulemaking - Air)

TESTIMONY OF MARCIA WILLHITE
IN PANEL WITH DR. THOMAS HORNSHAW AND
DR. GERALD KEELER

BEFORE MARIE E. TIPSORD
HEARING OFFICER

The testimony of Marcia Willhite, a witness called in the rulemaking proceeding before the Illinois Pollution Control Board beginning on June 14, 2006, at 9:00 a.m., at the offices of the Environmental Protection Agency, Springfield, Illinois, before Holly A. Schmid, Notary Public and Certified Shorthand Reporter, CSR No. 084-98-254587 for the State of Illinois.

A P P E A R A N C E S

MEMBERS OF THE ILLINOIS POLLUTION CONTROL BOARD:
Ms. Marie E. Tipsord, Hearing Officer;
Dr. G. Tanner Girard, Board Member;
Ms. Andrea S. Moore, Board Member;
Mr. Anand Rao, Board Staff;
Mr. Thomas Johnson, Board Staff;
Mr. Tim Fox, Board Staff;
Mr. Nicholas Melas, Board Staff;
Ms. Alisa Liu, Board Staff.

COUNSEL FOR THE ILLINOIS
ENVIRONMENTAL PROTECTION AGENCY:
Mr. Charles Matoesian;
Ms. Gina Roccaforte;
Mr. John Kim;
Mr. Richard Ayres;

COUNSEL FROM SCHIFF-HARDEN
Ms. Kathleen Bassi;
Mr. Stephen Bonebrake;
Mr. Sheldon Zabel;
Mr. Jim Ingram, Dynegy, Inc.

COUNSEL FROM JENNER & BLOCK
Mr. Bill Forcade;
Ms. Katherine Rahill.

COUNSEL FROM McGUIRE-WOODS:
Mr. James Harrington;
Mr. David Rieser;

COUNSEL FROM ENVIRONMENTAL LAW & POLICY CENTER
Ms. Meleah Geertsma;

COUNSEL FROM MIDWEST GENERATION
Mr. Basil G. Constantelos.

COUNSEL FROM CHICAGO LEGAL CLINIC
Mr. Keith I Harley.

E X H I B I T S

MADAM HEARING OFFICER: Good afternoon again. Mr. Kim, you gave me the testimony of Marcia Willhite, Thomas Hornshaw and Gerald Keeler.

MR. KIM: Yes, I apologize. There was one other thing, just to tie up one loose end with Jeff Sprague's testimony, I believe there were two outstanding issues we were going to look into. One was a question as to where the 6 percent figure came from on the last page of his testimony, and I will be honest with you, the other was a question that I didn't quite get, and I don't think Mr. Sprague quite got, either, so Mr. Sprague can testify now and answer where he got that 6 percent figure and maybe if the reporter can read it back or if you can remember your --

MR. BONEBRAKE: The second question I will have to go back and take a look at my notes.

MR. SPRAGUE: Just to start from, I wanted to clarify one point, as well. I stress pretty heavily that I was confined to using the two reports in developing my contribution to the TSD. Well, when it came to answering the questions posed by the attorneys I still tried to limit myself to those two reports, but in certain cases, I went beyond just to try and be as complete as possible, and with regard to 6 percent

stuff, that came out of the CDC's morbidity and mortality weekly report. This is dated November 5, 2004, and the 6 percent value appears in there.

MR. BONEBRAKE CONTINUES:

Q. The follow-up question was the 6 percent value then Mr. Sprague with respect to a particular year or years?

A. Yeah. The years of data that they used were 1999 through 2002.

MR. ZABEL CONTINUES:

Q. I'm just curious, Mr. Sprague. You said you tried to confine yourself to two reports, but also tried to go beyond that to answer some of the questions. How did you make the determination which ones to go beyond the two reports for?

A. Well, there were certain time constraints, so I had to use those two regarding my contributions to the TSD. That was a given, and then, of course, the questions came in later, so there was more time to do some -- try to respond to the questions as fully as I possibly could, but still keeping in mind that the TSD contribution was based on those two reports.

Q. But in responding to the prefiled questions, you had no limitation on going beyond those

two reports in attempting to answer them. Is that correct?

A. None beyond any time limitation in developing responses.

MR. KIM: Just to clarify, maybe in your answers that you provided earlier if you did reference documents outside of the two that you identified that you looked at in preparing the TSD, did you try and cite to or identify those reports when you were giving your answers today?

MR. SPRAGUE: For the TSD, the only other thing and I mentioned it was just a web search for definitions for certain terms and that was it, exclusively.

MR. BONEBRAKE CONTINUES:

Q. Then I think the other question that was outstanding was the issue that I had raised of my understanding that the CDC study was looking at concentrations in the body, whereas the sentence in -- the last sentence in your report that refers to the CDC study compares it to the reference dose, which I had understood to be an intake or consumption measure, and so it was not clear to me how those two or the different type of numbers were being compared.

A. My understanding is that you're right on both accounts, that the 6 percent number refers to a body burden level within these women. The reference dose is a reference dose referring to exposure, but then, again, there is the linkage the CDC is making between body burden and the reference dose.

Q. Is the linkage, Mr. Sprague, set forth in the document that you have with you today?

A. Whether it's clearly stated or not, I certainly don't -- I don't see it in this first paragraph here, but this -- in talking with Dr. Rice, apparently, built within this is the assumption that there's a one-to-one ratio between maternal blood and cord blood, and whether that assumption is valid or not, I guess there is reason for that different researchers have to -- but from what I could distill out of the report, that was what I was taking away from it, that, indeed, they were making a comparison between the body burden and the reference dose, as we know it.

Q. Do you have an understanding, Mr. Sprague, of whether the document that you have with you today was submitted to the Board by the Agency?

A. I haven't done an extensive look at reference lists. It may or may not be.

MADAM HEARING OFFICER: If not, could we please have it admitted?

MR. KIM: If it hasn't been, we will have some copies made and tomorrow morning, at the latest, we'll have that.

MADAM HEARING OFFICER: Mr. Forcade.

MR. FORCADE CONTINUES:

Q. I'm sorry to repeat the same question, but I'm not understanding correctly. Are you saying that this last sentence on page three means that CDC estimated, approximately, 6 percent of the women of childbearing age have blood mercury levels greater than the intake recommendation?

A. That would correspond to the reference dose. Remember again, that you can -- my understanding, anyway, is that you can make an extrapolation between what the body burden is in maternal blood or cord blood with regard to the reference dose, as has been indicated earlier, for maternal hair.

Q. Then are you suggesting that 6 percent of the women of childbearing age have a blood mercury at, or exceeding, the level they would have if they consumed --

A. If they consumed that daily rate over a

lifetime. That's my understanding.

MADAM HEARING OFFICER: Thank you, Mr. Sprague.

MR. KIM: With the end of Mr. Sprague's testimony, what we would be doing then next is presenting, basically, a three-person panel. Marcia Willhite will be answering her questions first. Then Dr. Gerald Keeler and then Dr. Thomas Hornshaw. The reason we're trying to group these three individuals together is that Ms. Willhite's questions are fairly wide in range, and there are some of her questions that are actually better answered by either Dr. Keeler or Dr. Hornshaw, so it seems convenient to have them here at the same time. If we haven't done it already, we could ask that Ms. Willhite and Dr. Keeler's testimony be admitted as if read.

MADAM HEARING OFFICER: Dr. Hornshaw's, as well. If there's no objection, I will enter Marcia Willhite's testimony as Exhibit 8; Dr. Hornshaw's testimony as Exhibit 9, and Dr. Keeler's as Exhibit 10. Any objection?

(Exhibits 8, 9 and 10 were admitted.)

MR. BONEBRAKE: What I would put on the record is there's no objection, but we reserve

questions regarding qualifications of the witnesses.

MADAM HEARING OFFICER: So noted.

MR. BONEBRAKE: Just a housekeeping item, we're going to be going first, asking, first, questions with respect to Marcia Willhite, but the other two members of the panel may answer some of the questions directed to Ms. Willhite?

MR. KIM: Correct, if there were some questions directed to her, for example, the fish consumption advisory, and she's not all that well versed on it, but Dr. Hornshaw, obviously, is, then she may just simply ask him to answer that question, and that would be not inconsistent to how we have identified, for example, with Dr. Rice's testimony this morning where she indicated some of the questions directed to her would be better answered by Dr. Hornshaw, that kind of thing.

MADAM HEARING OFFICER: Ms. Willhite, when you begin, since you have multiple questions or questions from different parties posed to you, can you identify which party's questions you are beginning with?

MS. WILLHITE: Should I start with the Dynegy ones? How would you like me to do that?

MR. KIM: Whatever your flavor.

MS. WILLHITE: Question 1: "Has Marcia Willhite published any articles or studies concerning mercury?" No, I haven't. "Has Ms. Willhite ever conducted a TMDL study or report or personally identified a water as impaired under Section 303 of the Clean Water Act?" I'm testifying today as a state official who manages the part of the Agency that administers the Illinois Protection Act and the Federal Clean Water Act. Those duties include overseeing the staff that asses water bodies, that identify waters that are impaired under the 303-D provisions of the Clean Water Act and developed TMDL's, but I have not, personally, conducted the work. I have reviewed it. "Does Ms. Willhite have any formal training or regarding the mercury methylation process for mercury, mercury speciation, mercury deposition or mercury health impacts?"

MS. BASSI: Could you please give the question number as you're doing this, just so we can follow along better. That was it.

MS. WILLHITE: We're to question 3. Question 3, "Does Ms. Willhite have any formal training in these areas? If so, please describe." I have a master's in toxicology, and I'm pretty sure that 20

years ago that formal training included methyl-toxicology and mechanisms of toxicity, but I'm not offering myself as a toxicologist today. As a state official, we become familiar with the literature and other people's work regarding things like mercury methylation, speciation, mercury deposition and health impacts as it impacts the decisions that we have to make in administering the program, so I would characterize myself as well informed on those subjects, but not trained formally in them. Question 4: "Did Ms. Willhite draft or assist with drafting any portion of the TSD's in its rulemaking, and if so, please identify the portions." I drafted the portion of the TSD and those were Sections 4.1, 4.2, 4.3, 4.4 and Section 5.2. Question five: At page one of Ms. Willhite's testimony, she states as follows: `Arguably, if the fish that are caught are not safe to eat, the fishable goal is not being met.' With respect to this statement, A, what does the term "arguably" mean in the sentence and has the Agency ever taken the position that the fishable standard is satisfied, even if the fish caught are not safe to eat?" I'm going to combine this with the next question, B, which is, "What is the fishable goal?" The answer to these questions --

the term "arguably" was used because the Clean Water Act is not explicit that the fishable goal includes unlimited consumption of fish and so you have to infer that from the language. Section 101.A.2 of the Clean Water Act states the national goal is that where ever attainable a goal of water quality which provides for the protection and propagation of fish, shellfish and wildlife, and provides for recreation in and on the water be achieved by July 1, 1983. This is commonly referred to as the Fishable and Swimmable Goals of the Clean Water Act. Here's how U.S. EPA explained the applicability of the fishable goal to safer consumption of fish in a guide dated October 24, 2000. EPA interprets "fishable" in quotes under Section 101-A of the Clean Water Act when the United States minimum designated uses providing for protection of aquatic and human health related to consumption of fish. In other words, EPA views "fishable" to mean only that, not only can fish and shellfish thrive in water, but when caught, can also be safely eaten by humans. This interpretation also satisfies the section 303-C-2-A requirement that water quality standards protect public health, including human consumption of fish and shellfish in the definition of Section 101-5. Fishable uses is not new.

For example, under the National Toxicology Rule (phonetic) all waters designated for even minimal aquatic life protection, and therefore, a potential fish and shellfish consumption are protected for human health and then the guide is cited at 57-FR-60859, dated December 22, 1992. The second part of five, A, was -- the answer to that question is I am not aware of any situation when the Agency has taken the position that waters with fish having tissues levels of contamination above fish consumption advisory levels were satisfying the fishable goal.

MR. BONEBRAKE CONTINUES:

Q. A follow-up question. The U.S. EPA guidance document that you just quoted, is it your understanding that that guidance document is being followed and has been followed by the Illinois Environmental Protection Agency with respect to the 303-D prior water reports?

A. Yes.

MS. WILLHITE: Question 5-C: "How does the Agency determine whether fish caught are not safe to eat for purposes of this analysis?" The answer is fish with tissue concentrations above the fish consumption advisory levels, as defined by the Illinois

Fish Contaminant Monitoring Program, are not safe to eat in unlimited quantities.

MR. BONEBRAKE CONTINUES:

Q. You just referred to unlimited quantities.

A. Yes.

Q. Are you indicating, Ms. Willhite, that fish are not caught to save if an unlimited quantity of the fish cannot be consumed by residents of the state?

A. That's what I meant with my testimony.

Q. Does that mean that, if a fish contains concentrations of methylmercury above .05 parts per million that the fish caught is not safe to eat?

A. In unlimited quantities.

Q. And is that particular determination made on a waterbody-by-waterbody basis?

A. With relationship to my part of the task here of identifying waters that are impaired and not meeting their designated uses, yes.

Q. And if you have multiple fish samples from a particular waterbody, and some are above .05 and some are below .05, how does the Agency deal with that scenario?

A. I'm going to defer that to Dr. Hornshaw.

DR. HORNSHAW: The Fish Contaminant

Monitoring Program would look at the weight of the evidence, look at the average concentration among all the fish of a particular species, look at the maximum concentration, look at the pattern over time, if there is more than two years' worth of data. Our policy is to use, at least, two years of recent data before an advisory is issued, changed, or developed, so if there's more than two years' worth of data, we look at the pattern over time, and make our best professional judgement of what the level of light, if any, should be available for that species.

MR. BONEBRAKE CONTINUES:

Q. I'm trying to understand the testimony innerface between what I'm hearing from both of you. Ms. Willhite, is it your testimony, then, that, in identifying whether fish caught are not safe to eat, you or the people who work with you, would defer to Mr. Hornshaw, or the people that work for Mr. Hornshaw?

MS. WILLHITE CONTINUES:

A. Right. Dr. Hornshaw is the Agency's representative on the Fish Contaminant Monitoring Program. They are the ones that look at the tissue data from the fish collection and make a determination about what the advice should be for a particular waterbody.

The Bureau of Water then uses that information as we assess for a particular waterbody whether all of it is designated uses are being met. Does that help?

Q. So is an advisory issued by the Agency, fish advisory issued by an agency a prerequisite for listing a body of water as impaired by the Illinois Environmental Protection Agency?

A. A waterbody-specific fish consumption advisory, yes, as opposed to the statewide advisory.

Q. I was going to ask you to define that distinction for us.

A. I actually have a question that gets to that a little bit later, but I can turn to that now, if you would rather.

Q. We can deal with it in the due course of your testimony.

MR. ZABEL CONTINUES:

Q. Ms. Willhite, is a waterbody considered not fishable if a single species exceeds the standard.

A. I guess I would phrase it that we would say the waterbody is not meeting the fishable goal, is not meeting the fish consumption that's designated to that, if there's a fish consumption advisory for that waterbody.

Q. For a single species?

A. Well, I defer, again, to Tom as to how the decision is made about whether a fish consumption advisory is put in place for a certain waterbody.

DR. HORNSHAW: We do issue single species fish advisories. That's not the case for the mercury statewide, as I testified earlier. It's for all predator species based on the data that we have. We do have single species advisories for PCB's, and I believe there's one nor chlordane, as well.

MR. BONEBRAKE CONTINUES:

Q. That would make that waterbody not meet the standard of fishable?

A. Right.

Q. Are there any fish species-specific methylmercury, special advisories?

A. Yes. The special mercury advisory has 14 -- some number of lakes in the teens that have special advisories because the species are greater -- have greater levels of contamination than would meet the definition of one meal per week that would keep them in the statewide advisory.

Q. Just a follow-up question. Are the special advisories, by definition, fish

species-specific?

A. They are waterbody specific, and it depends on what amount of data we have. I believe that we do have data, based on just largemouth bass, because that's all the data we have.

MR. ZABEL CONTINUES:

Q. For the record, could you identify the document you're looking at.

A. I will making a exhibit of this later, but it's the current 2006 Illinois Fishing Information, which is one of the two primary vehicles we use for getting information out.

Q. That's an EPA publication?

A. Illinois Department of Natural Resources. This is the booklet that's available with each fishing license that's sold that contains bag limits, best lakes for whatever species and it has four pages of advisory information and for example, arrowhead Lake in Cook County, the fish species of concern is largemouth bass, and for women of childbearing age and children less than 15 set up a meal per month, which would be the statewide advisory, a meal per week, which is the statewide advisory. Our advice is a meal per month, and for women beyond childbearing age and children over 15, the advice

is a meal per week, instead of unlimited consumption. There's several other bodies of water that have a single species that puts them on special mercury advisory.

MADAM HEARING OFFICER: Ms. Bassi. Before we get to that, since you are referring to that now, I think we need to go ahead and admit that as an exhibit for purposes of the record.

MR. BONEBRAKE: Can we have copies of that made?

DR. HORNSHAW: I only have three copies left from the allotment that DNR gave me.

MADAM HEARING OFFICER: Do you know if this is available from the website?

DR. HORNSHAW: This information is available on the Public Health website. I have never gone to DNR's website, so I'm not sure. I believe it is, but I can't say for certain.

MADAM HEARING OFFICER: If we need more copies can we get them Xeroxed copies?

MR. KIM: Yes. At the very least, we will provide Xerox copies. We can maybe tomorrow morning try and contact DNR, and see if they have any more actual written copies left. At the very least, we can make additional photocopies.

MADAM HEARING OFFICER: I'm marking this as Exhibit 11. Is there any objection? Seeing none, we'll mark this as Exhibit 11.

(Exhibit 11 was admitted.)

MR. BONEBRAKE CONTINUES:

Q. Dr. Hornshaw, the four pages that you were referring to, what are the number designations in this document?

A. It starts at page 40 and goes through page 43. The reason I'm making this an exhibit is because it answers the question to me are there advisories based on PCB, which you will find on page 42, 43 entitled "Chlordane and PCB Advisory." That's why I needed to make this an exhibit.

MS. BASSI CONTINUES:

Q. Maybe I misheard. I thought you said that the fish advisory for -- I think just mercury was all predator fish. Is that correct?

A. The statewide advisory, that's correct.

Q. Does the statewide advisory refer to mercury?

A. Yes.

Q. Then I thought you said -- I thought I heard your say that the only data you have is largemouth

bass. Is that correct?

A. For Arrowhead Lake, in order to place it on the special mercury advisory.

Q. But do you have -- then do you have data on other types of predator fish in other waterbodies?

A. Yes.

Q. Thank you.

MR. BONEBRAKE CONTINUES:

Q. Another clarification, my understanding from what you said before was if a waterbody has a special advisory, then it's considered by the Agency to be impaired, and an Impaired Water Report needs to be provided to the U.S. EPA. Is that correct?

A. I'm not completely certain if the special advisory lakes that are on there are the same ones as what we have as waterbody-specific identified as impaired, but generally, yes, that's the case. Just in contrast, some states make the decision that, if they have a statewide advisory, then every single waterbody is covered by that statewide advisory, and goes on their list of impaired waters. That's not the choice that Illinois has made. Illinois makes the choice that we only put it this 303-D list those waterbodies for which we have specific data and waterbody specific advisory.

Q. And unless the water goes on the Impaired Waters Report list, then, ultimately, it's not going to require a TMDL. Is that correct?

A. Correct.

MADAM HEARING OFFICER: Mr. Zabel.

DR. HORNSHAW: I'm going to add some clarification that the Fish Contaminant Program and what Marcia does with the impaired waters list are a little bit different. If we have, for instance, two years worth of data that shows largemouth bass from whatever lake we are concerned about requires a one meal per week advisory, that water is automatically covered by that statewide advisory, and we would not list that water, specifically. If Marcia's program has that same information, it would list that water, specifically, in the 303-D list because we have waterbody specific information.

MS. BASSI CONTINUES:

Q. But she -- I thought she said she gets the information from you, so don't you tell her when you have one?

DR. HORNSHAW: She has access to the main database, and the people that work for her can look through that database, and see whether there's two

years' worth of data. I wouldn't necessarily report every body of water to Marcia's program that has two years worth of data or even one year's worth of data that shows a particular waterbody meets the definition of one meal per week because that's already covered by the statewide advisory. There's no reason for me to make anything special out of that water because it's already covered by the advisory, whereas --

MR. ZABEL CONTINUES:

Q. I'm sorry. I'm still confused. We have a statewide advisory, one meal per week for mercury. Does that apply to any largemouth bass caught anywhere in the state of Illinois?

A. That's correct, except Lake Michigan.

Q. All waterbodies, even some of which you have no current data on.

A. Absolutely.

MS. WILLHITE: So we only list as impaired those waterbodies for which we have specific data that shows that it's above the advisory levels. Although all the waterbodies are subject to the statewide advisory, not all waterbodies are under 303-D.

MR. BONEBRAKE CONTINUES:

Q. Then I also have a follow-up. You

mentioned, Dr. Hornshaw, the one-meal-per-week standard I believe.

DR. HORNSHAW CONTINUES:

A. What about it?

Q. Is that what is used to identify a waterbody for purposes off issuance of a special advisory for impaired water purposes?

A. No. The statewide advisory is for one meal per week. Only where we have two weeks of recent data that says the fish are more contaminated and need more restrictive advice do we put it on the special mercury advisory, and in every case, it's a meal per month for the sensitive group for that species so far.

Q. Does that mean, then, that for purposes of the impaired water listing he fish concentration threshold is .23 parts per million?

A. .06 parts per million because that makes it eligible for one meal per week advice.

Q. So any waterbody containing fish that have been sampled and have concentrations above .06 --

A. Starting at .06.

Q. Starting at .06 will be identified as waterbodies subject to special advisory, and therefore, on the impaired water listing?

MS. WILLHITE: Will be on the impaired water listing.

DR. HORNSHAW: It will be -- it won't be subject to the special mercury advisory, until it reaches .23 and above. .06 to .22 is the range for the one meal per week advice.

MS. WILLHITE: Questions 5-D and 5-E -- 5-D: "Is the goal stated in this sentence different from the `beneficial use' goals described in the next paragraph of her testimony?" And E is, "If so, what are the different statutory regulatory bases?" And the answer is yes, these are different. The fishable goal is general policy of the Clean Water Act. As I mentioned, it's defined in Section 101-A-2 of the Clean Water Act, and again official use is the designation that's made by the state under the Clean Water Act Section 303-C-2-A of how the state defines how the water in a particular waterbody will be used. Examples of designated or beneficial uses are, like, for drinking for swimming, for fishing, etc. Question No. 6: "In page of Ms. Willhite's testimony, she refers to a water quality standard of 0.12 micrograms per liter of water for protection of human health due to accumulation of mercury in fish tissue. With respect to that statement,

A, the Agency's TSD, at page 50, states the standard to `address the potential for mercury to bioaccumulate in fish tissue is quote 0.012 micrograms per liter total mercury.' Is the TSD referring to the same water quality standard?" And then sub 1: "If so, what numeric standard is correct, 0.012 or 0.12 micrograms per liter?" Congratulations. You found a typo. The Illinois Water Quality Standard for mercury for protection of human health is 0.012 micrograms per liter of stated on page 750 of the TSD. 6-B: "Is the Illinois water quality standard related to the protection of human health the most stringent water quality standard with respect to mercury?" I'm going to answer that together with questions 6-C, "Is the presence of mercury in fish tissue the only health concern with respect to mercury in Illinois waters?" Sub-1: "If not, please identify any other health concerns and any Illinois waters in which such concerns exist." The answer is Illinois has two types of water quality standards for mercury. One is for the protection of human health, and that's the 0.0123 micrograms per liter, and then there's those for protection of aquatic life from acute toxicity, which is 2.2 micrograms per liter, and to protect aquatic life

from chronicity 1.1 micrograms per liter, so the answer is that that is not the only concern, but the human health standard is the most stringent. Question 7: "At page two of Ms. Willhite's testimony, she states as follows: `Only those waterbodies where fish tissue data have been collected and analysis shows mercury levels of concern are identified as impaired.' With respect to this statement, A, please confirm that the presence of mercury in the water column or sediment is not, and has not, been used by the Agency to identify or list any waterbody as impaired under Section 303-D of the Clean Water Act." And the answer is the presence of mercury in the water column or sediment has not been used as the primary criterion for identifying or --

MADAM HEARING OFFICER: Could you slow down? It's Not so bad when she has copies.

MR. BONEBRAKE CONTINUES:

Q. I do have a follow-up. Did you say "the primary"?

A. Yes.

Q. And does that suggest that mercury or presence in the water column or sediment, in some secondary fashion, has been used to identify a water as impaired?

A. Possibly we do have in our 303-D list a situation where a few waters are identified as impaired for aquatic life use, and the presence of mercury was identified by the biologist as a possible contributor to the toxicity.

Q. In those particular waterbodies, was mercury present in fish tissue above the relevant standard, and so --

A. It was based on detecting the presence of mercury in the water column and the or the sediment based on the information I have, but that was not the primary issue. It wasn't that there were tissues above advisory levels.

Q. I guess I'm still struggling with your answer. Is it that there are some waterbodies in Illinois that have been identified when we talk about methylmercury here that have been identified with respect to methylmercury on the bases of methylmercury in the water column or sediment and not in fish tissue?

A. Not exactly. As I mentioned, you can designate different types of beneficial uses for a waterbody. One type is fish consumption; another type is supporting aquatic life. That means that the conditions are healthy for a thriving fish or other type of aquatic

organization population in that waterbody. And the way our process goes is that you identify a waterbody as impaired, for example, for whatever reason, the fish population is not as robust as you would expect given the waterbody, and there might be a variety of factors that are contributing to that use impairment. What I'm saying is that we have, on our 303-D list, a couple of waters where the aquatic life use was impaired, most likely, for some other type of factor as the primary issue, but we are required to list any possible cause of impairment, and in a few waters, I think there's, like, three river segments or something like that -- I think I actually answered this question a little bit later in my testimony -- it was noted that there were high mercury levels in either the water or sediment and the biologist identified that as a possible contributor, but the opinion of the biologist was that was not the primary issue, and if that part of the waterbody was not listed as not meeting the fish consumption use -- in other words, there were not excessive levels of mercury in the fish tissue.

MS. WILLHITE: 7-B we believe we have already answered.

MR. BONEBRAKE CONTINUES:

Q. Just to make sure that I understand, know what the answer would be to 7-B is .06 ppm. Is that the level of concern?

DR. HORNSHAW: That's correct.

MS. WILLHITE: And 7-C. Do you want to take that one, too?

DR. HORNSHAW CONTINUES: This question was also answered of me, and I have a fairly involved answer. Do you want it now or do you want it in context with my questions?

MR. BONEBRAKE: Why don't we defer.

DR. HORNSHAW: D: As I said before, the Fish Contaminant Monitoring Program is involved with the levels of concern, but I did the actual calculations and presented the values to the Fish Contaminant Program when we discussed whether we should change to the risk-based approach versus the approach that had been in effect up to that period of time. I had a lot of discussion and that discussion -- questions about that will be asked of me later.

MR. BONEBRAKE: I guess we will defer that. We'll have a number of follow-up questions for you.

MR. KIM: For the record, and I'm all

for moving quickly, but I think we are referencing some questions just by number and letter, as opposed to actually reading it for the record. If you want to actually read the question and then -- because 7D: "Who calculates the level of concern?" I don't think that was actually read into the record.

MADAM HEARING OFFICER: Thank you for mentioning that. We should still read the questions, so we know what is going to be deferred.

MS. WILLHITE: We're there now. 7-E, "Please describe the various forms of mercury that may be emitted from coal-fired EGU's." The answer is mercury emitted from coal-fired power plants can be elemental mercury, particulate mercury or reactive gaseous, otherwise known as oxidized mercury.

MADAM HEARING OFFICER: For the record, "EGU" is electric generating units.

MR. BONEBRAKE CONTINUES:

Q. The I think RGN (phonetic) that you mentioned, is that also known as divalent?

MS. WILLHITE: Yes. 7-F: "Please explain whether the mercury referenced in this sentence includes all forms of mercury or only a specific form of mercury." Sub-1: "If the latter, please identify the

specific form of mercury referenced." The answer is methylmercury is referenced.

DR. HORNSHAW: I will take G. "In setting the level of concern, does the Agency assume that all of the mercury detected in fish tissue is methylmercury? Yes. "If so, what is the basis for this assumption?" Again, this question was also asked of me. I can take it now or later.

MR. BONEBRAKE: Let's go ahead now, while we're here.

DR. HORNSHAW: I will have to find it. The Illinois EPA lab reports the mercury results as total mercury. The Fish Contaminant Monitoring Program assumes based on literature and studies, and I have three of them that I relied upon. One is a 1992 paper by Blume on "The Chemical Form of Mercury on Edible Fish and Vertebral Tissue from a Canadian General Fishes and Aquatic Sciences," (phonetic) pages 1010 through 1017, the second is 1990 paper by Grieb -- G-R-I-E-B -- et al., "Factors Affecting Mercury Accumulation of Fish in the Upper Michigan Peninsula" and in the Journal of Environmental Toxicology and Chemistry, Volume 9. The third is Hucaba -- H-U-C-A-B-A -- et al., a 1979 publication "Accumulation of Mercury in Fresh Water

BIODA" in a book "Chemistry of Mercury in the Environment," pages 277 through 302. All three of these journals or these references state that 95 percent or greater of the total mercury in fish is methylmercury and so the Fish Contaminant Program does not check the total mercury versus methylmercury.

MR. BONEBRAKE CONTINUES:

Q. A follow-up I think first for, Ms. Willhite. In response to the question, "Please explain whether the mercury referenced in this sentence includes all forms of mercury or only a specific form of mercury, and if the latter, please identify the specific form of mercury," I believe you said methylmercury. Is that correct?

A. Correct.

Q. Does that mean that if the mercury is present in the water column in a form, other than methylmercury, that that would not lead to identification of an impaired water?

A. No. The statement that was referenced here says only those waterbodies where tissue levels of concern are identified as impaired. Probably I should have gone on to say as compared for the fish --

Q. With respect to the fish tissue component,

then, the presence of mercury is not relevant to the designation of the waterbody as impaired. It's only methylmercury?

A. Well, I would need to check and see whether our water quality standard for acute and chronic toxicity to aquatic life is focused on methylmercury or total mercury. I'm not certain. I will look that up and provide you the answer.

Q. Dr. Hornshaw, if I understand you correctly, the Agency assumes that all mercury detected in fish samples in Illinois are methylmercury, although the studies you just mentioned indicate that up to five percent of the total mercury identified in lab tests might be a form other than methylmercury?

DR. HORNSHAW CONTINUES:

A. That's correct. Then the second question, "Is the Agency aware of any study or data that suggests this assumption is not correct?" I am not aware of any.

MR. BONEBRAKE CONTINUES:

Q. With respect to the mercury present in fish that is not methylmercury, is that form of mercury present the same health risk as methylmercury?

A. No. It would present a different health risk. Inorganic mercury is primarily a kidney toxin,

rather than an oral toxin.

Q. Is that form subject to a different reference dose or standard for consumption?

A. I believe it is, yes.

Q. Is that reference dose or standard higher than the reference dose for methylmercury?

A. Yes.

Q. Do you know what that standard is?

A. Not offhand. We haven't calculated corresponding levels of fish tissue, in case you were going to ask that.

MS. WILLHITE: The next several questions I consider outside the scope of my testimony, but since you ask, I will go ahead and answer them. But I have to say that I probably won't be able to answer too detailed of questions on the follow-up questions that may come up, and I will read slowly. Question 8: "What percentage of total mercury in water is deposited in or absorbed by sediment, remains in the water column, or is reemitted?" Elemental mercury, inorganic mercury and organic mercury are the three most important forms of mercury in aquatic regions. Inorganic is the primary form introduced into water. On average, about 85 percent of total mercury water is made up of inorganic

mercury, and the remaining 15 percent is methylmercury. This distribution is dependent on the location of the waterbody as methylmercury may present 27 to 44 percent of total mercury within anoxic zones -- A-N-O-X-I-C -- which is also called the hypolimnion, and 4.6 to 15 percent within oxygenated zones, also called epilimnion. Elemental mercury is volatile, and is typically found in the atmosphere, rather than water. It can be produced in water from demethylation of other forms of mercury, but is revolatilized back into the atmosphere. The percent of total mercury that is deposited or absorbed in sediment retained from the water column or volatilized is highly dependent upon chemical and biological characteristics of the waterbody. It is deposited in factor PH, dissolved organic carbon (inaudible), which is abbreviated DOC. Absolved oxygen and temperature influence methylation within a waterbody due to methylation and demethylation rates. There is no clear answer to the distribution of total mercury within the water and sediment as some forms of mercury are more or less water soluble than others, and the distribution of mercury within an environment is dependent upon water chemistry and biology. One estimation of total distribution in an aquatic environment is offered by

Lanthrop, et al. This is a Wisconsin DNR study where it is estimated that over 90 percent of mercury in lake systems is associated -- located in the sediment. Estimating the distribution of a specific mercury form within a waterbody is difficult. For example, methylmercury is less soluble in water than other forms of mercury, and is, therefore, more confined to organic matter. However, this does not mean that methylmercury will form in the sediment as lakes with high suspended DOC will never adhere in sites within the water column. Question 9 --

MR. BONEBRAKE CONTINUES:

Q. That was a mouth full. Let me ask some basic questions about that. What is the basis or bases for the answer that you just provided?

A. I'm sure it's from a literature search that staff did.

Q. You had your staff do a literature search to respond to that question?

A. Yes.

Q. You mentioned a number of factors that bear on methylation rate.

A. Yes.

Q. Can you describe for the Board and the

rest of us what methylation is?

A. That's the process by which inorganic mercury is acted upon by biological organisms, bacteria or whatever to add to methyl (phonetic) group to inorganic mercury and changing its chemical form, so it's more easily absorbed biologically.

Q. I think you also mentioned that inorganic mercury is the primary form of mercury that enters into waterbodies. Is that correct?

A. That's what I understand.

Q. So the methylation process needs to occur with respect to most of the mercury that enters a waterbody before the mercury becomes methylmercury?

A. Correct.

Q. And the methylation process, is that highly waterbody specific?

A. Yes. It depends on the conditions in the waterbody. I think some of the things that -- I can find it here. Some of the types of factors, PH, organic carbon, absolved oxygen, temperature, make a difference, so it does -- when I get to Question 10, I can tell you more.

MR. BONEBRAKE: I was trying to take this in baby bites. Why don't we go on to question 10,

if no one else had any --

MS. WILLHITE: Should I skip nine right to 10 or answer nine?

MR. BONEBRAKE: Let's go to nine next.

MS. WILLHITE: Question No. 9: "Of the total mercury in sediments, what percentage is methylated?" The inorganic form of mercury is predominantly in aquatic sediments, in wetland soils if percentage of methylmercury is less than two percent while in aquatic systems, it has been estimated that .7 to .0006 percent of total mercury in sediment is methylmercury. However, methylation is highly variable among lake systems and dependent on an environment of chemical and biological elements, which brings us to 10. "Please describe the methylation process."

MR. BONEBRAKE CONTINUES:

Q. Let me follow up on nine before we move to 10. I think you just testified that the inorganic forms are predominant in sediments. Is that correct?"

A. Correct.

Q. Does methylation occur in sediments?

A. It occurs where the biological organisms, the bacteria or whatever are present. My expectation is that it would be mostly in sediments, unless you have a

lot of suspended organic material that the bacteria are adhering to and they can methylate it as it's sitting in the water column.

Q. As an example, does that mean you are going to have more methylation in the Mississippi River than in a nice, clear, mountain stream?

A. Potentially, but there are other factors, PH, dissolved oxygen. I have seen other data that suggests that a percentage of sulfate and other kinds of things can speed up or slow down methylation process, so my take on that is it's difficult to predict.

Q. Is an anaerobic environment required for methylation?

A. Tom suggests that I answer 10, and if you still have that question, then we'll go back to it. Would that be okay?

Q. That's fine from my perspective.

MS. WILLHITE: Question 10: "Please describe the methylation process." The primary form of mercury in the atmosphere is elemental mercury, which may be oxidized to the water soluble inorganic form, divalent. Most mercury enters into an aquatic environment as inorganic mercury, which is readily absorbed to inorganic and organic particulates and DOC

and limits the availability for direct uptake by aquatic organisms. Inorganic mercury can then be reduced to elemental mercury and volatilized back into the atmosphere, or else converted to methylmercury, which is the primary form that accumulates in fish. Inorganic mercury is transformed to methylmercury primarily by sulfate-reducing bacteria living in anoxic zones, although abiotic methylation is known to occur as well. Once formed, methylmercury can be further methylated into methylmercury, which is volatile and readily released from lakes, but these reactions occur primarily at higher PH, greater than seven. Methylmercury may also be demethylated by a microbial process mediated by methylmercury-resistant bacteria. The net methylmercury in a lake is dependent on the rate of methylation and demethylation, which is strongly influenced by a number of waterbody specific chemical and biological factors.

MR. BONEBRAKE CONTINUES:

Q. We talked a little about the factors that impact methylation . What are factors that impact demethylation?

A. I'm not certain that I have the answer to that.

Q. Does the rate of demethylation affect the

level of methylmercury in fish tissue in a particular waterbody?

A. From this information, it would suggest that the rate of demethylation is more related to what would volatilize then from the lake.

Q. Once the mercury is volatilizing from the lake that is not available to become methylmercury in fish tissue. Is that right?

A. I'm not certain.

Q. The factors that you mentioned that bear on the issue of the methylation rate, has Illinois conducted any study of Illinois waterbodies -- here I mean the Environmental Protection Agency -- with state agencies concerning those particular parameters?

A. No.

Q. So does the Agency have any specific waterbody-specific information available at this time that would provide information about those characteristics and their impact on methylation rate in Illinois waters?

A. No.

MADAM HEARING OFFICER: Mr. Zabel.

MR. ZABEL CONTINUES:

Q. Just to be clear, your discussion I think

all eight and nine and so does that reference only to lakes or does it reference to foreign bodies of water, as well?

A. Just lakes. I note that I'm going to answer that question in 11.

Q. Maybe in part of the next question 11, but 11 is not worded precisely that way, so I thought I would ask that question now.

A. Lake terms. Those are lake terms.

Q. So the percentages that you were giving and such were for --

A. Lakes.

Q. But only as to lakes, not to moving bodies of water?

A. Yes.

MR. BONEBRAKE CONTINUES:

Q. Related follow-up. You read a couple fairly lengthy answers to us. What was the source of information in those answers?

A. I can find out for you. I don't have that information at this second.

Q. Was that the result of additional staff searches?

A. Yes. As I said, this was outside the

scope of my testimony, by since you asked, I thought we would answer.

Q. From my perspective it was within the scope of your testimony because I think you're testifying about potential reductions in mercury emissions, and the impact that they have on impaired waters, so that seemed necessary to raise the question of the methylation process in bodies of water because that, ultimately, is what's in question as to what's going to end up in fish tissue, and whether that is related to impaired water, so from my perspective, these were all relevant questions.

MS. WILLHITE: "Is the rate of methylation the same at different lakes and streams?" And sub-A, "If not, please identify the factors that cause different methylation rates." The rate of methylation is highly dependent on water chemistry and biology. Therefore, this is lake and stream specific and quite variable. There are numerous parameters that may influence the rate of methylation and demethylation within a waterbody, but the exact rate within a waterbody is difficult to estimate due to the complexity of this process. Some of the most important factors that influence net methylation in a waterbody are PH,

dissolved oxygen, DOC, nutrient concentrations, selenium concentrations, temperature, sulfate concentrations, drainage size to lake volume ratio, percentage of wetland and watershed, conductivity and water level fluctuations. Of these parameters, it is, generally, believed that PH and dissolved organic carbon are two of the most important factors driving the methylation production.

Q. Again, you refer to lakes. I assume that answer is lake-specific, and does not describe the process of the answer as to streams?

A. Well, it says that the rate is lake and stream specific, so I would conclude that these factors are important to the stream environment, as well.

MR. BONEBRAKE CONTINUES:

Q. Given the factors on methylation, waterbody specific and variable, would you agree that that means that you can't extrapolate, from one waterbody to another, the result in the reduction of mercury deposition?

A. I would think that would be challenging to extrapolate from one kind of waterbody to another on the rate of methylation.

Q. Does that similarly mean that, if you have

data with respect to one waterbody reflecting a reduction in fish tissue, and at that particular waterbody, there was also a reduction in mercury emissions, that it would be challenging to draw -- you could have -- if you were just to make the assumption that the same reductions in mercury levels in fish tissue would occur in a different waterbody if you didn't know, for a fact, that the same characteristics impact methylation were present in both waterbodies? Is that correct?

A. I think I got a little lost in your question.

MADAM HEARING OFFICER: As long as we're all lost. Speak up, please, where I can -- you are fading.

MR. BONEBRAKE:

Q. Let's get back. We'll break this into smaller chunks. I think you were saying that the characteristics that impact methylation are waterbody-specific. Is that right?

A. Yes.

Q. Therefore, the rates of methylation will be different between -- could be different between different waterbodies?

A. To the extent that they've got a different set of factors or the ranges of those parameters are different, yes.

Q. If you don't know what those characteristics are in two waterbodies, you don't know whether the methylation in those two waterbodies will be the same. Is that right?

A. Right.

MS. GEERTSMA CONTINUES:

Q. Among those different factors, are there any that are more deterministic than others?

A. PH, dissolved organic carbon are two of the most important factors driving methylation.

Q. Is it possible to collect data on various waterbodies, and not have the full set of parameters, but to make a reasonably informed guess based on parameters that you do have as to similar rates among waterbodies?

A. Possibly. I'm uncertain.

MS. WILLHITE: Question 12: "What factors affect methylation in sediment?" Sediment level is higher at lower PH's that is less than six, and at higher dissolved organic carbon concentrations. Also, the composition of sediment is also a factor as highly

reactive soil, such as wetlands and newly flooded areas, will have a higher methylation. Question 13: "Please describe the transfer rate of methylmercury from sediments to predatory fish including percentage of transfer for each trophic level. Once methylmercury is bound to dissolve organic matter or is dissolved in water, it may be consumed through uptake through lower traffic phytoplankton, which are then consumed. The transfer rate from sediment to phytoplankton to invertebrates is difficult to estimate and is highly dependent upon chemical and biological factors within the waterbody. Invertebrates are consumed by larger predatory fish. The assimilation efficiency of predatory species has been found to be variable, which may explain why some predatory species typically accumulate more methylmercury when compared to other predatory species within the same traffic level. For example, channel catfish tend to accumulate less methylmercury than largemouth bass due to the physiology of methylmercury to red blood cells and plasma. The assimilation of top-level predators is variable, but has been estimated to be between 20 to 50 percent when consuming contaminated --

MR. BONEBRAKE CONTINUES:

Q. Has the Agency done any studies regarding the transfer rate of methylmercury from sediments to predatory fish in Illinois waters?

A. No.

MS. WILLHITE: Question 14, "In the first full paragraph at page two of Ms. Willhite's testimony, she states that TMDL quote must consider all potential sources of pollutants, whether point or nonpoint. It also takes into account the margin of safety which reflects scientific uncertainty, as well as the effects of seasonal variation. With respect to these statements, A, must a TMDL analysis include the impact, if any, due to air emissions and waste water discharges from other states or countries, including any impact of mercury emissions from other states?" The answer is a TMDL must identify all potential sources of impact, regardless of the origin. In order to develop the TMDL, the amount of loading from any point source or any nonpoint source to a particular waterbody must be assessed. Air emissions from whatever location would need to be assessed as part of the nonsource component. It doesn't really matter for the TMDL where the loading comes from because the TMDL is, typically, a calculation of what is the maximum amount of loading on a daily

basis that can be added to the waterbody and still meet water quality standards. Knowing the source of the loading is only important in developing an implementation plan for reducing the loading.

MS. BASSI CONTINUES:

Q. In the development of a mercury TMDL in Illinois, then, are you distinguishing between nonpoint sources that are airborne that are in the state, as opposed to those that come from outside the state?

A. We would not distinguish between those. What you would need to know is what the loading to the waterbody is and there is --

Q. So you are only looking at the air loading?

A. That is an example of a nonpoint source. There are other kinds of examples of nonpoint sources, and in the calculation of a TMDL, a point source would be a direct discharge from the water, for example, from a publicly-owned treatment works.

Q. But are you looking at those different categories of loading sources, nonpoint, point, airborne, as in the aggregate, as opposed to something more specific? Is that what you're telling us?

A. Air deposition would be an example of a

nonpoint source, and would be considered as you calculate the loading from nonpoint sources.

Q. And it would be just characterized as air deposition?

A. It would be characterized officially in a TMDL calculation as the load allocation, which is secret government code for nonpoint source loading.

Q. So then this nonpoint source loading including air deposition could also include runoff?

A. Right.

Q. Okay.

MS. WILLHITE: 14-B: "Must a waterbody in the state of Illinois be listed as impaired if fish tissue levels exceed applicable standards for mercury, if such exceedence is due to discharges or emissions from other states or countries?" Yes. The source of the loading is not the issue. It's whether you have got contaminated fish tissue. So as I mentioned before, the source is not the tissue. It's whether the contaminant is present. 14-C: "Has the Agency performed any analysis to determine the amount of mercury deposited in Illinois due to air emissions generated in other states or countries?" No. So I have no applicable answer for sub-1 and sub-2. 14-D: Has

the Agency performed any analyses of the contribution of mercury emissions or discharges in other states or countries to the presence of mercury in sediments, waters, and fish in the state of Illinois?" No.

MS. GEERTSMA CONTINUES:

Q. Just a follow-up to C, is it normal practice to evaluate out-of-state or out-of-country contributors for any pollutant or generalizing that question?

A. Again, it's not really important to the figuring out what amount of loading is coming into the waterbody and how it needs to be reduced or to what degree it needs to be reduced. That's what the TMDL process is. It only becomes important when you try to figure out how you are going to do that. With air deposition, certainly, you would need to understand, as you go about implementing reductions, where is it coming from, and there are states that have issues when they have got impairment in the portion of a waterbody in their state that's coming upstream from some sort of point source discharge, so it would be typical from the standpoint of how you implement the TMDL that you assess where is the loading coming from.

MR. BONEBRAKE CONTINUES:

Q. Does that mean that even if the state were to eliminate all of its own air emissions of mercury, if mercury emissions were coming into the state from another state that continued to cause an exceedence of mercury in fish tissue level standards, that waterbody would continue to be designated as impaired?

A. Yes.

MS. GEERTSMA CONTINUES:

Q. Turning that question around, is it possible that emissions from Illinois power plants would then be contributing to causing TMDL levels in other states bodies of water?

A. It's possible, yes, because, as we all know, the air deposition doesn't stop at the boundary of the state.

MADAM HEARING OFFICER: Mr. Harrington.

MR. HARRINGTON CONTINUES:

Q. Have you evaluated other sources of mercury to the Illinois waterways, such as stream overflows, adequately.

A. We have evaluated what is loading from point sources. Primarily, from waste water treatment plants that are required to monitor their discharges, and we have that information that I will get to a little

bit later in my testimony, so yes, we have looked at that.

Q. What about combined sewer overflows?

A. Typically, those are not required to test for mercury, don't have that data.

MS. BASSI CONTINUES:

Q. If you implement -- following up on something that Mr. Bonebrake was saying a bit ago, if you implemented a TMDL that relies on reductions that you can control -- in other words, those within the state of Illinois, and you still have impaired waters after that is done, and because of transport, either through water or through air pathways, is your TMDL approvable by U.S. EPA?

A. Well, I don't know, but certainly, you would do the very best you could do in your distribution of the sources of loading to identify what those potential ones were. I have seen a draft TMDL that Minnesota has done where they identify a fair amount of their nonpoint source loading as coming from outside their state, air deposition loading. It hasn't yet been approved by U.S. EPA.

Q. When a state does something like that, do they account for anticipated reductions from programs

that have been identified? And for example, in the Minnesota one, would they identify a certain level of reduction they would expect to occur when the national CAMR is put into place?

A. That's really getting more into what, in the water world, we call the "implementation plan" rather than the actual calculation of a TMDL. In looking at other drafts or final TMDL's, there's been variability as to how people with how are we going to get there, and in some cases, they do specific cliff talk about types of things, as Minnesota does, and some of the Georgia TMDL's that I looked at, they say, "Well, we expect that this is going to be a phase process, and there's going to be some reductions that will occur from federal rules that are going to be coming on line."

Q. I'm not as familiar with TMDL's, and so if I understand you correctly, what you're saying is that the level of specificity in a TMDL, as far as how you're going to reduce the daily loading, can vary and U.S. EPA may not be quite so exacting in what they approve as what we have seen in SIPS, which you probably don't know about?

A. Well, I actually know what that means, but the SIP is really more analogous to what we would call,

in the water world, as the implementation plan for a TMDL. The TMDL is just a calculation for loading, and it has a factor for point source loading, a factor for nonpoint source loading, seasonal variation and margin of safety, and that's, basically, what U.S. EPA looks at and approves.

Q. And so then there's a separate implementation plan to reduce the TMDL down to whatever your standard is?

A. Well, the TMDL is the load that --

Q. I understand.

A. The maximum load that you can have and still meet the standards. That's, basically, what the definition is. The implementation plan defines what actions would need to occur to get those load reductions.

Q. Does the action plan or the implementation plan have to be approved by U.S. EPA?

A. The implementation does not have to be approved by U.S. EPA.

Q. Does the State have some level of obligation to achieve a TMDL or to set a TMDL that protects water quality?

A. That is the goal. If the State does not

develop a TMDL within a certain time frame, then the U.S. EPA is obligated to do so.

Q. Thank you.

MR. RIESER CONTINUES:

Q. Ms. Willhite, is this rule being proposed as an implementation plan for a TMDL?

A. I don't believe that's -- no, but I can certainly see the relationship, and that's certainly why the water program of the Illinois EPA that rule would be a very key component to our ability to reduce impairments in the state.

Q. So you are not identifying to U.S. EPA that this proposed rule, if adopted, would be part of your implementation plan for the TMDL?

A. Nowhere we are -- Illinois has not yet developed any mercury TMDL's, so we're a ways down the road before we would need to make that kind of identification to the U.S. EPA. My understanding is it is primarily what Illinois will use to present to U.S. EPA how they are going to implement CAMR.

MR. BONEBRAKE CONTINUES:

Q. Your testimony referred to a study in Massachusetts relating to fish tissue levels and some related reductions in mercury air emissions in

Massachusetts, and my understanding is that the state of Massachusetts has submitted a proposed TMDL to U.S. EPA. Do you know the status of that submission with respect to U.S. EPA's approval?

A. As far as I know, Massachusetts has not proposed a TMDL to U.S. EPA. What they have proposed to U.S. EPA is, under the TMDL guidance, you can identify waters as being impaired, but not propose to do a TMDL, but some other plan that is going to result in meeting water quality standards. In the water world, we call that a 4-B Plan because that refers to the section in the guidance that identifies that category. Massachusetts had submitted that to U.S. EPA, and as far as I know, they have not yet heard back, officially.

Q. Did that 4-B Plan rely upon reductions of mercury emissions in the state?

A. I believe that they identified that mercury emissions in the state was going to be part of the plan.

Q. I think you said, to your knowledge, EPA has not responded to the plan?

A. To my knowledge, they have not.

MS. WILLHITE: 14-E: "Please explain what is meant by the phrase "margin of safety" and

describe how it is calculated. The term "margin of safety" is used in the context of TMDL's and including the uncertainty that accompanies the collection and analysis of data and the evaluation of those data as maybe conducted in water quality models. For example, uncertainty may be characterized by the use of different statistical ends, such as the mean, or maximum, for a data set with the same analytical evaluation. Future growth, also something states need to consider when conducting a TMDL on this is part of the margin of safety. I would say that the margin of safety is really not calculated. It's a factor that's estimated. A typical margin of safety factor is 10 percent. It might be higher or lower, depending upon the confidence that the TMDL developer has in the data set that's being worked with.

CROSS EXAMINATION BY.

MR. CONSTANTELOS:

Q. My name is Bill Constantelos, C-O-N-S-T-A-N-T-E-L-O-S. I'm really trying to figure this out. What I'm curious about is, on the actual methylation process, if you have a body of water and mercury is coming to it from a variety of sources, atmospheric, out of the ground, runoff or discharges,

since the methylation process is going to be different waterbody to waterbody, how do you know what is the amount of mercury that needs to be present that will not methylate at the rate that will contaminate the fish?

A. Yeah. That's a good question. Ideally, you set your water quality standard to address that, and the way that water quality standards are set up in the Clean Water Act is U.S. EPA develops a criterion, which is, typically, a suggested standard and on a state-by-state basis, the State can decide to use that water quality standard as suggested or to vary it in some way based on whatever kind of factors the State needs to take into consideration in setting that standard, but we have found -- in later responses to my questions, we'll address that -- that the suggested standard -- the water quality criterion that U.S. EPA suggests and that Illinois EPA adopted doesn't have a lot of relationship, necessarily, on an across-the-board basis. Water work as we discussed here is very, very, very site specific, very waterbody specific. The end point of interest for fish consumption is the amount of methylmercury in tissue. U.S. EPA is in the process of developing a suggested standard based on tissue level of methylmercury for states to consider if that's how they

want to -- how they want to set their water quality standards. It is difficult to identify what your end point for your model is going to be, given all of those factors.

Q. When you normally do a TMDL, you're taking the loading, and you can calculate the amount of material that will manifest itself in the water column, and see if you are over the water quality standard or you're not. In this case, you have water that is entering -- I don't know if its environment is subjected to methylation by bacteria, and it may be that you can remove all air sources and still have enough in those environments to methylate, contaminate the fish and cause it not to be fishable.

MADAM HEARING OFFICER: Is that a question, sir?

MS. WILLHITE: Actually, we have seen a study that suggests that sediment doesn't act as a reservoir that continues to feed the bioaccumulation of methylmercury and fish tissue that's recently deposited within weeks to months, to maybe a year, is what is most important in a methylation bioaccumulation process.

MR. CONSTANTELOS CONTINUES:

Q. Sediment that's covered you are going to

have runoff from surrounding environments, mercury in the soil. There can be other nonpoint sources, and then, clearly, in a lake system when you have spring and fall, those things turn over, and the lake becomes heterogeneous, and you have actually resuspended the mercury sediment. In quiescent parts of lakes, you won't have that, but normally --

MADAM HEARING OFFICER: You are getting beyond questions --

MR. CONSTANTELOS: What I'm really driving at is, if you don't know how much mercury you need to limit to in order to meet the TMDL --

MADAM HEARING OFFICER: I also think that question is probably one that's more appropriate for a situation where we're determining what a TMDL is. If you can give a short answer, that would be great, but we need to get back on topic here. I think we have gotten pretty far field.

MS. WILLHITE:

A. You have to have some sort of end point that you are pointing at in order to view the TMDL calculation you have to have some sort of numerical end point that you are aiming at, which is one of the challenges in viewing mercury TMDL's. It's one of the

challenges in doing a TMDL. For example, nutrients, if you don't have a nutrient standard, if you don't have a phosphorus standard, it's very difficult to use the models for doing the TMDL calculation without that end point, so those states that have done TMDL's come up with a number that they believe is what they are aiming at and that's how they calculate the TMDL.

MADAM HEARING OFFICER: Question 15, then.

MS. WILLHITE: We're to 15. "In the second full paragraph of page two of Ms. Willhite's testimony, she states that `when a waterbody is not supporting the fish consumption use, then the waterbody is identified as impaired and is placed on the 303-D list.' A, what does "fish consumption use" mean?" The answer is fish consumption use is one type of beneficial use that the state may designate for a waterbody under the Clean Water Act, Section 303-C-2A. B: "With respect to mercury, is the nonsupporting fish consumption use the only basis upon which the Agency has listed waterbodies in the state of Illinois as impaired?" That's the answer I gave you earlier. It's the current version of the Illinois EPA assessment database, and this is the database that we use to

accumulate the results of our assessment of waterbody condition mercury is identified as a potential cause of impairment for 78 what we call assessment units and an assessment unit is a specific stream segment, or it's a lake. So to repeat, mercury is identified as a potential cause of impairment for 78 assessment units. Fish consumption use was impaired in 75 of these due to excessive mercury in fish tissue. Aquatic life use was impaired in three of these assessment units due to primary criteria, other than mercury. However, excessive mercury or water sediment was identified as one of the potential causes of aquatic life impairment. 15-C: "If not please identify all the sir calms under which the" --

MR. BONEBRAKE CONTINUES:

Q. What were those three assessment units?

A. I don't have that in front of me, but I can try and get that for you.

MS. WILLHITE: 15: "If not, please identify all the circumstances under which the Agency has listed a waterbody as impaired with respect to mercury." So I answered that in B. 15-D --

DR. HORNSHAW: I'm going to take the rest of 15. "What concentration of mercury or

methylmercury in fish tissues demonstrate that a waterbody is not supporting the fish consumption use?" We have already discussed this. It's greater than .05 milligrams per kilogram in tissue. E: "Has this number changed over time?" I can't answer this directly because I've only been involved with the Fish Contaminant Program since the late 80's. I've been told by the previous chairmen of the Fish Contaminant Program that initially, when the Fish Contaminant Program started in the mid 70's, they used the one milligram per kilogram action level that the Food and Drug Administration uses for commercial fish. That was changed by the Department of Public Health to .5 milligrams per kilogram in the late 80's prior my involvement with the Fish Advisory Program, and we switched over to the current risk-based approach based on the Great Lakes Protocol in late 2001 for the 2002 advisories. "When did that last change?" I just answered that.

MR. BONEBRAKE CONTINUES:

Q. Dr. Hornshaw, if I understood your answers correctly, does that mean that any waterbody in which fish tissue mercury levels have been identified through sampling above .05 parts per million will be identified

as impaired waters in the state of Illinois?

A. That's correct.

MR. RIESER CONTINUES:

Q. Yeah, Dr. Hornshaw, I understand you're not a lawyer. Are you aware of any statutes that give authority to the Illinois EPA or the Illinois Department of Public Health to issue fish advisories?

A. There are none.

Q. And when you talked about how these fish advisories are changed at different points, does that process go through some type of rulemaking process?

A. No, it doesn't.

Q. So these are changed without any notice to the public and opportunity to comment?

A. That's correct.

MADAM HEARING OFFICER: Ready for Question No. 16. Ms. Bassi.

MS. BASSI CONTINUES:

Q. I'm sorry. If there's no statute or regulatory process that underpins the fish advisories, are these -- are the criteria or the -- whatever is used to establish a particular fish advisory -- explored, such as for mercury when you go through the process of doing the TMDL? I mean, is there ever any kind of

public input.

A. Yeah. I would say that's probably less with the TMDL process, but our listing process definitely goes through public comment and a hearing, and starting this year -- we do these every two years assess the waters, analyze those that are impaired. Starting this year, the assessment and the listing of impairments are one report, so the whole thing goes through public comment and public hearing, and very clearly, we define what and how the fish consumption advisories are developed in Illinois.

MS. GEERTSMA CONTINUES:

Q. I was just wondering if there are any consequences for not following a fish advisory.

A. Not that I'm aware of. Just advice.

Q. So if the process described in another process, would that subsequent description provide people who are interested in how the advisories are being set, would that give them information as to where they could submit their comments on how the advisories are set?

MS. WILLHITE: Since the discussion of -- we described the link between a fish consumption advisory for a specific waterbody being determined and

what that means to our decision about impairment of the waterbody in our integrated report related to assessment and recording of impaired waters. And that certainly is an tunnel for the public to comment. Since that's mentioned in there very explicitly, I would assume that would be an opportunity for the public to comment on the process of setting advisories.

MR. RIESER CONTINUES:

Q. Is one of the means by which the Agency determines that a waterbody is impaired is if the sediment within that waterbody is of water quality standards?

DR. HORNSHAW CONTINUES:

A. Yes.

Q. The water quality standards, of course, are set by the Pollution Control Board?

A. Yes.

Q. And then one of the other means that the EPA the IEPA has determined a waterbody is impaired is by the fact that a fish advisory has been issued. Is that correct?

A. Yes.

Q. And so because once the IEPA determines that a waterbody is impaired, then it takes this action

of developing a TMDL?

A. Correct.

Q. So that would be the legal consequence of the waterbody being impaired and the legal consequence of there being a fish advisory established?

A. Yeah, but the TMDL list is not a binding thing. The TMDL for point sources is implemented through a discharge permit for point source. There is no binding -- there's no permit for runoff, so the TMDL identifies the loading that would contribute to the impairment, but there's no, on the nonpoint source side, really no binding legal consequence in the same way that having a permit sets in place enforceable conditions.

Q. But the TMDL would set -- what would be used to implement a TMDL would be used to establish additional permit limitations that otherwise would not be required in an --

A. If a point source needs to be reduced in order to meet the TMDL level.

MADAM HEARING OFFICER: Question 16.

DR. HORNSHAW: I'm going to take 16. "In that same paragraph, Ms. Willhite states that the statewide advisory is based on methylmercury being found routinely at levels of concern in predator fish tissues

collected from throughout the state. With respect to this statement, A, have fish tissue samples collected by the Agency been analyzed for methylmercury, as opposed to total mercury or some other form of mercury?" I believe I have already answered this. We assume it's all methylmercury.

MR. BONEBRAKE CONTINUES:

Q. Just a follow-up. Dr. Hornshaw, you're answering a question that was directed to a quote from Ms. Willhite's testimony. Ms. Willhite, do you have a basis, then, for the statement that was made in your testimony?

MS. WILLHITE: Let me just read it real quick. Yeah. This is actually a quote from what we say in our report on conditions of waters, as we mentioned, involves incorporating our process for fish consumption advisories.

DR. HORNSHAW: B: "If those samples have not been specifically analyzed for methylmercury, does the Agency make any assumption about the percent of mercury detected that is methylmercury?" I have also answered this. Yes. "If so, what assumption?" Greater than 95 percent of total is methylmercury. D: "What does "routinely" mean?" Our original review of the bass

and the walleye data show that nearly two-thirds to three-quarters of all samples have mercury that would require some kind of restricted consumption advisory, and David, you asked about this yesterday, and I did bring copies of what I presented to the Fish Contaminant Group at our meeting in September of 2001. Did you want me to admit those now?

MR. RIESER: Yes, please, that would be great.

DR. HORNSHAW: There are three settings of tables. Did you want to make those three individual exhibits or as part of one exhibit?

MADAM HEARING OFFICER: Let's make them individual exhibits. We heave been handed --

MR. KIM: That would be offered as a group exhibit, not three separate exhibits just --

MADAM HEARING OFFICER: I would prefer to enter them as three exhibits. Let me just explain that there is a reason for that. When it comes to writing the opinion and order, if we cite to an exhibit, if we have these as a group exhibit, then you have to say "12-A Exhibit," so if you give an individual numbers then I cite to them just as an exhibit, so I prefer to enter everything as an individual exhibit, so we will

start with the summary for -- we'll do that as Exhibit 12, if there's no objection. "Summary Information of Mercury -- "Summary Information for Mercury in Crappy Sections" we will enter as Exhibit 13, if there's no objection. And "Summary Information for Mercury in Bass Samples" admit as Exhibit 14, if there's no objection. Seeing no objections, those exhibits are admitted.

(Exhibit 12, 13 and 14 were admitted.)

MR. KIM: I apologize. Did you say after admitting those -- we are going to finish, do the rest of question 16? We have one more document. It's a document that Mr. Sprague referred to. I can offer that after we get done with this.

DR. HORNSHAW: Where was I? 16-E (sic).

MADAM HEARING OFFICER: Did we have an answer to 16-D?

DR. HORNSHAW: That's what I'm doing, 16-D. As I said, we had the annual meeting of the fish Contaminant Program in September of 2001. First of all, we had to decide how best to incorporate the reference dose for methylmercury, instead of at that time what was enforce at that time, the .5 milligram per kilogram criteria, that the Public Health had developed in the

late 70's. We decided, yes, we were going to do that, and do it as the Great Lakes Protocol instructed us how, and there are five consumption categories, unlimited; one meal per week; one meal per month; one meal every other month; and do not eat, and all that information I have already discussed is in Table 4.2 and 4.3 of the Technical Support Document, and after we made that decision, we had to decide how to address the mercury data and fish samples that we had accumulated to date, and I believe I misspoke yesterday when I answered your question, Dave. I said I prepared these tables from all the data available, and that's actually, from 1988, through 2000, the data that were available at that time. There was some data prior to that, but I didn't have a lot of access to early data, and I'm not sure of the quality of it because it was done by other labs, as I have testified. I'm going to answer other questions, but the data for 1985, on, was done strictly by the Illinois EPA lab or contract lab under our control, so that's the data I have most confidence in, and that data starts, basically, at 1988, so this is what the Fish Contaminant Group had available in late 2001, and what we did was look at -- if you will see at the end of each species, there's a column or a row that says, "Percent

in each group; percent in advisory group." What's especially important is the one that says "Percent and Advisory Group" and for your information, "BDL" means below detection limit. Group one is the unlimited group; Group 2 is the one-meal-per-week group; and Group 3 is the one-meal-per-month group. If you look at Group 2, plus Group 3 for each species, you will see it's in the range of two-thirds to three-quarters of all the samples available at that time, all waters, all samples, so that's how we decided that a statewide advisory was needed at the one meal per week. From the best professional judgment of the members of the committee, that was the most appropriate way to describe the predator data, so that's how we did that advisory. I had, as a follow-up to this, the data for largemouth bass that's presented in the Technical Support Document I would say strongly confirms the findings that we came up with in 2001 in that the statewide means for this larger and more recent data set, and there's two different ones. One was used in one half the detection limit to represent the nondetect samples in that statewide mean was .17 milligrams per kilogram, and if you use the full detection limit of .1 parts per million, then the statewide mean is 1.9. These values

are well within the .06 to .22 range for the one-meal-per-week advisory, so I would submit that the initial decisions we made in 2001 had been born out by more recent data in a larger data set. I hope that answers D.

MADAM HEARING OFFICER: Any follow-ups on D? Mr. Bonebrake.

MR. BONEBRAKE CONTINUES:

Q. I was going to say I think you mentioned that we would have an opportunity to ask some more questions about this table tomorrow.

MADAM HEARING OFFICER: Since it is getting to be five o'clock. We will stop here at D an give you guys time to look at them over tonight.

MR. RIESER CONTINUES:

Q. Let me just ask a couple questions about the tables, themselves, to make sure I understand it. Looking at the bass samples -- well, first of all, each of them says "1988, to the present," and in fact, that should be 1988 to 2000.

A. "The present" meant the meeting that we had in September of 2001. Very few of these data would have been from 2001, so it would be primarily 1988 through 2000.

Q. In each of the columns -- well, the many of the numbers -- there are a set of numbers in parenthesis. Is that the range of values that you found within that group?

A. No; no. That's the size range of the fish in that group in inches, so for instance, the very first entry in largemouth bass for lakes -- the Fox Chain, lakes in Group 2, there were five samples from the Fox Chain in that time period, and those samples ranged from 12.6 inches to 16.4 inches. This was important information for the fish committee because it's a well-known fact that the length of the fish is a good predictor of mercury contamination. The older the fish, the longer it's been able to eat contaminated pray, so the more mercury it's going to have in its tissues. The case length made a difference in how we were going to issue an advisory, so that information was given for the group to use.

Q. Another question is it's my understanding that you took some of the fish that were listed as being BDL, below detection limits and placed them in Group 1. Is that correct?

A. That's because the average concentration is what's important in most of our fish advisories. And

since below detect limit you can't factor that in, I made the assumption that half of the samples were at less than or -- the detection limit at that time was .1 million grams per kilogram for all, but a very few samples -- and a common assumption is that when you don't have that value, the central tendency of the unknown value is around one half of the detection limit, so I put half of the group that was BDL in Group 1, which has an upper limit of .05 milligrams per kilogram, and the other half in Group 2 where the assumption was that half of the fish would be between .06 and .1.

Q. So what number is in BDL?

A. Again, using the Fox Chain example, five of the samples were less than .1 milligrams per kilogram.

Q. So they all ended up in Group 2?

A. No. As I said, half went to Group 1. Half went to group 2 for the purpose of calculating percent in each level I assume half of the fish that are listed as below detection limit would be in the eat-all-you-want group, and half would be in the one-meal-per-week group for purposes of summary statistics.

MR. BONEBRAKE CONTINUES:

Q. Just a related clarification to make sure that we have a proper understanding as we consider it some more this evening, your Group 1 column then represents the results of fish tissue sampling with mercury levels between zero and .05. Is that correct?

A. That's correct.

Q. And Group 2 is .06 to .1 parts per million?

A. That's correct.

Q. And Group 3 is .89?

A. .95.

Q. I'm looking at a footnote -- or table of page four on your bass table.

A. That would be correct, then.

Q. So .89 would have been correct?

A. I can't remember if that was an error on my part because the actual value was .95 or if that was the maximum value in detected. I just don't remember. I think it's probably an error on my part, and it should have been .95 because that's the actual range that was used.

MS. BASSI CONTINUES:

Q. Do you have more on the statement -- I had just one other question. It still wasn't clear to me

what the difference was between the bottom two rows percent in each group and percent in advisory group on your tables.

A. Percent in each group is just a percent that would be in the below detection limit group, Group 1, Group 2, or Group 3 should sum to 100, and then percent in each advisory group you can't put the BDL's into an advisory group because you don't know what the concentration is, and that's why I had to do the math that I described to David, and that resulted in percentage in Group 1; Group 2; and Group 3 over all the samples we had for a particular species in that time frame.

Q. I will be quick. So then your answer I think all of this is in response to Question 16-D in which we asked, "What does routinely mean?"

A. I was hoping that would answer that. I don't know how better to answer it.

Q. But was this a one-time thing or is this something now that you do routinely?

A. Like I just said, the new information from the TSD confirms what we did then because the average falls right in the middle of the point O 0 to point the 2 range for bass samples in much larger and more

coverage across the state data set.

Q. But it sounds like, from what you are saying, then, that the sampling process is not something that is done on a continuing basis at some set interval, but rather than it was done for you to gather data for this table for this meeting in 2001, and then you updated the data for the TSD. Is that correct? Do you do this all time or did you do it just for these purposes?

A. Do you mean collect samples for the Fish Advisory Program?

Q. Yes.

A. I go into great detail answering one of the questions directed to me. The short answer is, from 1997, on, we tried to get 400 samples per year, so yes it's a routine monitoring program.

Q. Thank you.

MADAM HEARING OFFICER: Mr. Kim, you had one more exhibit you wanted to admit today.

MR. KIM: I can do it tomorrow morning.

MADAM HEARING OFFICER: We will resume at nine a.m. tomorrow morning.

CONTINUATION OF

MARCIA WILLHITE FROM 6/13:

MADAM HEARING OFFICER: Good morning. Again, my name is Marie Tipsord, and I'm the hearing officer in this proceeding, RO6-25. This is day three of the hearing. Again, we will continue day to day starting every day, until nine. Tomorrow we will begin at nine, and recess around 10:30 and break, until about 12:30 or one, depending on where we're at.

During the breaks, I'm available to answer any questions. You may ask procedural questions of Tim Fox and Erin Conley, and any media inquiries should be directed to Connie Newman. My panel today is, on my left Dr. Tanner Girard; to my right, Board Member Andrea Moore, the presiding board members, and at the far right, Nicholas Melas, a board member. Today Tom Johnson and Anand Rao are in Joliet at a hearing on site-specific rulemaking, so they could not be here today, but we do have Alisa Liu from our technical unit today on my left. Connie Newman and Erin Conley, and I think that covers the board staff today. Dr. Girard, anything to add?

DR. GIRARD: No, just good morning and thank you for coming back. Good to see everybody and

let's get to work.

MADAM HEARING OFFICER: Ms. Moore?

MS. MOORE: Moving along.

MADAM HEARING OFFICER: And I believe we're at Dynegy's questions of Marcia Willhite, Question No. 16, D into E, but Mr. Kim, you wanted to enter an exhibit first, correct?

MR. KIM: Yes. This is a carry-over from Mr. Sprague's testimony. I believe he made reference to a document. There's some questioning concerning a 6 percent figure that he provided and this is the document that he was referring to.

MADAM HEARING OFFICER: Mr. Kim, we need, at least, four copies of exhibits when you hand them to us.

MR. KIM: I'm sorry. Can we give those to you at the next break?

MADAM HEARING OFFICER: Yes. For the record, this is "Blood Mercury Levels in Young Children and Childbearing Aged Women in the United States, 1999 to 2002" published November 5, 2004. If there's no objection, we'll mark this as Exhibit No. 15. Seeing none, it is Exhibit No. 15.

(Exhibit No. 15 was admitted.)

MADAM HEARING OFFICER: I think we are ready to begin -- you have to speak directly into that one.

DR. HORNSHAW: I will do that. Did you want to ask if there's questions for 16-D or should I --

MADAM HEARING OFFICER: That's okay. Are there any follow-ups? Mr. Bonebrake.

MR. BONEBRAKE CONTINUES:

Q. Yes, Dr. Hornshaw, I had some follow-up questions pertaining to the tables, three tables that were presented yesterday by you, and I thought perhaps we could use Exhibit 13, which is your table relating to crappy samples.

A. Okay.

Q. I just want to make sure that I fully understand the information that is on this table. Is this correct, based upon this table, that 70 percent of all crappy samples between 1988 and 2001 were below reduction levels?

A. That's correct.

Q. And 10 percent of the samples during that period of time were at or below .05 parts per million?

A. You're talking about just lakes now,

right?

Q. We are talking about lakes. Thank you for the clarification.

A. The answer I gave you before was the total data set. The answer is yes to lakes for both questions you have asked so far.

Q. So a total of 80 percent of the crappy samples from lakes, between the period of 1988 and 2001, were either nondetects, or below .05 parts per million?

A. Correct.

Q. And .05 parts per million is that the current most stringent numeric fish advisory level?

A. Yes. That's the upper limit of where we can say you can eat all you want.

Q. With respect to rivers, during the period of 1988 to 2001, were a total of 76 percent of crappy samples below the deduction level?

A. No. That's all waters.

Q. So 100 percent were below?

A. 100 percent of five samples.

Q. So in fact, for rivers, then, we had, for the crappy samples between 1988 and 2001, there were no samples with reduction levels of mercury.

A. That's correct . All five samples were

nondetects.

Q. If I understood it yesterday, you were making the assumption in connection with decision making that flowed from the information on these tables that a fish that contained nondetectable levels of mercury, at least, half of those fish were -- had mercury, in fact, at 50 percent of the detect limit?

A. That's the assumption we made, yes.

Q. And the other half had mercury at the detection level?

A. Somewhere between .06 and the detection level, yes. That's how we wound up with 50/50 in group one and group two, by that assumption.

Q. Was there data available to you, crappy fish sampling data, available to you for the period prior to 1988?

A. Probably. The database I use, for some reason, does not contain mercury results from the beginning of the Fish Contaminant Program in 1974 through about 1982 or 1983, so I would have to go back to a printout that I asked for from the people who run the Storet database, which I have questions asked of me later, to look at what was detected in all of those early samples and I haven't gone through it. It's a

printout about that big because there was a lot of samples run in early years for mercury, and I just haven't gone through those to find out what crappy data there are.

Q. I think you just mentioned the time period 1974 to around 1983?

A. In that, roughly, time period.

Q. Were there additional crappy samples between `83 and `88?

A. I couldn't tell you. There may have been. There were very few samples run on any species during that time period.

Q. Again, to your knowledge, similarly, were there walleye and bass samples collected during the period of 1974 and 1983?

A. Lots of them, yes, especially bass.

Q. Do you have that data?

A. It's all in that big printout that I just mentioned in Storet. I don't have that in the personal database that I have.

Q. It sounds like we may talk some more about that when we get to some related questions for you.

A. Okay.

MADAM HEARING OFFICER: Mr. Zabel.

MR. ZABEL CONTINUES:

Q. I'm not sure I understand that correctly. Group one is unrestricted. Is that correct?

A. That's correct.

Q. Group 2 has advisories for it?

A. Correct, one meal per week.

Q. If we assign a portion of the nondetected fish at group 2, we will always have advisories, won't we?

A. Not necessarily. We make the assumption in the Fish Contaminant Program that the nondetect samples are around .05 parts per million after detection limit, so if that's the case, then -- if we have all nondetect data for a fish species for a particular body of water, we will not put that on an advisory, so our assumption is the average of all the nondetect values is around .05, which is the upper limit.

Q. I'm sorry. Now I am confused. I understood that, if you had six samples below the detection limit, you assign half of them to group one and half of them to group two.

A. Only for the purposes of this exercise. When we were trying to figure out what we were trying do with the fishery data we had at the time, we decided to

make a change-over.

Q. But having assigned half of them to group 2, that creates an advisory?

A. What we were trying to do with this data is figure out where the bulk of the samples lie in the main data set, so that if we decided to issue an advisory statewide, we had to be comfortable that the majority of the waters in the state, the predators in the waters of the state, required some kind of an advisory, and in order to deal with nondetects we had to make some assumptions about the distribution of values that were below the detection limit in order to place them into groups for the purposes of our deliberations.

Q. But as long as you do that, aren't we going to have fish advisories for all the fish that are below the detection limit?

A. As I said, if we have a bunch of fish that are all nondetect when we're making actual decisions about placing individual waters on an advisory or not, if all the values are nondetect, we make the assumption that the average concentration is .05, and we won't put that water on the advisory. This stuff on these table was a one-time-only deal to look at values across the state, not to look at individual waters.

Q. Well, I guess I still don't know how we're going to avoid the problem of below the detection limit going forward, then.

A. What do you mean by "going forward"?

Q. You're continuing to sample fish. Is that correct?

A. That's correct.

Q. You are continuing to get results for, at least, some of those fish that are below the detection level?

A. Not very anymore. Last year -- I'm sorry, 2004 -- the lab made some upgrades in the mercury analytical equipment and the detection limits are now around .01 to .03.

Q. So you don't have the BDL problem as the detection limits get more precise?

A. That's correct.

MADAM HEARING OFFICER: Mr. Bonebrake.

MR. BONEBRAKE CONTINUES:

Q. It might be useful to clarify, when we talk about the term "nondetect" what does "nondetect" mean?

A. It means that the sensitivity of the equipment only allows the analyst to look so far down on

the concentration curve that's set up, and once you get below the level that's accurate, then, if there is a signal there, but it doesn't meet the requirements of the lab protocol, that value will be marked with a J-code, which means detected, but the concentration is questionable. If there is no signal there, it's given a K-code, which means not detected.

Q. So in the circumstances where we've been talking about the nondetect data that you allocated between group one and group two, that means there was no signal for the presence of methylmercury?

A. That's correct.

MADAM HEARING OFFICER: I think we're ready to move on to E --

MR. RIESER CONTINUES:

Q. If I may, these samples that are in the three exhibits, these samples were taken over, essentially, a 12-year period, from 1988 to 2000.

A. That's correct.

Q. Was there one group of samplers who did that work?

A. Almost exclusively, DNR field biologists.

Q. Did they operate under the same sampling protocol?

A. Yes.

Q. Did they go to -- did the samples go to the same lab?

A. They were either run by our lab -- I guess the majority of these samples were run by the IEPA lab. There may have been some that went through a contract lab under the direct supervision of our lab, if there was not enough laboratory capacity at a particular time. We try to have them run through our lab, if possible.

Q. And in looking at this collection of samples over the 12-year period, did you look for whether there were any changes over time?

A. Trends?

Q. Yes.

A. I have a much larger answer to that in the questions asked of me, but I can do that now if you want.

Q. Why don't we wait for the much larger answer. Thank you.

MADAM HEARING OFFICER: Anything else? 16-E.

DR. HORNSHAW: "How many lakes, rivers and streams in Illinois have not been sampled for fish tissue mercury levels?" I believe I have answered this

one already prior. Since ponds and other private waterbodies are not eligible for sampling in the Fish Contaminant Program, I really can't answer this one.

MADAM HEARING OFFICER: Mr. Bonebrake.

MR. BONEBRAKE CONTINUES:

Q. Do you have an impression or opinion Dr. Hornshaw, roughly, of the percentage of lakes in the state that have been sampled for fish tissue mercury levels.

A. I wouldn't even want to try and hazard a guess because I really don't know how many lakes are in Illinois, or ponds.

Q. Same question with respect to the percentage of rivers in the state sampled.

A. Again, that's problematic. The field biologists are instructed not to select samples from river segments where there is no public access or where there's not enough evidence of fishing, even on waters that are open to the public, which are very few rivers in Illinois, so that they are not going to collect a sample from a small stream that either does not support a viable fishing population or not really accessible by Illinois anglers, so again, I don't know what percentage of the total river miles in Illinois are even available

to anglers to fish, let alone ones that we could collect a sample from that would be representative of those waters.

MADAM HEARING OFFICER: Excuse me. Maybe it's just that I haven't had enough coffee yet this morning. Can you answer how many or even a percentage or an idea of how many that are publicly accessible? I know you don't know how many, but let's say the Illinois river segments that are available.

DR. HORNSHAW: Those are all available to the anglers, Mississippi, Ohio.

MADAM HEARING OFFICER: How much of that stream segments -- of those river segments has been tested? Can you answer that? If not, that's okay.

DR. HORNSHAW: I would guess all of them, but I'm not familiar with how the Bureau of Water segments up the river. We have a whole bunch of data from the Illinois River going all the way back to the beginning of the Fish Advisory Program. Some of those stations are what they are termed as permanent stations, and they were used for annual or semiannual sampling under a previous protocol that the Fish Contaminant Program operated under . There's other samples, state samples stations, that may have been visited once in the

entire period of 1974, through 2006, called nonpermanent stations, so my guess is, between the permanent and the nonpermanent stations, most, if not all, of the Illinois rivers have been sampled, at least, once?

MADAM HEARING OFFICER: Is sampling data between DNR and EPA shared?

DR. HORNSHAW: Absolutely, and Public Health, as well.

MADAM HEARING OFFICER: Thank you. I'm sorry. I just wanted to follow along. Mr. Zabel.

MR. ZABEL CONTINUES:

Q. You say, at least, all of the Illinois rivers have been sampled, at least, once. Is that once per year or once forever?

A. Once forever.

Q. Over the entire time you've had maybe some segments sampled just once?

A. That's likely, yes.

Q. Let me parse the other question, and maybe we can get at it this way: I understand there are private ponds and things that the Department or the samplers don't have access to. Public lakes, what percentage of those do you know have been sampled?

MS. WILLHITE: We have, like, 91,000

lakes in the state of six acres or more, and I don't know the answer to how many have been sampled for fish tissue.

MR. ZABEL: How many samples are taken each year?

DR. HORNSHAW: Our protocol calls for us to try to get 400 samples per year because that's what the analytical budget allows, fish, being what they will, they don't cooperate, and we almost never get the 400 samples. We actually overschedule to try and compensate for that, but it just doesn't seem to work out that way. I guess that's why they call it fishing. If you caught them every time, they would call it catching.

Q. I hope I'm not fishing, Dr. Hornshaw. 400 samples and there are 91,000 --

MS. WILLHITE: Lakes.

MR. ZABEL CONTINUES:

Q. Still bodies of water, not counting rivers.

DR. HORNSHAW CONTINUES:

A. And I don't know how many of those 91,000 have public access. I can't really answer your question of what percentage have been sampled.

MR. BONEBRAKE CONTINUES:

Q. When you say 400 samples, do you mean 400 fish samples or do you mean 400 waterbodies that have been sampled?

A. 400 fish samples.

Q. So the number of waterbodies sampled might be less than 400?

A. Much less.

Q. How much less?

A. We try to get somewhere in the range of 40 to 70 bodies of water each year. Well, lakes, plus stream segments each year. You may get more than one segment from a particular stream, especially if they are doing the Illinois, Mississippi, or Ohio in a particular year.

Q. So of the 90,000 or so lakes, in any given year, you would be sampling less than 40 of them?

A. Yes.

MS. WILLHITE: Let me just add a little bit to this answer to just give a general overview of monitoring programs in the state. We're required to assess waters as best we can. In a typical year, we are assessing water quality for about 20 percent of the state's waters. That's what our

resources allow us to do. That's probably towards the higher end as you look at monitoring programs across the nation. That's probably at the higher end of quality of monitoring programs. We sure would like to be able to do better, assess more, but that's just where we are. I have a question that's asked of me later, but I will go ahead and answer, but I might --

MR. BONEBRAKE: Dr. Willhite, if I may, can you identify the question.

MS. WILLHITE: Sure I will. I appreciate the "Dr." Although it's just "Ms." The question is what percentage and -- I'm sorry. I believe it's 18-L, sub 1, "What percentage and number of Illinois waterbodies have been, and currently, are subject to fish tissue sampling, water column sampling and sediment sampling by the Agency?" We answered this question assuming you wanted to know the convergence of what percentage of waterbodies have all three of those types of sampling. And the answer is, at least, 2,800 miles of Illinois streams have been and are currently monitored for fish tissue contaminants, water column physical chemical conditions and sediment conditions. These 2,800 miles comprise 4 percent of the total stream miles in Illinois. There are, approximately, 98 lakes

in Illinois monitored for fish tissue contaminants, water column conditions and sediment conditions. These 98 lakes represent, approximately, 3 percent of lakes in Illinois.

MADAM HEARING OFFICER: Ms. Bassi.

MS. BASSI CONTINUES:

Q. When you say these represent 3 percent of the lakes, is that the lake acres?

A. Number.

Q. The total number?

A. Right.

Q. 98 is 3 percent of 91,000?

A. That's what my notes said here. I'm sorry you're right. The denominator is 3,256 total number of lakes greater or equal to six acres. I misspoke earlier. 91,000 total lakes, 3,256 is the number of lakes six acres or greater.

MR. BONEBRAKE CONTINUES:

Q. Does the six acres or greater size that you mentioned, does that have some regulatory significance?

A. Not regulatory. This is DNR's information, Illinois Department of Natural Resources, and must have significance to them as far as category of

lakes.

Q. We've been using the terms "rivers" and "streams" and we'll be talking about these terms some more today. Just so we're all on the same page, are these terms used interchangeably from your perspective? I would ask the question of both Dr. Hornshaw and Ms. Willhite.

MS. WILLHITE: Yeah, rivers and streams are the same category the way we look at it.

DR. HORNSHAW: For my purposes, rivers and creeks are a little bit different. For the Fish Contaminant Program, anyway, we use streams to cover both. The bodies are usually named either X River or X Creek and if we use a generic term, we use "streams." And I would like to add a little bit on to what Marcia was just saying about the sample, the lakes that are sampled for all three, water, sediment and fish. We don't or in the Fish Contaminant Program, we schedule lakes based on what we need to do to keep up with our schedule and that's separate from what the Bureau of Water does for sediment, and fish tissue samples, so we will be collecting samples from lakes that the Bureau of Water will not be collecting water and sediment samples from every year.

MS. WILLHITE: There are lakes, and streams that we sample for water quality parameters, but we don't collect fish tissue samples.

MADAM HEARING OFFICER: Mr. Zabel.

MR. ZABEL CONTINUES:

Q. Just so I'm clear, the 2,800 miles of streams and the 98 lakes that sampling, that sampling is the 400 we're talking about?

DR. HORNSHAW CONTINUES:

A. It may be. The 400 samples that are budgeted for the Fish Contaminant Program, we do that on our own schedule. If it meshes with the Bureau of Water's schedule, fine. If not, then we go to DNR to collect them for us, anyway.

Q. As I understood the answer to 18-L, one of the elements was fish tissue sampling, and that's why I'm trying to make sure I understand.

MS. WILLHITE: When we assess a water body -- and let's talk about a stream -- we do it in a couple of different ways. We have fixed monitoring stations that collect samples every several weeks throughout the year. That's one type of data. Then we have, in the summer, we've got biologists that go out, and they sample chemical parameters, look at the

habitat. They collect the type of fish that are in there to assess the quality of the biological community there. If the schedule permits, and the waterbody is such that it would be a fishable portion of a stream river or lake, then that fish that were collected would be sampled for fish tissue levels, as well, but they don't always mesh. The information that I gave you is the percentage of locations where we have fish tissue data, water quality data and sediment quality data for the same location.

MR. ZABEL CONTINUES:

Q. For that same waterbody or segment?

A. Right. That's how we answered the question.

Q. So in a given year, that particular segment of a stream or lake might not be fish tissue sampled?

A. Right.

Q. Might not be in the 4040?

A. Correct.

MS. BASSI CONTINUES:

Q. Attempting to pull you two together a little bit more, when Bureau of Water inspectors are out collecting fish samples, as you just described, are

those fish samples -- are those tested in your labs Dr. Hornshaw?

DR. HORNSHAW CONTINUES:

A. Yes.

Q. Are they used then for your program? Is the data that you collect from that used for your program, Dr. Hornshaw?

A. Yes, and I think it might clarify things more to give an explanation of how we schedule the samples for the Fishing Contaminant Program. The Agency participated with DNR in what's called Base and Intensive Surveys, and the state is divided up into base basin regions, and every five years on a rotating cycle, all of these major basins and sub-basins are sampled, as Marcia has described, for water sediment and fish, so that's one component of how we draw up the sampling list for DNR each year. Another component is we follow up on waters on a routine basis that have existing advisories to make sure that the advisory is up to date and doesn't need to be modified. We also have a hand full of samples each year that are recommended for special projects, such as the Clean Lakes Program, that requires fish monitoring data. Then the bulk of the samples after that are made up of waters that need to be sampled on a

rotating basis, not as frequently as the waters that have existing advisories. These are waters that have no existing advisories, and they are on a five- to 10-year schedule for sampling or they are waters that have not been sampled in a long period of time, as I described earlier. There may have been only one sample in the entire 1974 through 2006 period, and we try to catch up on those as the sampling budget allows. So we have, basically, four different ways of identifying waters that need to be sampled in a particular year.

MADAM HEARING OFFICER: Ready to move on? Question 16-F. The question is "Has the frequency of water and tissue mercury --

DR. HORNSHAW: I was looking at the one she just answered. F: "Has the frequency of water and fish tissue sampling by the Agency changed over time?" Yes. I have a long answer to that in questions asked of me. Do you want that now or later?

MR. BONEBRAKE: Let's take that later.

DR. HORNSHAW: Then we'll put G off until later, also.

MADAM HEARING OFFICER: Question No. 17.

MS. WILLHITE CONTINUES: 17: "Has

U.S. EPA ever raised any concern or issue with respect to the manner or method by which the Agency has sampled or analyzed water sediment or fish tissue for mercury or any form of mercury?" No. So I will skip all of sub-A there.

MR. BONEBRAKE CONTINUES:

Q. Just a related question, I thought I heard one of you mention yesterday that there was some concern about some of the data that had been collected historically based upon the laboratory that had been used, if I understood the answer correctly.

DR. HORNSHAW CONTINUES:

A. That was my answer, and that's an internal concern to the fish contaminant program. Do you want me to go into that now?

Q. If you could, describe that concern for us, please.

A. Prior to 1985, any one of four laboratories could have done the analytical work for the Fish Contaminant Program, our laboratory, Department of Agriculture laboratory, Department of Health laboratory, and contract laboratory that was on retainer I guess at that time period, and it's been told to me by the previous chairman of the Fish Contaminant Program that

there were concerns raised, especially for chlordane and PCB analyses because a round robin test was done among the four laboratories, and there were known inconsistencies between the laboratories. I don't know if that inconsistency extends to mercury analyses because I wasn't familiar with the program at that point in time, but for the purposes of the Fish Contaminant Program, I almost always limit my searches to 1985, and beyond, when all of the laboratory work was done by our lab or by a contract lab under supervision of our lab, so for the Fish Contaminant Program purposes, I almost never go back to the earlier data because of these known inconsistencies.

Q. Have you had any concerns regarding the laboratory data for the post 1985 mercury samples?

A. No.

MS. WILLHITE CONTINUES: 18: "In the third full paragraph on page two of Ms. Willhite's testimony, she states that according to "the latest 2004 Illinois list of impaired waters, there are 61 river segments or 1,034 miles and eight lakes, 6,264 acres, that have mercury listed as a potential cause for impairment due to restrictions on fish consumption. With respect to this statement, A, how many total river

segments and miles of river are there in the state of Illinois?" The answer is, in Illinois, there are 71,394 miles of rivers and streams, including the large and great rivers on our borders. B: "How many lakes and acres of lakes are there in the state of Illinois?" And the answer is, according to the Illinois Department of Natural Resources, there are more than 91,400 inland lakes and ponds in Illinois, 3,256 of which have surface area of more than six acres, total lake acres in the state number 318,477.

MR. BONEBRAKE CONTINUES:

Q. Ms. Willhite, are you familiar with the 2004 Illinois Water Quality Report?

A. Somewhat, but I don't have it in front of me.

Q. Did you mention that there were a total of 71,000 miles of streams in the state of Illinois?

A. 671,394.

Q. What is the basis for that information?

A. I presume measurement, but I'm not certain.

Q. I guess did you pull that information from a particular document?

A. I presume that it was taken from the

Conditions of Water document. I didn't, personally, look up that number.

Q. I believe you mentioned there were -- what was the total number of lakes you mentioned, Ms. Willhite?

A. The total number of inland lakes is 91,400. Those that have a surface area of more than six acres, 3,256, and the lake acres, in total, for the state, 318,477.

Q. So if we wanted to know the percentage of lake acres for which mercury has been identified as a potential cause of impairment in the state of Illinois, we could divide 6,264 acres by 318,000 or so acres. Is that right, Ms. Willhite?

A. Yeah.

Q. And similarly, if we wanted to know what percentage of river segments have been identified as impaired with a potential cause of mercury, we could divide 1,034 miles by 71,000 miles. Is that correct, Ms. Willhite?

A. Correct.

MS. BASSI CONTINUES:

Q. I just wondered if the lake acres and the 3,256 number of lakes, six acres includes Lake Michigan.

A. No. "Inland lakes" means within the state.

MADAM HEARING OFFICER: Mr. Zabel.

MR. ZABEL CONTINUES:

Q. Just for the sake of clarification, lakes that were sampled are all over six acres?

A. Yes.

MS. GEERTSMA CONTINUES:

Q. Do you have any way of estimating about what percentage total lake acreage and total river miles are publicly accessible?

A. That's not something we typically assess. I'm sure there's a way of assessing that. I would probably call somebody over at the Department of Natural Resources, but I don't have that information.

DR. HORNSHAW: I can tell you that DNR has told me that there are, approximately, 17 rivers that have public access in Illinois. Almost all the rest are, basically, private property and not legally accessible to anglers.

MS. GEERTSMA CONTINUES:

Q. But these people on the public property could use the river for fishing, as well. I mean private property.

A. Only from bridges I guess.

Q. Let me rephrase the question. People who own the private abutting those rivers are free to use those rivers for fishing?

A. Of course.

MADAM HEARING OFFICER: But those rivers aren't sampled.

DR. HORNSHAW: No.

MR. BONEBRAKE CONTINUES:

Q. The 1,034 miles or so of rivers in the state of Illinois that have been identified as impaired due to mercury as a potential cause, I'm assuming because they have been so identified that means that there has been fish tissue mercury sampling in that river segment that has yielded results of greater than .05 parts per million. Is that correct?

A. Correct.

Q. Does it take just one such sample, then, to result in the identification of the river segment as impaired?

MS. WILLHITE: Well, I will defer to Dr. Hornshaw to answer the question about whether a decision is made about fishing consumption advisory based on one sample. Our impairment identification is

based on whether the fish consumption advisory and the amount -- I'm not speaking -- I need more coffee. Whether there is information that would suggest a consumption advisory is needed.

MR. BONEBRAKE CONTINUES:

Q. Just so I understand that, before we turn to Dr. Hornshaw, your identification, then, for purposes of the 303-D report is going to depend on the answer we're about to hear from Dr. Hornshaw?

A. Yes.

DR. HORNSHAW CONTINUES: I believe I stated yesterday that our policy to issue -- either add advisory, change an advise, or drop an advisory almost always has to be based on two recent years of sampling data and it can be for just one species.

MR. BONEBRAKE CONTINUES:

Q. What do you mean by "almost always"?

A. The advisory that we issued for the Fox River, technically, was based on two samples of some period of time apart about a hand full of stations. The Fox River advisory was kind of unique in that it was the subject of a massive investigation by DNR into whether the many dams on the Fox River needed to be left in place, upgraded, or taken out, so they went in and

generated a very large database for fish tissue contaminant for this project, but it was also used by the Fish Contaminant Program. The historical data for the Fox River consisted, at that time, mainly, of a few stations spread out across the whole length of the river over time, but in this case, we had data from either 16 or 17 stations up and down the whole river, and multiple samples usually from each station, so we determined, based on the data that was available, primarily from one year, but with a hand full of stations with more than one year, that the entire river needed to be put on advisory, so we don't have multiple years' worth of data for 10 or 11 stations that were located on the river, but all of the data from every one of the 16 stations indicated that carp and catfish needed to be on a strict consumption advisory based on PCB levels that were reflected.

Q. Have you run into the situation where you have a couple years of data, and say a sample from one year is above .05 parts per million, but in the other year it's either below that level or is nondetect? Have you had that situation present itself.

A. Yes, we have. In some cases, where the historical database goes back, and there's a consistent

record, we have decided to either issue or not issue an advisory. Most often what that would do is have us ask DNR to get a third sample from that water before we make an advisory decision.

Q. In connection with making that decision, what assumption, if any, does the Agency make with respect to the presence of mercury in samples which were below the detect level?

A. We assume that the value, the average value, over time would be -- and over a bunch of samples would be .05 parts per million, and we would not issue based on that.

Q. But if you had that nondetect information, in conjunction with the sample that was above detect and above .05, would you, in that circumstance, issue a fish advisory?

A. Like I said before, if there was other historical data that indicated that an advisory was needed or if there was a bunch of nondetects prior to that, I would say the advisory is not needed. That would be the course we would choose. If all we had was the two samples, we would ask DNR to go back and get a third set of sample the following year.

MADAM HEARING OFFICER: Mr. Zabel.

MR. ZABEL CONTINUES:

Q. You mentioned there were 16 stations on the Fox River. Is that correct?

A. For that sampling event, yes.

Q. Is that included in the 2004 data that is in Ms. Willhite's testimony?

A. I believe, but it was all PCB data.

Q. Not mercury?

A. That was of interest.

Q. I guess what I'm curious about is, if my math is right, each segment that you refer to would average about 17 miles in length. Is that correct?

A. I guess. I'm not that familiar with the Fox River.

Q. I'm thinking -- I'm sorry. I'm referring to Question 18 of the quotation from Ms. Willhite's testimony that's in question 18. It says 61 river segment at 1,034. My division it's about 17 miles.

MS. WILLHITE: I think the river segments are a variable length.

MR. ZABEL CONTINUES:

Q. So some have a much more course analysis than --

DR. HORNSHAW CONTINUES:

A. Yeah. Samples that DNR collected had nothing to do with river segments. It was all centered around dams, so some of those stations that's the only sample that we would have ever, probably, base it's not a station that we would designate as a segment.

Q. So there could have been two in the same segment?

A. Oh, I'm sure there was, yes.

Q. Just to finish line my arithmetic indicates the average lake is about 780 acres. I assume some are a good deal larger and some are a good deal smaller?

A. Absolutely.

MS. WILLHITE: I'm nodding my head yes.

DR. HORNSHAW: The three Arm Corp. of Engineers reservoirs are all greater than 1,000 acres, something like that, for example.

MADAM HEARING OFFICER: Anything further?

MS. WILLHITE: I would like further to the answer simply because we did spend some time talking about what percentage of rives and lakes are sampled, and I think probably most people would conclude it's a

pretty low percentage, so we have a portion of the picture, enough of the picture to call eight lakes in the 1,000 miles of river or stream impaired, but it's likely that much more than that are, just haven't been able to get out to get the sample to be able to verify.

MR. BONEBRAKE CONTINUES:

Q. In that regard, has there been any effort by the Agency to take what it views to be a representative sampling of the waters in Illinois?

A. That's what we try to go for, given our limited resources, is try to be representative in the size of stream and the number of lakes, but the number of locations that we do fish tissue sampling is a smaller subset than what we do for other types of parameters.

Q. Who makes that determination of what sampling will be representative in any given year?

A. Well, our biologists, our stream and lake biologists try to make that judgment as they plan samples for the next year.

MADAM HEARING OFFICER: Mr. Zabel.

MR. ZABEL CONTINUES:

Q. Let me throw you a softball. I take it the limitation on sampling is purely a budgetary

restriction. You would do more, if you had more money.

A. Yeah, you bet you.

DR. HORNSHAW: I will second that. Let me add a little to what Marcia just said. The Fish Contaminant Program tries to be representative, but there are instants where we direct sampling where we suspect there may be problems. For example, a lot of the waters that are on the special mercury advisory are in the far south end of the state, and in fact, that's where the two lakes that went on a mercury advisory from the beginning of the program, Cedar Lake and Kincade Lake are locate, so in the last couple of years, we have tried to oversample lakes and streams in the far southern end of the lake (sic) to get a better idea of how widespread mercury distribution is in that area of the state.

MADAM HEARING OFFICER: Dr. Hornshaw, I believe you mean the far southern end of the state.

DR. HORNSHAW: I'm sorry. I meant state.

MADAM HEARING OFFICER: I just don't want that to jump out at someone.

MR. BONEBRAKE CONTINUES:

Q. Has the Agency taken any effort to

identify why there is a need to oversample in that particular area?

A. Just historical data that suggests that the levels in the fish are higher than those waters in the far end of the state, so we try to get where we have the ability to schedule additional samples. We try to get those in areas where we think there may be problems.

Q. Has there been any study or analysis regarding why the mercury levels are higher in that portion of the state?

A. Not to my knowledge.

MS. WILLHITE: No.

MADAM HEARING OFFICER: Move on.

MS. WILLHITE: 18-C: I'm going to take C, D, E, and F together. C is: "Do figures 4.3, 4.4 and 7.1 in the TSD provide information concerning locations of fish tissue sampling and water column sampling in Illinois?" D: "Who prepared figures 4.3, 4.4 and 7.1 of the TSD?" E: "What is the source of information of these figures: F: "Please describe these figures 4.3, 4.4 and 7.1 and what information is provided on these figures." The answer is figures 4.3 and 4.4 identify water quality sampling locations the for 2004 study of mercury concentrations in ambient

water conducted by Illinois EPA Bureau of Water. The study is described in Section 4.4.3 of the TSD. I don't know what the page number is for that. Figure 4.3 identifies the 32 locations of lakes where samples analyzed from mercury were collected and notes the two lakes where mercury levels in ambient water were above the water quality standard of 0.012 micrograms per liter. Figure 4.4 identifies the 52 locations on streams or rivers where samples analyzed for mercury were collected and notes the three streams where the mercury levels in ambient water were above the quality water standard of 0.012 micrograms per liter. Fish tissue is not collected as part of the study. The Bureau of Water staff prepared the figures. Figure 7.1 denotes the locations of coal-fired power plants in Illinois, as well as the location of rivers and lakes listed as impaired on the 2004 Illinois 303-D list. The figures were prepared jointly by Bureau of Water and Illinois EPA Bureau of Air staff based on GIS information obtained by Illinois EPA.

MR. BONEBRAKE CONTINUES:

Q. Figures 4.3 and 4.4, do those reflect solely 2004 data?

A. Yes.

Q. If I understand the answer correctly, then, two of 32 sample lakes and three of 52 sampled streams had a mercury water quality issue, other than fish tissue mercury levels?

A. I would phrase it that, in those locations, the concentration of mercury in the water exceeded the .012 microgram per liters standard.

MADAM HEARING OFFICER: Ms. Geertsma.

MS. GEERTSMA CONTINUES:

Q. For clarification on the water quality standard that you're referencing, is that Human Health?

A. Yes.

MADAM HEARING OFFICER: That was shorthand for Human Health --

MS. WILLHITE: Water Quality Standard.

MADAM HEARING OFFICER: Thank you.

MR. BONEBRAKE CONTINUES:

Q. Follow-up question on Figure 7.1.

A. Yes.

Q. Is it your view, Ms. Willhite, that reductions in mercury emissions from the power plants identified on that figure will result in reduced mercury fish tissue levels in the impaired waters identified on that figure?

A. Yes.

Q. Can you quantify for us the extent of that reduction, Ms. Willhite?

A. No.

Q. I wanted to take further example -- Rock River, is that identified on Figure 7.1 as an impaired waterbody? Is the Rock River identified as an impaired waterbody?

A. Yes.

Q. That's for mercury.

A. Yes.

Q. And on this particular figure, the power plants that would be subject to the proposed mercury rule, are they identified as red circles?

A. Not on my version.

Q. You have a black-and-white copy?

A. I do.

Q. I actually have a couple of additional color copies, if I could give the witness -- I believe this is how it was filed with the Board.

MADAM HEARING OFFICER: Color copies were filed with the Board.

MR. BONEBRAKE CONTINUES:

Q. Just so it's clear, these are color copies

of Figures 7.1, 4.3 and 4.4.

Q. You have a color copy, Ms. Willhite?

A. Yes, I do.

MADAM HEARING OFFICER: You started to ask the color about the red circles.

MS. WILLHITE: Now I know where the red circles are.

MR. BONEBRAKE CONTINUES:

Q. Can you identify for us what's designated by the red circle?

A. Those are existing power plants.

Q. And are all of the power plants identified on Figure 7.1 west -- excuse me -- east and south of the Rock River?

A. Yes.

Q. Do you know, in the vicinity of the Rock River, Ms. Willhite, what is the prevailing wind direction?

A. No.

Q. Have you looked into that issue at all in connection with your testimony in this proceeding?

A. No.

Q. Would you believe that prevailing wind direction would be relevant to the question of whether

the power plants identified on Figure 7.1 would have impact on the Rock River?

A. I don't know.

Q. So your testimony is you don't know whether wind direction has any connection with impaired waterbodies in the state of Illinois?

A. I'm not certain.

Q. I think you mentioned, in response to an earlier question, that you had not quantified the extent of reductions that you would expect in mercury fish tissue levels as a result of the proposed rule. Is that correct?

A. That's correct.

Q. Have you done any analysis or study at all with respect to what the likely extent would be of reductions?

A. I really get into some of this opinion stuff a little bit later, if you would be willing to wait, until I get to those questions.

Q. That's okay with me. I guess, just to follow up, then, we have been talking a little about what quantification, or lack thereof, you may have done. Has the Agency done any quantification of the expected reduction of fish tissue mercury levels as a result of

the proposed rule?

A. No.

Q. Ms. Willhite, do you know of any evidence that the -- that any emissions from the power plants identified on Figure 7.1 are, in fact, being deposited in the Rock River?

A. I will answer in a later question that I have reason to believe, but I have no evidence.

Q. Maybe a follow-up on this line of inquire with respect to the later questions.

MADAM HEARING OFFICER: Anything further?

MS. WILLHITE: 18-G: What portion of these impaired rivers and lakes are also listed as impaired or potentially impaired due to the presence, one, of PCB's; two, other nonmercury contaminants, or three, any other cause." Assuming that by saying "also listed" means in addition to mercury, of the 78 assessment units, and I defined "assessment unit" yesterday as being a river segment or a lake, that have mercury as a potential cause of impairment, and that's the way that we phrase it. That's the way that we are asked to, by 303-D process, identify something as a potential cause of impairment -- 58, that is, 74

percent, of the assessment units that are impaired for mercury also have PCB's as a potential cause of impairment; 48, that is, 62 percent, of the assessment units have analyzed, other than mercury, PCB's -- it could include PCB's dissolved oxygen or PH as a potential causes of impairment, and 31, or 40 percent, of these assessment units, have other causes, but unidentified as potential causes of impairment.

MR. BONEBRAKE CONTINUES:

Q. With respect to the totality of waters that have been identified as impaired, do you know, Ms. Willhite, do all of those waters also have identified as a potential cause of impairment something other than mercury?

A. Do you mean the total of all waters that are identified as impairment, or the totality waters identified as mercury impaired?

Q. The totality of waters identified as mercury impaired.

A. Could you repeat the question?

Q. Sure. Of the waters in the state that have been identified as impaired for mercury, do all of those waters also have identified as a potential cause of impairment some other reason, such as some other

contaminant?

A. The way these data are presented I don't know that.

Q. Has the Agency taken any steps to prepare an analysis of what would be the likely plan for reductions of contaminants in impaired waters, other than mercury?

A. Well, what you have described to me means an implementation plan for TMDL. Yes. We have -- I can't remember the number of -- probably, a few hundred TMDL's that have been developed that include an implementation plan that we have identified for contaminants, other than mercury.

Q. I'm sorry. Did you say a few hundred?

A. Yeah.

MADAM HEARING OFFICER: Move on?

MS. WILLHITE: "The Agency's TSD, at page 51, notes various nonpoint sources that may impact water quality." H sub-1: "Has the Agency identified nonpoint sources, other than emissions from electric generating units, that are actual or potential nonpoint sources for mercury in Illinois? If so, which of these nonpoint sources contribute or have contributed to the mercury present in the waters listed as impaired for

mercury by the Agency?" Other testimony has identified the sources of mercury air emissions in Illinois other than -- other testimony has identified the sources of mercury air emissions in Illinois, other than coal-fired power plants. The Bureau of Water has not yet assessed, nor allocated, various nonpoint source contributions to mercury loading to a particular impaired waterbody. That would be done as part of the TMDL development process, and the Bureau of Water has not initiated any mercury TMDL's to date.

MADAM HEARING OFFICER: Ms. Bassi.

MS. BASSI CONTINUES:

Q. Just to help me along on this, could you tell me which other testimony that was?

A. I believe Jim Ross' kind of a pie chart of contributions to air emissions is located.

MADAM HEARING OFFICER: We also I think discussed yesterday, at some length -- I think that came out yesterday when we talked about the TMDL that there were other nonpoint sources of mercury yesterday afternoon, just to refresh your memory.

MS. BASSI CONTINUES:

Q. Pardon me, but is someone going to elaborate more on what these other sources are? I mean,

Jim Ross' testimony, as you say, was kind of the over all pie chart of what's going to be done. Is that all we're going to hear on this particular topic, what these other sources are?

A. Well, I was addressing the fact that, from a water standpoint, any air emissions of mercury is in the nonpoint source category, and as the process of developing a TMDL, you have to figure out what the loading is and understanding where it's coming from will help you in the implementation part. It's not necessary to allocate it, but I acknowledge that there are other sources of air emissions, other than coal-fired power plants.

MR. BONEBRAKE CONTINUES:

Q. Can you identify what those other sources are?

A. Off the top of my head, I don't remember, but typically, it's things like incinerators or chloro-alkali (phonetic) plants or cement kelms, but I don't remember sitting here what the pie chart for Illinois looked like.

MADAM HEARING OFFICER: I believe yesterday we talked about naturally-occurring things, such as fires and volcanic eruptions, which can result

-- although we wouldn't have volcanic eruptions in Illinois -- but fires can also -- this was covered yesterday afternoon. It's my recall that we talked at length about nonpoint sources when we talked about the TMDL stuff yesterday afternoon.

MR. BONEBRAKE CONTINUES:

Q. I recall talking about nonman-made sources with Dr. Rice and I'm a little fuzzier we --

MADAM HEARING OFFICER: I thought we did yesterday, and I apologize if I'm misremembering, but that was my recall. Certainly, if we could revisit this, if we need to.

MR. BONEBRAKE: I'm trying to avoid duplication.

MADAM HEARING OFFICER: As am I, but feel free to ask your questions, but that's sort of my recall. That's why I was trying to help out a little bit.

MR. BONEBRAKE CONTINUES:

Q. In a follow-up, you have mentioned and identified a couple of air sources of mercury emissions. In addition to air sources of mercury emissions, are there other nonpoint sources of mercury in the state of Illinois?

A. I'm not certain at this time.

Q. Page 51 of the TSD, IEPA's TSD, in Section 4.1.3 is labelled "Nonpoint Source Pollution Control."

A. Yes.

Q. Did you draft that section?

A. I can say that I assembled that section.

Q. I assume that --

A. Actually, it's quoting, mostly, from a Water Quality Conditions Report or Mercury Advisory Report.

Q. So you are familiar with the contents of that section?

A. Yes.

Q. In the second sentence reads, "Nonsource pollution can result from precipitation moving over and through the ground and picks up pollutants from farms, cities, mine lands an other landscapes, and carries these pollutants into rivers, lakes, wetlands and ground water." Was it your indention, or do you know, to say that those various nonpoint sources of pollution also make contributions with respect to mercury?

A. It wasn't my intent that I would identify those as sources of mercury, but rather describe, generally, what is considered nonpoint source pollution.

I don't know today to what extent that that those types of sources would be a source of mercury.

Q. Aside from the question of whether any such contribution may have been quantified, do you have an understanding or view as to whether any of those nonpoint sources, in fact, contribute or may contribute mercury to the waterbodies of Illinois?

A. Well, I tried to look -- I didn't do an extensive literature search, but trying to understand the idea of the possibility of runoff as a source, and I didn't see in the things that I looked at that identified as a large source of -- or contributing source. The other TMDL's that I looked at I didn't see any note that runoff was a significant source of mercury.

Q. Is combined sewer overflow a nonpoint source?

A. No. It's a point source.

MADAM HEARING OFFICER: Mr. Harrington.

MR. HARRINGTON CONTINUES:

Q. Do you know whether the naturally-occurring soils and minerals in Illinois contain mercury?

A. I would imagine that soils contain a portion of mercury, like they do other types of metals. It seems to me, when I've seen soil samples and past work that I have done, mercury is a parameter in analyzing that you find, but I asked the geologist in the Agency whether there were deposits in Illinois that would significantly cause background or natural levels of mercury to be elevated, something like cinnabar, and that's something that's not present in Illinois.

Q. Is there mercury in coal in Illinois?

A. Yes.

Q. There is coal deposits and coal waste deposits across large parts of the state, correct?

A. Right. The information that I got from the geologist that I consulted said it, typically, wouldn't be liberated from just runoff. It would need to be combusted in order to be liberated.

MADAM HEARING OFFICER: Anything further? Let's move on to I.

MR. KIM: As part of the answer to I and K, we have some exhibits. I'm just going to give those to you now.

MADAM HEARING OFFICER: Two pages.

MR. KIM: Yes.

MR. KIM: Ms. Willhite will identify which table go with --

MADAM HEARING OFFICER: Let me just note that you have handed me "Mercury Impaired Segments in 2004 303-D List" and "The Current Level of Mercury in the Sediment and the Waters Listed as Impaired Due to Mercury" and we'll enter them as exhibits as Ms. Willhite discusses them.

MS. WILLHITE: This is 18-I. "Page 68 of the TSD states that, of the 137 facilities with mercury point source discharges into the state of Illinois, quote 89 facilities fell in six major watersheds, which contained waterbodies listed as potentially impaired due to mercury in the 2004 303-D Report." Question one, "Which impaired river segments received such mercury discharges?" If you will refer to the exhibits entitled "Mercury Impaired Segments in the 2004 303-D" lists the river segments that received discharges.

MADAM HEARING OFFICER: If there's no objection, I will mark the "Mercury Impaired Segments 2004" -- is that the one?

MR. KIM: Yes.

MADAM HEARING OFFICER: 303-D list as

Exhibit 16. Is there any objection?

MR. RIESER CONTINUES:

Q. I just have a question, not an objection. Ms. Willhite, is this from the actual 303-D report or is this prepared for this testimony here today?

A. This was prepared as part of a report that I asked staff to put together last fall just to kind of look at the issue of point source discharges into impaired waters, so this is extracted from that.

MADAM HEARING OFFICER: We'll mark that as Exhibit No. 16. Please continue.

(Exhibit No. 16 was admitted.)

MS. WILLHITE: So what the table notes is that, of the 61 river segments identified as impaired or potentially impaired due to mercury, approximately, 18 received discharges from about 27 facilities out of the 89. It's kind of hard to follow. That actually was the answer to question two. Question two -- let me just go back through this again. "How many of the 61 river segments identified as impaired due to mercury receive or may receive discharges from these 89 facilities?" And the answer is -- now on that exhibit was an asterisk.

MR. KIM: Yes.

MS. WILLHITE: That's not in my notes -- so on this exhibit, "Mercury Impaired Segments in 2004 303-D List" the segments that are noted with an asterisk identify the ones that are receiving discharges from point source facilities.

MR. BONEBRAKE CONTINUES:

Q. Just a clarification, then, Exhibit 16 lists all of the mercury impaired segments in Illinois and only those that have been identified with an asterisk receive, at least, in your perspective, a point source mercury discharge. Is that correct?

A. Directly, yes.

MADAM HEARING OFFICER: Could we have that question actually read back.

(At which point, the previous question was read back by the court reporter.)

MR. BONEBRAKE CONTINUES:

Q. And how were those specific 18 segments identified, Ms. Willhite?

A. I presume that it was based on locational information. We have GIS information about what the segment length is and where the point source is located.

Q. Do you know how the determination was made regarding the number of segments that would be impacted

by any given point source?

A. Well, I presume that it was made -- I'm not certain because I didn't do the analysis myself, but I presume it was done by, if there was a river segment that contained that point on the map where the point source discharge was located, that was identified with an asterisk.

MADAM HEARING OFFICER: Mr. Zabel.

MR. ZABEL CONTINUES:

Q. I'm looking at this exhibit, Ms. Willhite, just to get clarification. What do the letters under the segment indicate?

A. I'm not completely certain, but I believe that the "A" do you mean the "A-B" under the segment ID? I believe that identifies the larger basin, so, for example, "A" is the Ohio River Basin; "B" is the Wabash River Basin; "D" -- it's an identifier to help us understand where in the state it's located.

Q. And then the numbering, for instance, if you look at the Kankakee the segment seems to be sequential 01, 02, 03, 03, 04. Is that -- does that mean they are geographically adjacent?

A. I'm not certain.

DR. HORNSHAW: The answer is no. I

don't know how the station codes are developed, but they are definitely not -- one would be the top of the river segment and the lowest number -- highest number would be the bottom of the river segment. It doesn't work that way, unfortunately.

MR. ZABEL CONTINUES:

Q. Do you think it's historic?

DR. HORNSHAW CONTINUES:

A. I believe so. I don't know how the stations are assigned codes. It may be sequentially in time, rather than sequentially in location. I just don't know, but they are definitely location from top to bottom.

MADAM HEARING OFFICER: Are those codes assigned by DNR?

MS. WILLHITE: I don't know how the identification system is.

DR. HORNSHAW: I'm not familiar with how that's done, so I can't answer.

MS. WILLHITE: If that's important, we can get the answer.

MADAM HEARING OFFICER: No. I'm just curious.

MR. ZABEL CONTINUES:

Q. Let's take G-12 of Des Plains, which has an asterisk. The asterisk indicates there's point source discharge of mercury. Is that correct?

A. Correct.

Q. And G-24 could be the next downstream segment, could it not?

A. Could be, don't know.

Q. So the fact that the discharge could be just feet from the next segment, in fact, couldn't it?

A. Right. Again, I think we were just trying to locate segments where the discharge exactly was, but all of these segments are in watersheds that receive point source discharges. All of these segments, potentially, could receive discharges.

Q. And a segment that has an asterisk with an existing --

A. That's where the outfall is.

Q. But that discharge could impact downstream segments, just for geographic reasons they are listed differently?

A. Yes.

DR. GIRARD CONTINUES:

Q. Just getting back to these segment ID numbers, is there a key for the location of these

segment ID numbers in that 2004 303-D list.

A. I don't believe so.

Q. Could you get us a key for that, and put it in the record, please? Is that an affirmative?

A. Yes.

MR. BONEBRAKE CONTINUES:

Q. Would Exhibit 16 include segments sampled by sewer overflows?

A. I believe so. If we have that locational information. Sometimes we don't have complete locational information on the overflows.

Q. When you say "sometimes" can you give us a sense of what you mean by that?

A. I just know that we haven't GPS'd all of the outfalls.

MR. ZABEL CONTINUES:

Q. Are sewer overflows sampled for mercury?

A. No.

MADAM HEARING OFFICER: Anything further?

MR. HARRINGTON CONTINUES:

Q. Yes. Does Exhibit 16 include the current level of mercury in the sediment? The second page that was handed out that's being marked as the same document?

MADAM HEARING OFFICER: That's a different exhibit and that's the answer to her next question on the part of the answer to the next question.

MR. HARRINGTON: I will hold my questions then.

MR. FORCADE: I have some questions on point source discharges. I don't know if it's better now or at Question 49, and I'm happy to wait. We can go whichever direction you want.

MADAM HEARING OFFICER: Should we wait for 49 and we can always revisit --

MS. WILLHITE: 18-I, sub-3: "How many of the 137 point source discharges of mercury are identified by the Agency discharge into Illinois lakes that have been identified as impaired or potentially impaired due to mercury?" None. Are any waters in the state of Illinois listed as impaired or potentially impaired due to mercury for any reason other than wet impairment due to restrictions on fish consumption? As noted previously, we do have three assessment units that were listed as impaired for aquatic life use, mainly due to some other criterion, but mercury in this water or sediment is listed as a potential contributor to the wild life impairment.

MADAM HEARING OFFICER: Mr. Bonebrake.

MR. BONEBRAKE CONTINUES:

Q. Just a follow-up and it actually relates to small Roman iii. One of your prior answers, I think you mentioned that none of the 137 point source discharges discharged to an impaired lake. Do you know if there is a lake in Southern Illinois that has been identified as impaired for mercury that has historically received mercury contamination from mining or lab waste activities?

A. I don't know because that wouldn't be considered a point source, and the question I asked staff was, "What are the point sources?"

MS. BASSI CONTINUES:

Q. Why would a lab not be a point source?

A. Excuse me?

MS. BASSI: Did you say a lab?

MR. BONEBRAKE: Mining or lab activities is what I referred to.

MS. BASSI CONTINUES:

Q. Why would a lab or laboratory not be a point source?

A. If it doesn't have a direct discharge through a pipe, then it wouldn't be a point source.

Probably, I didn't quite hear him say "lab." I heard "mine" and all I was thinking was runoffs, so perhaps I misunderstood your question.

MR. BONEBRAKE CONTINUES:

Q. If we include "laboratory" in addition to "mine" in my question, is your answer any different?

A. If it has a pipe and it's permitted, then it's a point source.

Q. But if for instance there was an accidental release or historical nonpermitted release, the answer is you don't know?

A. Right.

MR. ZABEL CONTINUES:

Q. Just to close that loop, you could also discharge through PRTW, could it not?

A. A lab?

Q. A lab.

A. Yes, and I don't think that's more typical.

MS. WILLHITE: 18-K refers to the next exhibit that was passed out.

MADAM HEARING OFFICER: That will be marked as Exhibit 17, and if there's no objection we will admit that. Seeing none, it's Exhibit 17.

(Exhibit No. 17 was admitted.)

MS. WILLHITE: The question is, "What is the current level of mercury in the sediment in the waters listed as impaired due to mercury?" And if you will refer to the table for the answer, and my summary of this information is that most of the sediment values are right at or below the detection limit of .1 were elevated.

MADAM HEARING OFFICER: I believe Mr. Harrington had some questions on this exhibit.

MR. HARRINGTON CONTINUES:

Q. Earlier I asked about mercury and soils, mining activities, etc., in the state, and you I believe answered that the geologist you talked to said mercury would not be liberated from that except through combustion? Am I correct?

A. Correct.

Q. But storm water and runoff, whether it's sheet runoff or through storm sewers, carries with it the sediments?

A. Correct.

Q. And soils across the state, so mercury in soils in sediment, mining activity, etc., could be contributing to the mercury in the sediments in the

streams where it's been detected. Is that correct?

A. I would presume so.

Q. Do we know to what extent the mercury in sediments may be a result of natural runoff, as opposed to air deposition independently of naturally-occurring mercury?

A. I've never quantified that? I can imagine that a portion of that is. I can also imagine that atmospheric deposition to soil then gets washed off into waterbodies.

Q. We don't have any quantification of those relative contributions, do we?

A. No. Other than -- not in Illinois. I have seen one study that's being carried out to try and understand the cycling of atmospheric-deposited mercury into a forest, a type of ecosystem, and that particular study didn't find that there was significant movement of mercury to the waterbody from runoff.

Q. In a forest system?

A. Yes.

Q. That would be very different than the agricultural systems in Illinois?

A. It might be very similar to Southern Illinois.

Q. Historically, is there not a great deal of use in mercury, both, industrial and scientific instruments throughout the state?

A. I don't know.

Q. Barometers, pressure devices in heavy industry and public works?

A. That seems likely.

Q. Was there not historically a level of leakage of such mercury into the waterways in the state?

A. I don't know.

MR. BONEBRAKE CONTINUES:

Q. Is the information on Exhibit 17 extracted from some other report, or was it put together for purposes of this proceeding?

A. I believe it was extracted from our data base that maintains this information.

Q. Does this database contain additional historical sediment information in addition to the current set of information that's listed on this exhibit?

A. I believe this is the extent of the information that we have on mercury impaired waters. I believe that there's other sediment data for other waters, but I think this represents everything we have

on the waters that have been identified as mercury impaired.

DR. GIRARD CONTINUES:

Q. I have a question. When you say "current level," what years does that represent?

A. I'm not certain, but I will be happy to check.

Q. So you don't know when the values were actually determined?

A. No, I don't.

Q. I have another question, also. So every time you have the "K" that means the value is actually below the detection levels?

A. You're referring to the -- where it says "K" means that the actual value is it not known, but known to be less than the value shown? So yeah, that would be my understanding is that it's going to be less than .1.

Q. So the way I read this table there are 34 river segments where you done some study of the sediment, in terms of mercury, and of those 34, seven locations had mercury levels above the detection level?

A. Correct.

Q. Thank you.

A. Rivers and lakes.

MADAM HEARING OFFICER: I believe we're on 18-M.

MS. WILLHITE: Did we answer L?

MADAM HEARING OFFICER: You answered that earlier.

MS. WILLHITE: So I did.

MADAM HEARING OFFICER: Out of sequence.

MS. WILLHITE: L and L-sub-one, as well. Okay. M: "Do any of these impaired rivers and lakes have catch-and-re-lease requirements for fish possession limits?" I don't know.

DR. HORNSHAW: The best I can say is statewide there are fish possession limits for bass. I think it's either five or six per day. I believe Kincade Lake is a trophy lake for muskies. I think there's a very high size limit, possibly 48 inches, and only one fish is allowed to be kept at 48 inches or above I believe. I would have to look that up. That's a trophy lake, so anything -- I believe anything under 48 inches has to be released immediately for muskies.

MS. GEERTSMA CONTINUES:

Q. A clarification on the catch-and-re-lease,

so those limits are mainly that the larger the fish you can keep the fish whereas you have to release smaller fish.

DR. HORNSHAW CONTINUES:

A. I believe the statewide limit doesn't have a size limit on it, only a possession limit, but there are a whole lot of lakes that have lake specific limits, and that's all listed in the booklet that we have entered into evidence already.

MADAM HEARING OFFICER: Exhibit 11.

DR. HORNSHAW:

A. I guess, DNR Fishing Information Booklet. All that is listed in there.

Q. To follow-up with your earlier testimony, I believe you said the larger the fish the higher mercury levels tend to be because they have been around longer and eating more?

A. That's correct.

MR. BONEBRAKE CONTINUES:

Q. You refer to I believe the exhibit that we -- 11 I think identified yesterday. Can you direct us to the specific pages, page or pages, that you just referred to.

A. The site-specific sport fishing

regulations begin on page nine and go through page 34. Like I said, there's a big list of site specific information for Kincade Lake. For instance, it's on page 21. It lists large- or smallmouth bass, 16-inch minimum length limit and three fish daily Creal (phonetic) limit. Peermusk (phonetic) 48-inch minimum length limit. I was right, and then there's restrictions on the number and size of crappy that can be kept, also. Everything listed here is different from the statewide limits, which are given on page eight.

MR. KIM: I would note this document, which was Exhibit 11 I believe was also provided to the Board as one of the documents that we relied upon, so it's already been provided in full form, and I don't know if, for anybody that doesn't have a complete copy of that, I don't know if that's accessible off the Board's --

MADAM HEARING OFFICER: If it's not, our clerk's office is always happy to scan and link documents.

MR. KIM: But that was provided in its entirety to the Board.

MADAM HEARING OFFICER: Anything else on Question 18? Mr. Zabel.

MR. ZABEL: If I may revert -- and I apologize for this. If you could look at Figure 4.3, the colored chart we had before --

MS. WILLHITE: We were looking at 7.1 before.

MR. ZABEL CONTINUES:

Q. 7.1 and 4.3 are the ones I want to compare, actually.

MS. WILLHITE CONTINUES:

A. Looking at 4.3.

Q. As I read this chart, this table of graphics, the stars are sites that exceed the Mercury Water Quality Standard. Is that correct?

A. Correct.

Q. Does that mean they are impaired or not?

A. No. Interestingly, they are not.

Q. I was trying to find some of them on 7.1 and couldn't, but that's what was puzzling. Thank you?

MADAM HEARING OFFICER: Anything else? Then let's take a break, and we'll come back and start Question No. 19.

(At which point in the proceedings, a 10-minute break was taken.)

MADAM HEARING OFFICER: Are we ready

to start again? I believe we are on Dynegy Midwest Generation Question 19 for Ms. Willhite.

MS. WILLHITE: At the top of Ms. Willhite's testimony, she refers to an analysis of the amount of reduction of fish tissue levels of mercury that would be needed to get below advisory levels, i.e, what is the target for eliminating the impairment? Is this the same analysis referred to in and described at pages 62 through 64 of the TSD?" Yes. "In that paragraph at the top of page three of her testimony, Ms. Willhite refers to fish data collected statewide over the last 20 years." A: "Is that data comprised of the total of 815 samples collected between May 17, 1985, and November 11, 2004, referred to at page 61 of the TSD?" Yes. B: "Is that the total number of fish tissue samples analyzed for mercury concentrations or levels by the Agency during that period of time?" Yes. "Is that data publicly" -- C: "Is that data publicly available?" That's a Tom question.

DR. HORNSHAW: This question is also asked of me, and I have a fairly involved answer. Did you want me to go through that now or get to my questions?

MR. BONEBRAKE CONTINUES:

Q. My preference would be to cover it, probably C and D? Would that be related answers?

A. Yes.

Q. My preference would probably be to cover that at a later point in time.

MS. WILLHITE: So skip D, E. "Does that set of 815 samples include 397 largemouth bass samples with the remainder comprised of samples from other fish?" Yes. F: "Does the analysis referred to in this paragraph of Ms. Willhite's testimony relate only to large mouth bass samples, not the more than 400 samples related to other fish?" Yes. G: "Have additional fish samples been corrected in 2005, and 2006?" Yes.

MR. ZABEL CONTINUES:

Q. Just on a very last portion of that, how many were collected in 2005 and 2006?

DR. HORNSHAW CONTINUES:

A. I can't answer that. The 2006 the samples are in the process of being collected right now by DNR. 2005 samples have been collected. I'm not sure all of them have been delivered to our lab, yet. Some of them sit in freezers in DNR offices for a while, until they have reason to come to Springfield, so I don't know at

this point.

MS. WILLHITE: Question 21, "Of the 397 largemouth bass samples included in this analysis, how many also contain PCB's or other contaminants above applicable fish advisory levels?" Unfortunately, the data are not organized in the database to answer to question. Question 22: "Has the Agency identified as impaired under Section 303-D of the Clean Water Act any lakes, rivers or other waters based on the presence of PCB's or other contaminants, excluding mercury, in fish tissue, water, and sediment, and if so, A, please identify each such impaired water, and B, please identify the contaminant that caused the water to be identified as impaired." Basically, I've been asked to provide the 303-D list because that is a complete listing of all the waters that we have identified as being impaired in the parameter that they are identified as potentially impaired, and that is produced every two years by Illinois EPA. Appendix A of that document lists the answers to the question 22, and the most current approved 303-D list, which is for 2004, as well as our draft, 2006 list which has been submitted to the U.S. EPA, but has not been approved can be found at www.EPA.state.il.U.S. back slash, water, back slash,

watershed, back slash, report, back slash, 303D hyphen report, back slash, 2006, back slash, 303D hyphen report dot PDF.

MADAM HEARING OFFICER: I'm going to ask that you provide a copy of both of those 2004 and the one submitted for the Board to enter as an exhibit in this rulemaking.

MS. WILLHITE: Did we submit the 2004 as part of the documentation for the rule?

MADAM HEARING OFFICER: I just looked at the table of contents at the break, and it wasn't there, and I may have overlooked it, but I didn't see it in the table of contents.

MR. KIM: So you would like the 2004 and the draft 2006?

MADAM HEARING OFFICER: Yes.

MR. KIM: I believe they were both submitted as reference documents to the TSD as the documented relied upon.

MADAM HEARING OFFICER: I missed it when I was looking at the table of contents.

MR. KIM: Listed on page 210 of the TSD.

MADAM HEARING OFFICER: Okay. If you

already have them, that's fine. I missed them on the list. That's why --

MR. KIM: Sure.

MADAM HEARING OFFICER: These references were -- part of the problem is the overall size of the proposal. The reference documents are the ones that were included like in banker's boxes?

MS. BILBRUCH: Yes, ma'am.

MADAM HEARING OFFICER: So there's no numbers together.

MS. BILBRUCH: Well, they are numbered in the box, but they are not numbered on the reference list.

MADAM HEARING OFFICER: That's why we were having trouble locating them.

MR. KIM: This is exhibit associated with Question 23. For the record, that was Shannon Bilbruch that just provided an answer. We're ready for question 23, then.

MS. WILLHITE: Question 23: "Describe how Ms. Willhite concluded that a 90-percent reduction in fish tissue levels of mercury is required for unlimited consumption by childbearing age women and children under 15 years of age, including the following:

A, whether she assumed that the 141 samples that were nondetect with respect to mercury contained mercury at the level of 0.05 milligrams per kilogram. B: The mathematical formula used to generate this conclusion, and C: Whether this conclusion relates only to the top five percent of largemouth bass with regard to mercury concentrations." Since this was asking for calculation, I thought this exhibit would be helpful.

MADAM HEARING OFFICER: I have been handed "Exhibit for Dynegy Question No. 23 to Marcia Willhite." We will mark that as Exhibit 18 for purposes of the record. If there's no objection, I will enter that as Exhibit 18.

(Exhibit No. 18 was admitted.)

MS. WILLHITE: The calculation for the cited reduction in mercury loading was based on all 397 fish tissue samples for largemouth bass, and in the Technical Support Document, we explain that we selected the species because it's ubiquitous. It's frequently found and it's favored by sport fisherman in Illinois. We calculated the reduction based on the generally-accepted 95th percentile. We are trying to figure out how can we be sure that 95 percent of largemouth bass samples are below advisory levels, and

essentially, is what we're saying. Using a detection limit in one data set of .1 milligrams per kilogram and another of .05 milligrams per kilogram just as a different way of treating those nondetect data and seeing if it makes a significant difference to the outcome. The 95th percentile for data were 0.544 milligrams per kilogram, if you treat the nondetects as being .1 milligram per kilogram, and 0.523 milligrams per kilogram, if you treat the nondetects as being .05 milligrams per kilogram. In order to achieve the acceptable mercury fish tissue level for the most sensitive subgroup -- and that most sensitive subgroup is childbearing-age women and children under 15 years of age -- we calculated the necessary reduction in mercury needed to achieve 0.05 milligrams per kilogram, the highest level of mercury in fish tissue for unlimited consumption in the subgroup. Therefore, the calculation was as follows: you take the 95th percentile minus our target level, 0.05 milligrams per kilogram, divided by 95th percentile times 100, and that equals the percent reduction necessary for unlimited consumption by this subgroup. So for using -- treating the nondetect as .1, we went through the calculation and came up with 90.8 percent reduction needed. If we treat the nondetects as

.05, we come up with 90.4 percent reduction needed. So in regard to question A, the sample results indicated nondetection were assumed and calculated as shown above, in the former case giving the nondetects the value of the detection limit; in the latter case, giving them one half of the detection limit. And we showed -- in answer to question B, we showed how this was calculated, and in regards to question C, the reduction is based on all 397 fish tissue results for largemouth bass.

MR. BONEBRAKE CONTINUES:

Q. Is it true that, of the 397 bass fish tissue samples that you were working with, 141 of those samples were nondetect for mercury?

A. I don't have that in front of me, I'm afraid.

Q. Maybe if we turn to page 63 of the TSD, that might refresh your recollection.

MADAM HEARING OFFICER: I'm sorry. What page did you say?

MR. BONEBRAKE: Sixty-three.

MADAM HEARING OFFICER: Thank you.

MR. BONEBRAKE CONTINUES:

Q. I believe there's such a reference right above table 4.35.

A. Yes. I see that, yes.

Q. So is it correct, then, that, of the 397 --

A. Yes. Yes.

Q. So more than a third of the samples were nondetect for mercury?

A. Yes.

Q. Your calculation, nonetheless, assumes that mercury is present at some level in all of the 397 samples?

A. Well, that's the typical approach that you use when dealing with nondetect data.

Q. When you say "typical" do you mean from a regulatory perspective, Ms. Willhite?

A. Kind of a practice of data analysis.

Q. You do not, in fact, know, do now, whether mercury was even present in those 141 samples, as a matter of fact?

A. No.

MADAM HEARING OFFICER: Mrs. Geertsma.

MS. GEERTSMA: Would eliminating that 141 samples, would that push the 95th percentile up or down?

A. Up.

Q. And therefore, would more than a 90-percent reduction be required?

A. That would be my expectation.

MADAM HEARING OFFICER: I didn't get the tail end of that question.

MS. GEERTSMA: I'm sorry, would a 90 percent reduction in fish tissues be required at that point?

MADAM HEARING OFFICER: Thank you.

MR. BONEBRAKE CONTINUES:

Q. Well, the reason that that would push the number up is because you have 14 samples, which may be zero that are not included in your calculation. Is that right?

A. Correct. That's why it's a standard practice of data analysis that you include the data, but you're I think, as Dr. Hornshaw explained in the past day or so, that you just assume the central tendency of the data to be towards the middle, between your detection limit and zero.

Q. It may well be, for those 141 samples, there was no mercury present at all, so you don't need a reduction at all. Is that right?

A. Well, I wouldn't make that conclusion.

Q. You did tell me, did you not, that, as a matter of fact, you don't know if mercury is present in any of those 141 samples?

A. I did say that, but I wouldn't conclude, if all of those levels were zero, that no reduction would be needed. I don't think that's how the data would come out.

Q. I want to take a look at this exhibit that was just handed to us. Just one other clarifying question, I believe you said this, but I want to make sure I understand this correctly. This analysis that we've been talking about relates solely to the bass samples, and not to any other fish samples. Is that correct?

A. I'm sorry? Would you repeat the question?

Q. The analysis that we've been discussing relates solely to bass samples and not any other fish samples?

A. Correct. It was the biggest complete data set that we had, and it's kind of the worst case fish.

MADAM HEARING OFFICER: Ready to move on?

MR. ZABEL CONTINUES:

Q. I recall Dr. Hornshaw testifying that the

be-low-the-detection-limit samples, some are marked with a J to indicate the substance was present, and some are marked that it wasn't identified at all. Is that correct?

DR. HORNSHAW CONTINUES:

A. To my recollection, in the database that I used, there are no J's. All the values are K.

Q. It all was shown as substance present, but quantification wasn't possible?

A. That's correct.

MADAM HEARING OFFICER: Ready to move on to Question 24?

MS. WILLHITE: "How large of a reduction in sources of inorganic mercury to waterbodies would be needed to achieve this 90 percent reduction of methylmercury in fish tissues?" We have not assessed what amount of reduction in inorganic mercury loading to Illinois impaired waters would be needed to achieve a 90-percent reduction in fish tissue, but we don't have any reason to accept that the relationship between atmospheric loading and fish tissue levels in Illinois waters will not be one to one. It was in Florida, as we will discuss later. In Massachusetts, where they made a 60-percent reduction in atmospheric loading. There's

been a result in average fish tissue reduction of around 30 percent after five years. The full reduction in fish tissue levels as a result of loading reduction, will probably take a few more years to emerge as it took almost 10 years in Florida. It seems likely that a reduction of, at least, 90-percent reduction in loading to Illinois waters will be needed.

MR. BONEBRAKE CONTINUES:

Q. If I understand that answer correctly, Ms. Willhite, you're assuming that there's a one-to-one relationship in the Florida and Massachusetts studies that you referenced in that one-to-one relationship will apply equally in Illinois?

A. I have no reason to believe otherwise.

Q. Those are the assumptions you are making?

A. Yes. That's the assumption that other states have made that they start talking about.

Q. We have a series of questions in here, I believe, related to the Massachusetts and Florida studies, and I have a series of follow-up questions, but I thought it would probably be better to handle those at the time we are talking about those specific studies.

MADAM HEARING OFFICER: That's fine.

MR. RIESER CONTINUES:

Q. Do you have any knowledge as to whether the proposed rule will result in a 90-percent increase in loading to the Illinois waters?

A. Say that again. I would expect there would be a 90 percent decrease in loading?

Q. As a result of the proposed rule?

A. Yes.

Q. So that assumes that there are no other sources of mercury deposition, other than in Illinois waters?

A. No. You are right. I presume that there would be a 90-percent reduction in the contribution from in-state sources as a result of this rule.

Q. And what impact would that have on the loading to the streams?

A. I believe that there would be -- that there is a portion of loading that comes from in-state sources and a portion of loading that comes from outside-of-state sources.

Q. What is that percentage?

A. I don't know.

Q. Is there somebody at the Agency who knows?

A. I don't think so.

Q. Are you aware of whether anyone is going

to present testimony on behalf of the Agency as to that question?

A. I can provide you, in later questions, some of the information that leads me to -- that supports that belief. I can do it now, if you would rather, but I'm an orderly kind of person and like to take the questions in order.

Q. Why don't we wait, until it's in order, then.

MADAM HEARING OFFICER: Ms. Bassi.

MS. BASSI CONTINUES:

Q. To follow-up on one of Mr. Rieser's questions he -- in response to his first question whether the proposal will result in a 90-percent decrease in loading, you said yes, and then changed it when he said, "This assumes there are no other sources." And you said, "This presumes a 90 percent reduction of in-state sources." So then do you presume that there are no other sources in Illinois that contribute to nonpoint loading?

A. Not significantly.

MR. BONEBRAKE CONTINUES:

Q. Ms. Willhite, on page three of your testimony, section entitled "Contribution from

Atmospheric Deposition," the first sentence reads, "Loading from atmospheric deposition of mercury to any impaired lakes, rivers or streams has not yet been determined. Do you see that?

A. I'm seeing that.

Q. I'm having a hard sometime understanding your testimony regarding the impact on loading to impaired with waters, given that there's no determination of loading to impaired waters.

A. I would probably use the words "has not been quantified."

Q. What's the difference between "determined" and "quantified"?

A. "Determined" would be, in this sense, reason to believe, yes or no. "Quantified" means how much.

Q. So the Agency does not know, at this point in time, how much reduction in loading to Illinois waters would occur as a result of the proposed Illinois rule?

A. We have not quantified that. I would make the assumption that loading that is coming from in-state sources, this rule would reduce that by 90 percent.

Q. All sources in the state of Illinois or

just EGU's?

A. From this rule from the sources covered by the rule.

Q. So your assumption is that, if there is a 90-percent reduction in mercury emissions from EGU's, there, similarly, would be a 90-percent reduction in mercury deposition to Illinois waters?

A. Yes.

Q. I think you were -- I think what you said was you were going to tell us the basis for that conclusion in response to some of the later questions?

A. Can I rephrase my answer. Excuse me. I believe that, if there is a 90-percent reduction as a result of this rule, it will result in a 90-percent reduction in the loading that comes from the sources to Illinois impaired waters.

Q. Doesn't that mean that there would be a 90-percent reduction in the deposition of mercury to Illinois waters attributable to such sources?

A. Yes. Did I say it differently? I'm sorry.

Q. I wanted to make sure I understood what you were saying.

MADAM HEARING OFFICER: Mr. Zabel.

MR. ZABEL CONTINUES:

Q. Now I'm not sure what you were saying. Is that the Agency's conclusion as to the Fox River.

A. Take me back to what you understand as the conclusion. I'm not sure I -- I don't understand the question, how the Fox River issue is in there.

Q. Let's take the sentence that you just referred to on page three of your testimony. "Loading from atmospheric deposition of mercury to impaired Illinois lake river or stream has not yet been determined." You now want to change that to say quantified. Is that correct?

A. I think that would be more accurate.

Q. You now want to change "atmospheric deposition" to "from sources in Illinois." Is that correct.

A. No.

Q. This rule will reduce atmospheric deposition from all sources --

A. No. That's not what I'm saying.

Q. I'm willing to listen to what you're saying. I just don't understand it. How would you change that sentence?

A. No. I would change the sentence, only to

say it has not been quantified.

Q. And I'm asking I thought you had said that a 90-percent reduction from EGU's would result in a 90 percent reduction --

A. In loading.

Q. To Illinois waters?

A. -- to Illinois waters from those sources.

Q. I'm asking if the Agency's view is that's the case for the Fox River.

A. I'm sorry. I just don't see the relationship.

Q. I'm sorry, the Rock River. I don't know why I had the Fox in mind, but the Rock River that was one of the impaired waterways?

A. To the extent that sources in Illinois are contributing loading, to the extent that EGU's covered by this rule that are in Illinois are contributing loading to the Rock River, I would expect that the rule would result in a 90-percent reduction in that loading.

Q. Have you determined if sources in Illinois are contributing to the atmospheric deposition loading on the Rock River?

A. I have not quantified that amount.

Q. I'm not asking you to quantify it. I'm

using your term "determined." I didn't ask for quantification.

A. I have reason to believe they are contributing some loading.

Q. What's the basis?

A. I will get to that.

Q. It will come up in a later question?

A. Yes, it will.

Q. Fine. We'll follow it then.

MR. KIM: Can I follow up and maybe ask a question to clarify or to put it in a proper context? When you state that you believe there's going to be a 90-percent reduction in loading from sources if the 90-percent reduction the rule sets forth takes place, is that your personal opinion or is that the Agency's opinion?

MS. WILLHITE: I'm stating my opinion.

MR. KIM: Thank you.

MR. BONEBRAKE CONTINUES:

Q. What's the difference? Do you have a reason to believe that the Agency has an opinion different than yours, Ms. Willhite?

A. No.

MR. ZABEL CONTINUES:

Q. The other obvious question is, is that the Agency's opinion?

A. I believe so.

Q. So it's, both, yours and the Agency's?

A. I believe so.

Q. We'll find out why later.

A. I will testify as to my belief, which I believe represents the Agency's belief.

MS. GEERTSMA CONTINUES:

Q. Can I just ask sort of a clarifying summary question? Your last statement was that, to the extent that EGU's are contributing to loading, you believe that that loading will be reduced by 90 percent by the rule.

A. Correct.

Q. Is that the extent of what you're testifying to?

A. Yes.

MR. HARRINGTON:

Q. I'm trying to get to the same point, just make sure the record is clear, because several different formulations have been used as we've gone through this. If you reduce emissions from Illinois power plants, EGU's regulated by the rule by 90 percent, do you expect

that would result in 90 percent less deposition from those same power plants in Illinois?

A. Yes.

Q. You're not saying any more than that at this time?

A. That's correct.

MADAM HEARING OFFICER: Ready to go on to Question 25?

MS. GEERTSMA: I have one follow-up question.

MADAM HEARING OFFICER: Yes.

MS. GEERTSMA:

Q. I'm sorry. Ms. Willhite, just one follow-up question. On the deposition model at the deposition questions that have been asked, will the Agency be producing another witness to testify on deposition of it, other than yourself?

A. Yes.

MR. RIESER CONTINUES:

Q. Will that witness testify as to deposition within the state of Illinois?

A. I'm not certain.

MS. WILLHITE: Question 25: "What are the natural sources of mercury to waters in the state of

Illinois and to fish in such waters?" Sub-A: "What is the extent of the contribution of such natural sources to mercury levels in such waters in fish?" And I think I answered this question about sources previously. Question 26: "In the first full paragraph on page three of her testimony, Ms. Willhite asserts that .05 milligrams per kilogram is the highest acceptable level for mercury fish tissue for unlimited consumption. What does" -- sub-A: "What does "acceptable level" mean?

DR. HORNSHAW: I'm going to respond to I think all of these questions. We already discussed acceptable level several times .05 milligrams per kilogram.

MADAM HEARING OFFICER: Mr. Bonebrake.

MR. BONEBRAKE: You want to address all of 26?

DR. HORNSHAW: I believe so. I have responses prepared through J, so the answer is yes.

MADAM HEARING OFFICER: I'm sorry.

DR. HORNSHAW CONTINUES:

A. A we have already discussed is .05 milligrams per kilogram and that translates to as many as 225 meals per year by women of childbearing age and children under 15, and that's based on those 225 meals

will not exceed the reference dose that we discussed earlier 0001 milligrams per kilogram per day. B: "Is this same standard applied in other states and countries?" I can speak for the Great Lakes states as a member of the Great Lakes Fish Advisory Task Force. All the Great Lakes states use the same protocol, so they are all consistent in saying yes. I can't speak for other states and other countries.

MADAM HEARING OFFICER: Excuse me. Ms. Geertsma.

MS. GEERTSMA CONTINUES: Can I ask for clarification on C from Dynegy? I was wondering what definition of "mercury poisoning" is intended by this? We had some testimony yesterday from Dr. Rice that there is a difference, a technical difference, between mercury poisoning and other effects of mercury.

MR. BONEBRAKE: I'm not testifying here today, so the witness can provide his understanding of the meaning of the term, and then we can ask appropriate questions.

MADAM HEARING OFFICER: Dr. Hornshaw, how did you interpret "mercury poisoning" in this question?

DR. HORNSHAW CONTINUES:

A. I didn't really give it much thought, until Dr. Rice made the distinction between acute toxicity and longterm chronic toxicity. My response was going to be for chronic toxicity and that would be --

MADAM HEARING OFFICER: Does that clear up your issue?

MS. GEERTSMA: Yes.

DR. HORNSHAW: The answer is yes. "Is it true that exceeding this level will not definitely result in mercury poisoning?" The answer is yes.

MR. BONEBRAKE CONTINUES:

Q. Is that because there is a safety factor built into the number, Dr. Hornshaw?

A. That's correct, and it's not a safety factor. It's an uncertainty factor, and it's for uncertainty, so there's some give and take in either direction. The definition of reference dose specifically, says with uncertainty spanning perhaps an order of magnitude.

MS. GEERTSMA CONTINUES:

Q. So taking the question in the converse, is it also true that not exceeding the level will definitely result in no mercury poisoning? I'm not sure if I stated all those negatives correctly, but I'm

hoping the --

A. I think I'm confused, but let me try and answer. You are trying to ask if it also pertains to Dr. Rice's definition of mercury poisoning, which would be some kind of acute noticeable effect?

Q. I'm trying to ask if someone who were to be exposed to mercury levels below this level, will that guarantee that they will not have any negative effects from mercury?

A. Not necessarily.

MR. BONEBRAKE CONTINUES:

Q. The uncertainty factor, what is the magnitude of that uncertainty factor?

A. Tenfold.

Q. Does that tenfold uncertainty factor apply to the Illinois Environmental Protection Agency's fish advisory numbers, including its .05 milligram per kilogram standard?

A. To the extent that it's included in the reference dose, I guess the answer is yes.

Q. Is that -- that is because the Illinois Environmental Protection Agency built its fish advisory numbers upon the U.S. EPA's reference dose that includes the uncertainty factor?

A. That's correct.

DR. HORNSHAW: D: "Table 4.2 of the Agency's TSD refers to this number as an advisory due to mercury, whereas Table 4.3 refers to the same number as an advisory for methylmercury. Do the numbers in Tables 4.2 and 4.3 at no time apply to mercury or methylmercury?" E: "We understand that the values Tables 4.2 and 4.3 of the TSD were calculated from U.S. EPA's methylmercury reference dose of 0.001 milligrams per kilogram per day. Please explain how the values in Tables 4.2 and 4.3 were generated from that reference dose." I answered this in question 7-C. I believe at that point I said I have a big description of that in the questions directed to me. We can do that now or later.

MR. BONEBRAKE: We tabled that for your testimony later before, so let's do that again, so we are consistent.

DR. HORNSHAW: F: "Does the Agency believe that U.S. EPA's reference dose is adequately protected with Human Health? Yes. That means sub-part I doesn't have to be answered. G: "Is it correct that Table 4.2 of the TSD indicates that the most sensitive population, women of childbearing age and children under

15 years old, is advised that they may safely eat one meal every other month of fish tissue with methylmercury concentration as high as 1.89." The answer to that is yes for the rest of this year. As I spoke earlier, the Fish Contaminant Program will be changing over to an upper limit of one milligram per kilogram for issuing advisories next year to be consistent with FDA's action level, so next year that will not be true.

MR. BONEBRAKE CONTINUES:

Q. Are you saying that, as of 1/1/07, above one part per million the standard will be "Do not eat"?

A. That's correct. That assumes the rest of the Fish Contaminant Monitoring Program agrees, and preliminary discussions look like that's going to be the case.

DR. HORNSHAW: H: Is it also correct that the remainder of the population is advised that it may safely eat one meal per month of fish with tissue concentrations of methylmercury as high as 2.82 parts per million?" Same answer as G. I: "Is it also correct that the highest mercury fish tissue concentration found by the Agency in its sampling of fish in Illinois has been 1.4 parts per million?" Yes. I need to do a little bit of explanation on that sample.

That was a 1988 largemouth bass sample from Sherman Park Lagoon in Chicago. I have an exhibit somewhere. I have a printout from my database for Sherman Park Lagoon in the Chicago Metro area where that particular sample was taken.

MADAM HEARING OFFICER: I have been handed "Sherman Park Lagoon Fish Data, Sorted by Station Code." We will mark this as Exhibit 19, if there is no objection. Seeing none, we will mark this as Exhibit 19.

(Exhibit No. 19 was admitted.)

DR. HORNSHAW: A little bit of explanation, this is a printout that I can get out of the database that I maintain that will be a sneak preview, if you will. This is for Sherman Park Lagoon, and if you look at the notation for largemouth bass sampling date, 10/7/1988. This is the fish in question. Look over to the mercury column, entry is 1.4. This is the highest value in the samples from 1985 through 19 -- whatever the date of the information is here. And what we did was, after this information became available, it looks like the Fish Contaminant Program, in 1990, wanted to follow-up on this sample, so we asked DNR to go back and collect a sample. Unfortunately, they didn't mark

any of the information that we normally require, a number of individuals, sample weight, sample length. All we have is the analytical data. I don't know how that occurred. But in this case, the mercury concentration for this fish was .1 milligrams per kilogram, nowhere near the 1.4 milligrams per kilogram. It was not followed up again, until 2002, when Sherman Park Lagoon came up for its routine sampling effort, and that year two more bass samples were collected, and again, the values in the mercury column for the smaller fish was less than the detection level of .1 milligrams per kilogram and that's indicated in the column, the last column following lipid content. That series of boxes, if there's a check in any of the boxes, that means the sample for the analite (phonetic) was not detected, and the value listed is the detection limit, so the smaller example was the less than .1 and the larger sample fish at 14 inches was .13 milligrams per kilogram. The information that -- the follow-up information collected for this fish makes the 1.4 milligram per kilogram value suspect in our eyes. There's no way of following up on it because they keep fish tissue for, roughly, 15 years in the tissue bank that we maintain, so this fish tissue was no longer

available. I strongly suspect that there was some kind of analytical error or decimal point error and that is probably not a true value, but we'll never be able to know.

CROSS EXAMINATION BY MS. MOORE:

Q. The weight, do you suspect that the weight was accurate, and that's the one consistent thing that you have got?

A. Oh, yes, definitely.

Q. So wouldn't something that was two-and-a-quarter pounds have a higher amount of mercury because it's probably an older fish?

A. That's true. I wouldn't suspect it would go that much higher than the next largest fish at 1.32 pounds, and of course, the one in 1990 we don't have weight data for. I pulled the actual field sheet for that one because we maintain all the field records in the lab and data records, at least, back to 1988, and that field sheet was not completely filled out, for whatever reason.

MR. BONEBRAKE CONTINUES:

Q. Is the reason that you suspect the 1.4 number to be suspect is you typically would expect relatively consistent concentrations over time and the

latter concentrations are considerably lower?

A. That's correct. Also, for a fish of that size, that's not really large for a largemouth bass. Large mouth bass in the range of three to five pounds is what I would consider very large and old. If we're going to see high levels of mercury in a fish, I would expect to see them in a fish larger than this.

MR. RIESER CONTINUES:

Q. Just to clarify. Would it be accurate to say just because a fish is large and old has - just to clarify. Just because a fish is large and old, does not necessarily mean he also has high levels of mercury in it. Is that correct?

A. That's correct. That's a waterbody-specific relationship.

MR. ZABEL CONTINUES:

Q. Do you happen to know, Doctor, whether that Sherman lagoon is a catch-and-release lagoon.

A. I couldn't answer that. If it is, it would be listed in the Illinois Fishing Information booklet that's been entered.

MR. HARRINGTON CONTINUES:

Q. Are you familiar with the location and condition of the Sherman Park Lagoon?

A. No, I'm not.

Q. Are you familiar with the amount of scrap that's deposited into that lagoon?

A. No, I'm not.

MADAM HEARING OFFICER: Anything else?

MR. BONEBRAKE CONTINUES:

Q. A follow-up. We talked a little earlier about the consistency of the data that you would expect. Is that something that you have seen, Dr. Hornshaw, with respect to over all the fish tissue mercury sampling that the Agency has undertaken over the years? In other words, has there been a consistent level in fish tissue mercury levels in various Illinois waterbodies over time?

A. Each waterbody or all waterbodies taken together?

Q. Let's take for any specific waterbody where there's been multiple samples over time. Would it be --

A. My general familiarity with the database, the answer would be yes, and it's size specific for each waterbody. If there's not going to be a problem, chances are even the big fish won't have very high levels of mercury. If there is a problem, even low or

smaller fish are likely to have problems with mercury. It's waterbody specific.

Q. So if I understood that correctly going back to 1988 or so, it's your experience that, generally, mercury levels in a specific -- mercury fish tissue levels in a specific waterbody for specific fish and fish of the same size have stayed about consistent?

A. That's my general impression, yes.

DR. HORNSHAW: Moving on then to J, "Is it correct that there has been only one other Agency tissue sample above one part per million?" I believe that's correct. That fish came out of Kincade Lake or Cedar Lake. I'm pretty sure it's Kincade. "If so, please describe that acceptable level and its applicability. You are going to have to interpret this question for me. I don't understand it.

MR. BONEBRAKE CONTINUES:

Q. That may have been cut and pasted from some other question.

A. I don't see much of an acceptable level above one part per million.

Q. So I think we can disregard that question.

DR. HORNSHAW: No. 2: "Also, please identify the lakes, rivers and other waters in Illinois

in which fish tissue samples exceed that level." Does that mean one part per million?

MR. BONEBRAKE CONTINUES:

Q. I think you have identified the two waterbodies that were, specifically, identified in the two sub-part questions we discussed, so we can otherwise disregard the question.

A. Okay.

MADAM HEARING OFFICER: Having reached the end of Question 26, and being right around the noon hour, let's go ahead and break for an hour for lunch and come back and start with Question 27.

(At which point in the proceedings, the hearing was adjourned for lunch.)

MADAM HEARING OFFICER: I think we are ready to start, I think, with question No. 27.

DR. HORNSHAW: Question No. 27: "How many meals per year comprises unlimited consumption for purposes of Illinois fish advisories?" I have answered this before. 225. "Is the .05 milligram per kilogram numeric standard applicable to all funnels mercury present in tissue or is that numeric standard limited to the amount of methylmercury in fish tissue? I have already answered this several times. Methylmercury.

Question 29: "Is the .05 milligram per kilogram numeric standard applicable only to children under the age of 15 and women of childbearing age?" Yes.

30: "What is the trend, if any, in concentrations of mercury and water bodies in the U.S. and in Illinois since the 1970's?" I can't answer for the U.S. because I don't have that data available to me. The part about Illinois was also asked me in the questions directed to me. Do you want to do that now or later?

MR. BONEBRAKE: I think we touched a little bit on trends already this morning, so let's go ahead and from my perspective and close that issue out now.

MS. WILLHITE: I will just say, from the Bureau of Water standpoint, we don't have trend data on mercury in ambient water.

DR. HORNSHAW: I believe this is Question 17 directed to me by Dynegy Midwest. This question really can't be answered with any degree of accuracy or confidence since the fish contaminant data are really not amenable to trend analysis. Trend analysis would require regular collection of similar

sized fish in a waterbody over time. And this is information with very few exceptions was not available from the fish contaminant monitoring samples. In my opinion, and this is just based on my familiarity with the fish data, I think I have kind of eluded to this earlier in response to another question. I believe that mercury levels in both individual waters are fairly steady, since I don't really see any large increases or decreases in levels where there are multiple samples available for a particular water and this also responds to Prairie State's Question No. 1.

MADAM HEARING OFFICER: To you.

DR. HORNSHAW: To me, that's correct.

MR. BONEBRAKE CONTINUES:

Q. To follow up, do you know if the Illinois Department of Public Health has made any statements about the consistency of the methylmercury data over time in fish tissue?

A. I believe that's one of the questions that were asked of me, and the answer would be yes, they have said that it's fairly constant over time. There's no big increase or decrease I believe they said.

Q. And my impression from your first answer is you would agree with the Department of Health?

A. Yes, I would.

MADAM HEARING OFFICER: For the record, I would just like to note that the Question No. 17 directed to Dr. Hornshaw from Dynegy is that, "The Illinois Department of Public Health document entitled "Facts about Methylmercury Advisories" available on that agency's website states that, "Methylmercury levels detected in predator sport fish have remained about the same." Over time, does the Agency agree that the FMCP fish tissue sample shows steady levels of fish tissue mercury concentrations over time?" So that's the question he was answering in the hearing.

DR. HORNSHAW: Do you need me to read Prairie State's Question 1?

MADAM HEARING OFFICER: No. I just wanted to do that since he, specifically, followed up with the question about the Public Health to be sure that that was a part of the initial question he asked you, so everybody was on the same page.

MR. BONEBRAKE CONTINUES:

Q. Then I had one follow-up for Ms. Willhite. I believe you mentioned that you don't have any trend data with respect to ambient water?

MS. WILLHITE CONTINUES:

A. That's correct.

Q. Would the same be true for sediment?

A. The information -- well, I will answer the question this way. Yes. Generally, we have a few years of data on sediment, and that's presented in that exhibit that was provided earlier.

MR. RIESER CONTINUES:

Q. Ms. Willhite, let me make sure I have your answer right. You were saying that the Bureau of Water doesn't evaluate it's data for trends with respect to mercury in water column. Is that what you're saying?

A. Yes. I think that our information on mercury in ambient water is spotty, and I've been told is not sufficient to be able to do trend analysis.

Q. So that would be different than for other constituents that are measured at water quality stations?

A. Routinely. It would be up to trend data because we have over 200 stations that measure certain parameters several times per year and have been for 20 years.

Q. Has there been any change in how the mercury -- in the practices of the IEPA when it comes to measuring if it was 200 stations for mercury.

A. No. It's not a parameter that we measure for routinely.

Q. How often is it measured for?

A. I don't know.

Q. So the measurements of mercury, to this day, would be, as you described them, "spotty"?

A. Yes.

MR. ZABEL CONTINUES:

Q. Just for the record, when you both Dr. Hornshaw and Ms. Willhite, you referred to a trend analysis are you referring to formal rigorous statistical trend analysis when answering the questions?

DR. HORNSHAW: I am.

MS. WILLHITE: Yes.

MADAM HEARING OFFICER: Anything further? Move on question 31 for Ms. Willhite.

MS. WILLHITE: "In her testimony, Ms. Willhite cites, both, Florida and Massachusetts studies." I'm going to answer all pieces of this together. 31 sub-A: "When were these studies conducted?" Sub-B: "Who conducted them?" C: "What reports were generated related to these studies?" D: Please provide copies of the reports related to these studies." My testimony on the Florida and Massachusetts

experience is based on the report first entitled "Integrating Atmospheric Mercury Deposition with Aquatic Cycling in South Florida and Approach for Conducting TMDL Analysis for an Atmospherically-Derived Pollutant" -- that's the title of the Florida document -- was conducted by the Florida Department of Environmental Protection is dated October, 2002. The other document is entitled "Massachusetts Fish Tissue Mercury Studies, Long-Term Monitoring Results, 1999 to 2004" produced by the Massachusetts Department of Environmental Protection in 2006. Florida's work was conducted by various researchers and contractors for mid 1990's to the early 2000's. The Massachusetts study was conducted from 1999, to 2004. The Florida report was one of several on the website noted in the TSD. The final Massachusetts report became available after the TSD was filed and all the data had been presented at conferences, and were we going to provide a copy of the Massachusetts report?

MR. KIM: We have copies -- we don't have enough copies right now. We can make copies.

MADAM HEARING OFFICER: Your response about the Florida report is available where?

MS. WILLHITE: On the website. In the TSD, I refer to a particular place where the information

was found, the website.

MADAM HEARING OFFICER: Nonetheless, since they, specifically, asked for a copy I think you need to provide it.

MS. WILLHITE: Okay.

MADAM HEARING OFFICER: We can't enter it as a hearing exhibit because everybody on the service list --

MR. KIM: Yes. We'll try to have that, if we can, before the end of the day. If not, tomorrow morning, at least.

MADAM HEARING OFFICER: Thank you.

MS. WILLHITE: Question 32: "In the Massachusetts study, did all the lakes studied show decreased methylmercury concentrations in fish?" The answer is 13 of the 17 lakes sampled showed a statistically significant decrease in concentrations between 1999 and 2004. Four lakes showed no statistically significant change.

MR. BONEBRAKE CONTINUES:

Q. Unless I missed it in that answer, did you address whether any of the lakes shown increases, Ms. Willhite?

A. That was question 34.

Q. Thank you.

MS. WILLHITE: Question 33: "With respect to the Massachusetts study, Ms. Willhite states that following air emission reductions of, `approximately, 90 percent levels of mercury in yellow perch and largemouth bass declined by 32 percent and 25 percent respectively.' Did the same number of lakes show declines for both species?" The answer is mercury concentrations in yellow perch showed a statistically significant decrease in 13 of 17 lakes. Mercury concentrations in largemouth bass showed a statistically significant decrease in 11 of 17 lakes. Eight lakes showed statistically significant decreases in both species.

MR. BONEBRAKE CONTINUES:

Q. I'm going to use this question to follow up on something that we discussed earlier. I think you said earlier, Ms. Willhite, that, from your perspective, there was a one-to-one relationship between mercury emission reductions and levels of mercury reductions in fish tissue, and I think you referenced the Massachusetts and Florida reports. Do you recall that?

A. I said mercury loading, between mercury loading and fish tissue levels.

Q. Can you describe for us what you mean by "mercury loading"?

A. Well, emission is what goes in the air and loading is what falls in the water or is discharged into the water.

Q. Well, let's start then with the mercury loading, what enters into the bodies of water, and it's your view that there is a one-to-one relationship between what mercury enters into the water, in terms of reductions and reductions in fish tissue mercury levels?

A. Say it again, please.

Q. Is it your view that, if there's a 90 percent reduction in mercury loading into a water body, there would be a 90 percent reduction in mercury fish tissue levels in the waterbody?

A. That's seems to be what's born out by those locations where there's 90 percent reduction. That's what the Florida study concluded of their data.

Q. In the Florida study, there was, approximately, a 90 percent reduction in air emissions, is that correct, of mercury?

A. More than 90 percent I think.

Q. And I think you said in your testimony that the levels of fish tissue and mercury decline were

32 percent in yellow perch and 25 percent in bass?

A. I'm sorry. In the Massachusetts study, that's right. I thought you said Florida, correct.

Q. So that's not a one-to-one relationship, is it?

A. No, but I also said that I believe that what the Florida experience showed was that it took about 10 years for the fish tissue levels to completely reduce, and the Massachusetts study is shorter than that, and I expect that, given another five or so years, that that equation will change.

Q. So it's your view, Ms. Willhite, that the 32 and 25 percent reduction level in fish tissue will ultimately rise to about 90 percent based on the Florida study?

A. No. That's not what I said.

Q. What about my question to you was inaccurate?

A. Can you rephrase it for me, please?

Q. I'm trying to understand what you're saying.

A. Well, rephrase your question. I will be happy to answer to it.

Q. Would you agree that a 32 percent

reduction doesn't have a one-to-one relationship with a 90 percent reduction in loading?

A. At this time. Well, what I'm saying is that, in Massachusetts, they had a pie chart of sources of loading. The sector that experienced a great 90 percent reduction in emissions in the 90's is what has been accomplished so far. That represents about 60 percent of the loading to those lakes in northeast Massachusetts. As a result of that, there has been around a 30 percent reduction in fish tissue levels of mercury, to date. I think that, given time, that that will continue to decline, based on what happened in Florida, but emission reductions that occurred in Massachusetts were not that whole pie chart of emissions. There's still other emissions that are providing loading to those water bodies, so I think that, although there's an early indication of what's going to happen there, it's not -- the process isn't finished, yet. The loading hasn't been 90 percent reduced. Only a portion of the loading has been significantly reduced, and it's been short enough time that the full reduction that's probably going to occur -- my expectation would be, at this point, to occur hasn't emerged as yet.

Q. If I followed all that correctly, is it true, then, that there has been a 90 percent reduction in the 60 percent loading attributable to the sources from which there had been reductions?

A. Correct.

Q. And do you know, in the Massachusetts study, how they were measuring loading?

A. No. I know that they had done some modeling and some monitoring, but that was really not discussed in the study.

Q. Then, going back to what we talked about earlier, then, is it true that, based upon the Florida study, you would anticipate that the 32 percent reduction seen so far in yellow perch fish tissue levels, as you say in your testimony, would ultimately rise to 90 percent of 60 percent or about 54 percent?

A. "Rising" is what's confusing me. Do you mean is the reduction going to --

Q. Increase, become greater.

A. The reduction is going to increase, yes, I believe that's true.

Q. And that's based upon the Florida study?

A. Yeah, in expectation that that's the way it's going to go.

MS. WILLHITE: Question 34.

MR. ZABEL CONTINUES:

Q. I'm sorry. Were they measuring the loading on the waterbodies in question in Florida?

A. I don't know.

Q. Then we don't know the relationship between the loading on those water bodies and the reduced emissions.

A. I don't know if that just means I didn't study that part of the report.

Q. But then you don't know --

A. I've seen information that says that Florida attributed 98 percent of loading to atmospheric deposition on the waterbodies of interest.

Q. From the waterbodies or from those sources.

DR. KEELER: In Florida, they actually did have actual measurements for wet deposition, and then the remaining deposition was actually modeled, so there were actual measurements that were used in the Florida case.

MR. ZABEL CONTINUES:

Q. When you refer to wet deposition measurements, how were those taken?

DR. KEELER CONTINUES:

A. There were two sets of data that were used in that analysis. One was taken using a system identical to what was used in the mercury deposition network. That was part of the Florida atmospheric mercury study performed by the Florida EEP. The other measurements were taken using a system that my lab developed at a limited number of locations. That's the methods given in the literature. It's a wet-only automatic collector.

Q. I'm sorry. I'm having trouble hearing you, Doctor. Measured in the water body?

A. You asked about loading and deposition, so that's what I'm referring to.

Q. What I'm trying to get to -- and I will put it on the table -- is how do you know what the sources were?

A. You asked about deposition.

Q. I did, indeed.

A. The deposition was measured and now you're asking me a different question.

Q. Yes.

A. Could you ask me the question again, please?

Q. Yes. How do you know what the sources of the reduction in loading were?

DR. KEELER: Is this the appropriate time to start?

MR. KIM: Sure.

DR. KEELER CONTINUES:

A. We have published several papers dealing with how we calculate the source contributions of various sources to the deposition of mercury in the sample. This is accomplished by actually measuring the rain that falls into a collector and analyzing that sample for a long list of trace elements, major ions, as well as mercury, and then using statistical and meteorological modeling techniques to work backwards to determine what the sources were. I will get into this a little bit more when the questions about my testimony come up, but that work was published in the peer-reviewed literature and the details how we went about that.

Q. I don't know if you know, Doctor, or any of the three of you, I guess, was something similar done in the Massachusetts study?

DR. KEELER CONTINUES:

A. In Massachusetts, we actually did make

measurements, but for the report that you're referring to, these long-term monitoring, they actually -- it looks like they used some modeling results to estimate their deposition loadings, so I'm aware that they had their own version of the CMAQ model, the model developed by EPA, and used New England-specific emissions data to do that modeling study. I'm not familiar with who actually did that work, but in the report, it looks like that's what they used.

Q. You didn't do the work?

A. I did not do the work.

Q. Do you know how they accounted for, if they accounted, for phase I of Title IV of the Clean Air Act?

A. I can't answer.

Q. I take it same answer for Phase II in that case?

A. I can't answer that.

MR. BONEBRAKE CONTINUES: A follow-up. If I understood, Ms. Willhite, your testimony correctly, you were relying upon the Florida study to support your view that the reductions in fish tissue levels will continue to get greater over time in Massachusetts. Is that correct?

MS. WILLHITE: That would be my expectation.

MR. BONEBRAKE CONTINUES:

Q. We talked yesterday about the fact that the methylation process is very waterbody specific. Do you recall that testimony?

MS. WILLHITE CONTINUES:

A. Yes.

Q. Do you have any information about the factors that bear on the methylation process with respect to the Massachusetts bodies of water in question in the Massachusetts study?

A. No.

Q. Do you have any of that information available with respect to the waterbodies in question in if Florida study?

A. I didn't study that part. It may have been that they characterized it. I know part of what the Florida work was, was to make use of an aquatic cycling model to help understand methylation bioaccumulation, and that sort of thing, but I didn't really review that part of the work.

Q. So is it --

MR. KEELER: Could I help?

MR. BONEBRAKE: I would like to finish with the line of questioning with Ms. Willhite.

MR. KEELER: I was going to provide a supporting answer. Is that okay?

MR. BONEBRAKE: I would prefer to finish up the line of questioning.

MADAM HEARING OFFICER: If he doesn't want the rest of the answer, then we'll go back to Ms. Willhite.

MR. BONEBRAKE CONTINUES:

Q. So is it correct, Ms. Willhite, that, as far as you know, the methylation rates in the waters in question in the Florida study may be very different from the methylation rates for the waters in question in the Massachusetts study?

A. I don't know. I mean, it's interesting to me that, in Massachusetts, there were 17 lakes that probably had different types of methylation rates, and in Florida, there were different lakes and canals that were sampled that probably had different methylation rates, but they all had fish tissue levels that were of concern, so I am unclear as to what the relationship is.

MR. KIM: Before we go further, my understanding is that the whole purpose behind, among

other things, behind the hearing officer rule is to gather as much information, relevant information, as possible. One of our panel members has indicated that he can add to the question. I understand the question was presented to one witness, but if another witness can add to that, isn't that inappropriate?

MADAM HEARING OFFICER: Not at all, Mr. Kim, but Mr. Bonebrake said he wanted to finish with Ms. Willhite. My intent was to ask Dr. Keeler what he wanted to add. That was my personal intent.

MR. BONEBRAKE CONTINUES:

Q. I'm not sure you answered my question. My specific question was, as far as you know, the methylation rates in the Florida waterbodies in question might be varied different from the methylation rates for the waterbodies in question in the Massachusetts study. Is that right?

A. They might be. I really don't know.

Q. And that might also result in a level of reductions in Florida that would not be repeated in Massachusetts. Isn't that also correct?

A. I don't know.

Q. Isn't it also correct that, with respect to Illinois waterbodies, those Illinois waterbodies that

are currently impaired might have very different biochemistry or other factors bearing on methylation rate from the waters in question in the Massachusetts study. Is that correct?

A. I don't know.

Q. So the methylation rate in Illinois waters might be very different from the methylation rate for the waters in question in the Massachusetts study. Is that correct?

A. I don't know.

MADAM HEARING OFFICER: Are you -- Dr. Keeler, could you please. I apologize for interrupting you, but Mr. Bonebrake, wanted to finish.

DR. KEELER: Just for clarification, I was a co-author on the Florida TMDL report and main contributor to the deposition part of that work, so I'm intimately familiar with what was done. One thing that should be made clear is that the mercury cycling model is an aquatic cycling model. It, basically, takes, once the mercury hits the waterbody, and figures out through -- it's a very complex model, but it, basically, works the mercury through the ecosystem and calculates how much mercury will be in different types of fish at different sizes and so forth, and it also has the

ability to then continue that into the future, so that it can look to see how much mercury will be in the fish given a length of time. In the Florida case, there was a dramatic decrease in the deposition of mercury in South Florida primarily due to the decrease of mercury emissions from incinerators from municipal waste and medical waste incinerators and that decrease in loading then, was reflected in the decrease in deposition. The change in the deposition then was put into the mercury cycling model, and after about a 10-year period, they actually did see a commensurate, almost one-to-one -- I say almost one-to-one because it might be one plus or minus .1, so 10 percent variability between the deposition that hit that ecosystem, and how much was found in the fish, fish tissue, itself. This was surprising to everyone involved because the model is not linear. There is not a decreased deposition in the fish automatically decreased by the same amount. It's a very complex model. It has all kinds of different things, but it takes into account the specific water quality parameters in the model, itself, so the temperature of the water, the amount of sunlight that hits the waterbody, the dissolved organic carbon content, the sulfur concentration, the PH, all of the important

parameters that we already heard discussed, in terms of methylation of mercury. Those are all taken into account in the model and they vary seasonally. The model came up with this one-to-one decrease from deposition to decrease in fish. That model has been applied elsewhere, in different places, and we continue to see the same type of relationship, so when the question is asked whether one would expect to see the same result in Massachusetts as what you would see in Florida, the answer is no. What they did in Florida was they would use a model and include the parameters for the water quality in Massachusetts, specifically. It's going to have different PH, different dissolved organic carbons, different temperatures. The seasonality is going to be different, and then it will take into account the exact loading that was either modeled or measured as input to that model, so you would expect to see different methylation rates and that's what you do see. There have been studies done by other researchers again, there are a plethora of papers in the peer-reviewed literature that talks about changes in methylation rate between Florida and other places, and you would expect that just because the environment is very, very different, but these models take that into

account when they estimate it, and the models are pointing to changes in deposition, pretty much linear changes in the fish content, so those are studies that have been performed thus far.

MS. BASSI CONTINUES:

Q. Has that model been applied to Illinois?

A. To my knowledge, I don't know. I'm not aware of any, but again, it could be applied to Illinois given, if the input data was there to apply it to a body of water.

MR. BONEBRAKE CONTINUES:

Q. You mentioned that the model is predicting a one-to-one relationship. Would that be the right way to put it?

A. Yes.

Q. Has the actual data in question in the Florida study shown a one-to-one relationship across all waterbodies studied?

A. For the TMDL that was performed down there, they looked at water conservation area 3-A, which is a specific part of the Everglades, and for that waterbody, they actually have a fairly large database of mercury content in various levels of the ecosystem from low traffic levels, all the way up to the fish and

wading birds and other things, so the model has predicted what has been observed, in terms of observed levels in wading bird feathers, and also in the levels of fish that were actually from that area. The TMDL was specific to that specific part of the Everglades. It's not widely representative for the whole state of Florida because, obviously, the waterbody is water composition of 3A is very different than we find in those in Florida or in other parts of the Everglades.

Q. Isn't it true that in the Florida study the authors of that study considered actual fish tissue methylmercury levels in nine different locations in the Everglades.

MS. WILLHITE: Twelve.

MR. BONEBRAKE CONTINUES:

Q. Of those 12 locations in question in the Everglades, how many showed an actual decrease in methylmercury levels?

MS. WILLHITE CONTINUES:

A. Would you prefer to answer that question now or finish up with Massachusetts stuff because that question is asked and I was prepared to answer related to the Florida study.

MR. BONEBRAKE CONTINUES:

Q. Let's proceed to answer the question, since we are here.

MADAM HEARING OFFICER: Excuse me. With all due respect, you only have two questions left on Massachusetts. Can we -- let's finish Massachusetts, and then come back. Otherwise, the record is going to be even more messed up than it already is. We'll try to keep the same mind set when we get back. I do believe you actually have a specific question presented to Ms. Willhite on the prefiled questions for Massachusetts, so we won't lose the question. I apologize, but like I said, you only have I'm all for a clearer record.

MS. WILLHITE: I think we're at question 34. 34: "Did the Massachusetts study show any lakes with increases in methylmercury levels in fish?" One lake had an apparent increase in trend in yellow perch mercury concentrations, but the increase was not statistically significant. It was not significantly different between 1999, 2004.

MR. BONEBRAKE CONTINUES: I thought she was finished. Please continue.

MS. WILLHITE: One lake had a statistically significant decrease in largemouth bass

mercury concentrations between `99 and 2003, but the 2004 sample was slightly here than the 1999 value. Massachusetts is awaiting the results for 2005 to help shed some light on mercury dynamics in this lake.

MR. BONEBRAKE CONTINUES:

Q. So if I understood that correctly, there were, at least, two lakes in the study area that showed increases over time in fish tissue methylmercury level.

A. Yes.

MS. WILLHITE: 35: "Did the Massachusetts Department of Environmental Protection determine that their air emission reduction efforts were sufficient to reduce methylmercury levels in fish to the level that TMDL's and public fish advisories would no longer be necessary?" I would say, apparently, not. The incinerators emissions were reduced around 2000, but in 2004, Massachusetts established a 90 percent mercury reduction requirement for emissions for coal-fired power plants in order to address another significant in-state source of loading to impaired waters. Massachusetts believes that, in addition to in-state reductions, significant out-of-state reductions of mercury will be needed to completely address fish tissue contamination in their state. Question 36 --

MR. RIESER CONTINUES:

Q. Ms. Willhite, are you familiar with the Meramec River Valley fish mercury study?

A. No.

Q. So you are not familiar about whether that -- let me step back. I believe you said that earlier that one reason that the Massachusetts data wasn't showing a one-to-one reduction that you're claiming was partly they didn't have time to achieve that state, and also not all of the sources of mercury within Massachusetts have been controlled. Is that fair?

A. I would say both in-state and out-of-state, yes.

Q. Instate and out of state?

A. Loading. I will just say, if I'm a waterbody, what's hitting the water body is loading and the loading can be coming from a variety of sources.

Q. Understood. So you're not familiar with the Meramec River Valley Fish Study, in terms of how it addressed evidence of whether there is downwind, whether lakes that were downwind of power plants were showing certain levels of methylmercury?

A. I'm not familiar with the study, but maybe

I've never heard it characterized as that. I don't even know what state that is.

Q. Thank you.

MS. WILLHITE: Question 36: "Does the Florida study that is mentioned in the TSD and Ms. Willhite's testimony rely heavily on modeling for making predictions?" Florida mercury studies are a broad program of monitoring, modeling and research into the atmospheric and aquatic cycling of mercury, bioaccumulation and risk with specific reference to the Florida Everglades. The results of these investigations are supported by a broad base of data and analysis as it's embodied in the report. 37: "What are the caveats and cautions in the Florida report regarding the predictions the authors of the reports were making?" As is stated in the 2002 report, there is considerable treatment of the uncertainties of the analysis, and these are detailed in the appendices, but there were no overarching cautions provided that I saw. Question 38: "Do all of the data for largemouth bass shown in the Florida study support the modeling results of a one-to-one relationship between reduced inorganic mercury emissions and reduced methylmercury concentrations in fish? A: If so, how?" The data that

underlies this analysis are the results of consistent annual collections of, typically, 20 fish per site using protocols in place since 1994. This analysis compared actual field data to the Tetricheck mercury cycle model customized in this application.

MR. BONEBRAKE CONTINUES:

Q. I'm not sure if you did you answer the question, Ms. Willhite, if the actual results for the 12 data points that you referenced earlier showed a reduction in methylmercury concentrations.

A. Well, the question said, "Do all the data show one-to-one relationship?" I think maybe we got off on -- my notes may be incorrect on what question is here.

MADAM HEARING OFFICER: Question 37 is where we were, right? Is what were the caveats and cautions of this Florida report?

MS. WILLHITE: Yeah.

MR. BONEBRAKE: I think we had moved on to 38.

MADAM HEARING OFFICER: I'm sorry. I didn't cross it off fast enough.

MS. WILLHITE: I'm sorry. I'm gong of the to go through my notes again. I think I have gotten

off track here.

DR. KEELER: From my recollection, the best relationship was a one-to-one relationship for the data points in the largemouth bass. That doesn't mean that every single point fell perfectly on that line, but that's what my recollection is from the report.

MR. BONEBRAKE CONTINUES: I have three copies of a report that I think is the report that Ms. Willhite was referring to earlier. I wasn't sure exactly, in advance of this proceeding, what documents she was referring to, and so I can provide a copy of the report to Ms. Willhite and copy to the hearing officer and the copy to Mr. Kim for some follow-up questions to see if we can nail these issues down.

MADAM HEARING OFFICER: Which report is that?

MR. BONEBRAKE: This is entitled "Integrating Atmospheric and Mercury Deposition with Aquatic Cycling in South Florida" dated October, 2002, revised November of 2003. I think that was -- I think that was the report that she was referencing.

MR. KIM: I think some of our staff is probably copying the very same report that you just referred to with sufficient copies for the four, and one

for opposing counsel. If you would like to do that, that's fine. If you can do that right now, that's fine, and we can supplement with additional copies.

MADAM HEARING OFFICER: We will admit the Florida report as Exhibit No. 20, if there's no objection. So this will be Exhibit No. 20. I see no objection.

(Exhibit No. 20 was admitted.)

MR. AYRES: I think we need to make sure which version of it we're looking at because I know there have been some different things published.

MR. KIM: I believe the copy that we are retrieving is the one that's available right now off the website.

MADAM HEARING OFFICER: We will admit this as Exhibit No. 20 then, and then we will admit the other as Exhibit 21, if we need to.

MR. KIM: If it's different. It may be the very same copy.

MR. BONEBRAKE: I pulled this copy off the website and there was a lot of material on the website.

MR. KIM: I'm sure it's probably the same thing and we can give you sufficient copies for the

Board.

MS. WILLHITE: My notes are not complete enough to answer that question. I would need to study the report again to answer the question.

MR. BONEBRAKE: Maybe we can refresh your recollection.

MS. WILLHITE: I would prefer to do it and get back to you, if that's possible at all, because I can't do it in 30 seconds, sorry.

MR. KIM: Ms. Willhite has a scheduling conflict. She's going to be away from the hearing tomorrow, but she will be here on Friday if there were specific questions that come up today posed to her concerning the contents of the Florida report, then, at least, that would give her a little bit of time and we can come back and we'll answer the questions. I think you are going to get a better quality of answer if she has an opportunity to look at it as opposed to right now.

MS. WILLHITE: I will continue to answer questions, but for some unexplainable reason, my notes are not completely addressing that question.

MADAM HEARING OFFICER: Why don't we put the questions on the record, so she knows what the

questions are, and if she feels she can answer them today, she can address them. If not, we'll let her review the report, and we'll bring her back on Friday.

MR. BONEBRAKE: I'm a little concerned about putting questions on the record because they are narrative. It would depend if I asked questions and she gives me a response and I'm not sure where I'm going to go, and it would be difficult to put all the questions on that I would actually ask because it's difficult for me to predict how she's going to answer all my questions.

MR. KIM: We wouldn't limit you to questions you would read into the record, but if there was a particular section or topic that you wanted her to focus on in the report, even if you just give us that, then she can look at that and go from there.

MR. BONEBRAKE: I think there's a discussion, as I understand it of the actual methylmercury fish tissue results, as opposed to the model results, including at pages 81 and 82 of this report and Table 12 of the report, which is on 82, and I would ask a series of questions regarding what the actual data demonstrated over time.

MS. WILLHITE: If you would permit me

an opportunity to review those data and get back to you on the answer, I would be very grateful.

MR. BONEBRAKE: I think that's fine, Ms. Willhite. Just a follow-up question, is your concern about your notes on this particular question causing you any concerns about some of your responses to the other questions?

A. No.

Q. So as far as you know, this difficulty is just related to this one question?

A. Yes, so -- I'm prepared to continue on the other questions.

Q. We'll come back Friday then to the questions related, specifically, to the Florida report.

MADAM HEARING OFFICER: Absolutely.

MS. WILLHITE: I can even answer the additional questions that are asked on the Florida report. It's just that particular piece of information that I regret that I don't have complete notes on for today.

MADAM HEARING OFFICER: That's, generally, the stuff covered in Question 38?

MS. WILLHITE: Yes.

MS. WILLHITE: Question 39: "How many

different sites were sampled in the Florida study?" Largemouth bass have been collected with consistent field and analytical protocols since 1994. Annual fish collections target three-year-old size class largemouth bass at 12 sites in South Florida. Typically, 20 fish are collected at each site each year. Question 40: "How many of these Florida sites did mercury levels increase or show no change?" The way that Florida presented the data was they had 10 classes braced on kind of an age, site, size, descriptor, as I understand it at the 12 sites, so they had what they considered to be 120 categories, that combination of site and different kind of size and age class, and they did trend significance on these data that they collected looking at a period of data as early as 1988 to as late as 2000. 66 of these size and site cohorts that they describe had enough data that they could test significance for trends. The results were split relatively evenly between a significant decline at the 95 percent confidence level and having no trend. Significant declines were observed across the state suggesting a regional effect. For example, atmospheric deposition, with the most consistent declines across cohorts observed for the two Everglades canal sites that they

denote as L-67-A and L-35-B and East Lake -- I won't be able to pronounce this but I will spell it -- T-A-H-O-P-E-K-A-L-I-G-A. The three sites in water Conservation No. A near site 3-A-15 located near the so-called hot spot of high fish tissue concentrations also showed some cohorts with significant declines. Although nearly as many site cohort combinations also showed no change. Only three site cohort combinations showed a significant increase in trend, and all these were observed at the same site in water conservation area 2-A. The Florida folks that wrote the report said that this increase likely reflects a highly localized effect in, both, time and space, such as P burning and oxidation that occurred in the Everglades following the intense drought, and dry down in May and June of 1999 and they cite to publications, Pullman, et al., 2002.

MR. BONEBRAKE CONTINUES:

Q. Ms. Willhite, you just described some information relating to the South Florida study and if you wouldn't mind just taking a look at the page 82 of the Florida report, I want to make sure I know the source of your information, and ask you to take a look at Table 12 on page 82.

A. Yes.

Q. Is Table 12 the source of the information that you just described pertaining to trends in data in South Florida?

A. I know, but I was quoting what was on page 81. I believe so. I believe they are summarizing what was stated in the text on page 81 of the report.

Q. I think your testimony was that about half of the data points there was no significant change in methylmercury fish tissue levels. Is that correct?

A. Correct.

Q. And that was true, notwithstanding reductions in mercury air emissions in the area?

A. I didn't see how they related the reductions in loading to their locations for sampling, but that was just not something that I looked up in the report, so I'm not certain to what extent there was loading reduction on the places where there was no significant trend. I just didn't study that part.

Q. Is it your understanding that there were significant mercury emissions reductions in South Florida?

A. Yes.

Q. How significant were those reductions?

A. The emission reductions were around 90

percent, as I recall. 80 percent? 90 percent.

MS. BASSI CONTINUES:

Q. Was that 90 percent of overall emissions or 90 percent of a certain category, and by "category" I mean industrial category.

A. Yeah. They had a variety of sources. I'm not certain.

DR. KEELER: The 90 percent figure you're referring to is 90 percent reduction in all source categories. The 90 percent reduction that you are referring to that occurred around the year 2000 was for all source categories, but municipal waste and medical waste incineration was the dominant source of those emissions reductions. It should be pointed out, though, that the dominant reduction emissions was estimated to have occurred earlier than that, closer to 1990, so that the reductions I would guess the peak, which is shown on page 76 in Figure 19 was actually around 1991 in mercury emissions for all categories and then add that to reduction of 90 percent that occurred around year 2000 is really very insignificant compared to the reduction that occurred around 1991, so there was a big reduction in the early 90's and total mercury emissions and another one primarily from incinerators

around the year 2000.

MR. BONEBRAKE CONTINUES.

Q. I'm looking at a page 76 and you were referring to a bar graph on that page, Dr. Keeler?

A. Yes.

Q. Unfortunately, mine is not color printed, so I don't know if I'm missing some information. Is yours?

A. No. I have black and white. I have your copy, in fact.

Q. As I look at that bar graph, it looks to me like most of the reductions in the 1990-91-92 time frame were from what is referred to as MWI and MWC incinerators and combusters?

A. I think that's what I said.

Q. Maybe I misunderstood you.

A. Municipal waste incinerators and medical waste incinerators, that's what those two categories are.

MADAM HEARING OFFICER: Actually, municipal waste combusters and medical waste incinerators.

MR. BONEBRAKE CONTINUES:

Q. Defined at the footnote at the bottom of

the table. A follow-up question of Mr. Keeler since he was providing some testimony. Do you know, Dr. Keeler, if the emission reductions that are reported in the Florida report encompass, geographically, all of the -- "encompass" is maybe the wrong word -- in the vicinity of all the 12 data points that are listed on the table on page 82 of the report?

A. Could you be more specific with your question? I'm not sure what you're asking me.

Q. There's a table we talked about, Table 12, on page 82 of the Florida report. Do you see that?

A. I see that.

Q. We just talked about reductions in mercury emissions over time. That also referred to page 76 of this report. Do you recall that?

A. Yes.

Q. Do you know if the mercury emission reductions that are referred to on page 76 of the report were from sources in the vicinity of the data points locations that are identified in Table 12?

A. The emissions plot reflects all of the mercury sources in south Florida, not just ones in the vicinity for the sampling locations for the fish, so it's trying to take a comprehensive look at all the

emissions sources. Just to give a spacial reference frame, if you take south Florida, the south Florida peninsula, and kind of think of that as about the same size as Lake Michigan, that's about the same. Everyone thinks that South Florida is this huge peninsula, but in fact, it's not too much different in size. You could take it and stick it right in Lake Michigan, just for a frame of reference. From one side of Florida, from Naples to Fort Lauderdale is actually not that big of a space, so all of those sources are fairly close in proximity to all of the sampling areas in the Florida Everglades.

MS. BASSI CONTINUES:

Q. How far north does south Florida go? Is it, like, halfway up the state or are you talking less?

A. Typically, people think of Lake Okachobee as the cutoff point, so south of Lake Okachobee.

MADAM HEARING OFFICER: Just like people in Chicago and Southern Illinois. Mr. Harrington.

MR. HARRINGTON CONTINUES:

Q. Just for my own clarification -- if this is out of order I will come back to another point -- but I think my understanding is both the Florida and the Michigan studies dealt -- excuse me -- Massachusetts

dealt with primarily reductions from waste combusters and medical waste incinerators. Is that correct?

MS. WILLHITE CONTINUES: Yes. If I can just add to that --

MR. HARRINGTON CONTINUES:

Q. Sure.

A. From the standpoint, again, of the waterbody, the source is not the issue. It's the loading.

Q. But for clarification, was or emissions from medical waste through incinerators and municipal combusters in the same chemical form as emissions from power plants?

DR. KEELER: We'll get into this a little bit more when I give my testimony, but the form of mercury that comes out of power plants, as well as out of incinerators varies, depending on what plant, and so forth, depending on the fuel used, the type of waste that's combusted and so forth. A significant fraction of the mercury that comes out of waste incinerators, both medical waste, as well as municipal waste comes out in on oxidized form or the reactive form of mercury. A significant fraction of the mercury that comes out of power plants is in that same form, so yes, the answer is

that it comes out in similar form. The exact proportion is going to vary from plant to plant.

MR. HARRINGTON: Thank you.

MADAM HEARING OFFICER: Anything else. Moving on to question 41.

MS. WILLHITE: "Are site-specific factors relevant to determine whether or not and to what extent reducing local anthropogenic mercury emissions will result in reductions in methylmercury concentrations in local fish species? I guess, to start with, I haven't seen any studies in which reductions in local anthropogenic mercury emissions did not result in some reductions somewhere in the effected area of fish tissue levels, but yes, I think that site-specific factors are relevant in two aspects. First, as we've been discussing, many factors about a particular waterbody contribute to the rate and degree to which inorganic mercury deposited in the waterbody will be methylated available to bioaccumulate into fish tissue. It's difficult to predict this for a particular waterbody, so there is that aspect of site specificity, although I will just repeat what I said before. In spite of that, there seems to be amazing consistency about the fact that we have fish tissue concentrations

in Illinois and these other states that have looked at this issue that are above their fish consumption advisory levels. The second aspect in which site-specific issues are important is whether the mercury emitted locally will deposit locally and this is dependent on the form of mercury that's emitted. The particulate and oxidized form deposits locally, whereas elemental form deposits more distantly from the emissions source, so if emissions from a nearby source are depositing locally, there will be loading to the waterbody and apportionment to the amount of local deposition would be my assumption. Even though the amount of mercury loading to a particular waterbody is not the only factor that determines the amount of contamination of fish tissue, if there wasn't any loading, there wouldn't be any methylation. If there was less loading, it would be less available for methylation. We would expect fish tissue reductions in nearby waters to be proportionate to the reductions in local emissions that deposit in those waters.

DR. KEELER: Just an additional point to that, the big variable that makes this discussion a little bit more difficult is just the timing for when the reduction will be seen in the biological system, so

in Florida, where the metabolism of the ecosystem is very high, very warm climate, everything is moving very fast. Things might show themselves much quicker, so that 10-year time period that was seen in kind of recovery of the Everglades may take longer, let's say, in Massachusetts. The figures were, what? 40 percent at this point. It may take 12 to 15 years. It's a longer time frame, so the specifics of the ecosystem have an effect on the timing, but the pattern is there, but one cannot get at that by just taking a couple years of data. It will take some time down the road.

MR. BONEBRAKE CONTINUES:

Q. Ms. Willhite, you indicated that the methylation process varies from waterbody to waterbody. Is that right?

A. That's my understanding.

Q. Given that, I don't understand how you can say that there's going to be a proportional relationship between reductions in mercury loading to a waterbody and to fish mercury levels. Can you please explain that to us?

A. Proportionate. I think that, if you have a high amount of loading to a waterbody, there's going to be -- and that gets reduced, there's going to be a

proportional, some relationship between the amount of loading and the amount in the fish tissue.

Q. That relationship may be 10 percent?

A. Possibly.

Q. Five percent?

A. Eighty percent? You know it's proportionate. There's a relationship between the two.

Q. But it might be a very small number?

A. Possibly.

Q. So as I understood it earlier, you were saying that there was a one-to-one relationship between reductions in loading and reductions in fish tissue mercury levels. Is that still your view, Ms. Willhite?

A. I think that that's my personal belief, and that is an assumption that's been made by other states, as they look at how to deal with impaired waters.

Q. I would like to follow-up with Ms. Willhite before the microphone gets handed over, so when we talk about a proportionate relationship, and the fact that maybe only five percent, as you said, possibly of the reduction of loading may be reflected in methylmercury fish tissue levels. Given that possibility, I don't understand your personal view that

there's a one-to-one relationship. Can you please explain that to us, Mr. Willhite?

MR. KIM: I believe she has answered this question in that she says that she's explained her so forth and so on. She's also said it's her personal opinion. I think this is repetitive. I think we have already answered this.

MADAM HEARING OFFICER: I tend to agree. I think she told us that's her personal belief is based on the Florida study and what she's read. Is there something more specific than that?

MR. BONEBRAKE: Maybe I could your personal belief is there's a one-to-one relationship, but you also said that you understand that the relationship may be as low as five percent. If the five percent, then, is not your view, I'm not sure what it is. Can you tell us what it is?

A. My personal belief is that an expectation is that you're going to get a big reduction -- you get a big reduction in fish tissue, if you get a big reduction in loading.

Q. Even though you recognize it may only be five percent?

MR. KIM: She has answered the

question.

MADAM HEARING OFFICER: We're going to move on. Dr. Keeler, you wanted to add something on the one-to-one issue.

DR. KEELER: Just a clarification to this modeling study, again, using the mercury cycling model in different locations when you put in environmental conditions for the place that you're modeling, you put in a change in the deposition loading and you get a commensurate linear relationship to the amount of mercury that's in the fish, so you see a decrease in loading. You see a decrease in the amount of mercury on the fish based on the models. This isn't -- and I think that's where we're seeing this conclusion to be drawn from. The model predicts it, as long as you use the right water quality measurements, and the measurements of the fish in those ecosystems confirm what the models suggested.

MR. BONEBRAKE CONTINUES:

Q. Mr. Keeler, you just said the actual data supports the one-to-one relationship that the models predicted in the Florida study?

A. Sure.

Q. Did we just look at a Table 12 on page 82?

Do you recall that, Mr. Keeler?

A. Yes.

Q. Doesn't the data in Table 12 indicate that, approximately, half of the data points showed no significant change in methylmercury fish tissue levels?

A. In this table, there are fish taken from a variety of areas throughout the Everglades. This table is meant to be representative of a large area from northern Florida, central Florida and the Everglades, so it says "Everglades," and then it gives you the locations for these different places, so again, the analysis that was done was for one specific area in the Everglades where there was a very good relationship, so I think, when you take a look at any type of environmental measurements, where you're including biological measurements, you are going to see variability from one system to the other. You are going to see a difference between fish taken from the same ecosystem and that's to be expected. You -- I have never seen data, in the 25 years I have been collecting environmental data, where you see a perfect one-to-one relationship when you are using any type of a biological indicator, so you would expect to see, in some locations, no change, and some places you wouldn't even

see an increase because of some type of localized change in environment, so this data is over a very large area. I think you're taking results from the report and putting them together and drawing a different conclusion then, if you read through the entire report in its entirety, I think the conclusions that are printed out are born out by the data in the report.

Q. What specific data point location, Mr. Keeler, on Table 12 was the modeling point that you with referenced?

A. Well, the work that was done was for water conservation Area 3-A, and the point was 3-A-15. I actually haven't looked at this table, specifically. I just was looking at it just know showing it's all over Florida, not just one specific location. There are other data in the report I think that perhaps show things, like even the following figure tissue concentrations of mercury in largemouth bass at the L-57 canal shows a fairly clear trend I believe.

Q. But the Big Lost Man's Creek data point shows no change, Mr. Keeler?

A. Which one?

Q. Big Lost Man's Creek on Table 12, second from bottom.

A. I'm not, personally, familiar with where Big Lost Man's Creek is.

Q. It's identified as being in the Everglades in Table 12, correct?

A. The Everglades is the largest marsh area in the world. It's a huge area. It could be completely different than the area that we're referring to, so I'm not sure where Lost Man's Creek is, if you could tell me where it was.

Q. Well, but the issue is you don't know if Big Lost Man's Creek was in the vicinity of the air emission reductions, right, that were in question in this report?

A. Again, "the vicinity." What does that refer to when we are referring to air emissions.

Q. Well, my understanding was you were saying that the data from the other data from the data points in the Everglades that are reflected here are not relevant because they may not be in the vicinity of the sources from which there were emission reductions. Did I misunderstand you?

A. I actually didn't say they weren't relevant. What I was saying was they came from a large area. I mean, to say "the Everglades" you would to be

more specific. Like, Miami Canal and L-67-A, I know, for a fact, that goes through our study area, and even there, you have one point where it indicates no trend at .6 there, and I think that's what you would expect in any type of an environmental sampling program.

Q. Do you know --

A. I don't think this data is important. It's reflecting what you would see in a real environment.

Q. Do you know for a fact which of the other Everglades data point locations were in the study area, as you refer to it?.

MR. AYRES: Could we refer to it?

MR. ZABEL: Is counsel advising the witness or is he acting as an expert?

MADAM HEARING OFFICER: This is a rulemaking proceeding, and if the two of them want to want to discuss something, and then I'll bring you on and if you want to object to what they have to say, you are more than able to do this. This is a rulemaking, and Mr. Ayres can say anything he wants right now, as long as I swear him in.

MR. ZABEL: I agree. I would rather him say it, than whisper it. I would like to know who

I'm cross-examining. Is it Mr. Ayres, or is it Dr. Keeler?

MADAM HEARING OFFICER: I believe it's Dr. Keeler. We've been going for about an hour and 20 minutes. This might be a good time to take a short break.

(At which point in the proceedings, a short break was taken.)

MADAM HEARING OFFICER: I believe we are at Question No. 42 for Ms. Willhite. Wait a minute. I believe for Dr. Keeler we had a follow-up.

MR. BONEBRAKE CONTINUES: I think there was a question outstanding regarding the data point locations on Table 12 that were within the study area that Mr. Keeler had identified.

DR. KEELER: As I recollect from -- I don't recall where all these sites are, but they are, specifically, located across a very wide area from the northern part of the Everglades to the southern, and the variations that you are seeing here do reflect that. The methylation and the levels of methylmercury in the Everglades at these sites do vary dramatically, so you do see differences due to local variations. If you look at the data in the report, the report provides data, not

only for a specific area that we did modeling but also provides some of this other data for some other areas where ecosystem monitoring was taking place. This table does not reflect loadings or differences in loadings to any of these areas to go along with these trends that they are talking about, so it's really impossible to infer anything more from this table, except for it's showing you some spacial variation.

MR. BONEBRAKE CONTINUES:

Q. Do you know, in fact, there were differences in loading between the nine different data points that are listed on Table 12 with respect to the Everglades?

A. I don't have the spacial map to be able to answer that question at this point, but I know that, at least, two of -- a couple of these sites were pretty far apart, like the U-3-B marsh and the L-67-A canal, for example, or a long ways a part. The marsh U-3 site is fairly far to the north where the methylmercury levels are very low, and methylation rates are much lower and the deposition rates are much lower, as well, but other than that I don't have a recollection for where the rest of these sites are. I'm hoping that I can get a map for you. Then maybe I can present that tomorrow, but I

believe that's what this is reflecting, spatial variability.

Q. The Florida report on page 88 -- and I will let you get there -- is the first sentence in "Discussion and Conclusion" section?

A. Yes.

Q. Reads, "Local emission rates of mercury in south Florida appear to decline by over 90 percent since peek levels occurring in the late 1980's to early 1990's." Do you know what geographic area is included in the south Florida reference there, Mr. Keeler?

A. Again, that refers to south of Lake Okachobee?

Q. Where were those sources of reduction in relationship to the Everglades?

A. All of those sources are south of Lake Okachobee. All the measurements were made in the Everglades proper, which is entirely south of Lake Okachobee, but you are talking about a fairly large wetland. It's a third of a state, so --

Q. I think you had indicated that you were involved with deposition modeling in connection with the south Florida site studies?

A. Yes. I was involved in, both, modeling

and measurement as part of that study.

Q. Did the modelled impacts from the sources from which there were mercury emission reductions, did the modelled impact area include all of the data points listed on Table 12 in the Everglades section?

A. Again, you asked me if I was involved in the deposition modeling? And then you're asking me about Table 12?

Q. I'm trying to get an understanding of, in connection with the deposition modeling, did you model an area of impact for mercury emissions?

A. I'm sorry. I don't understand your question.

Q. Did you do any work in connection with the Florida study to identify the specific locations in the Everglades where mercury emission deposition would decrease?

A. We used the actual emissions data from all the sources south of Lake Okachobee and modeled the deposition to south Florida, yes.

Q. So I understand that correctly, for each of the nine data points on Table 12 with respect to the Everglades, is there actual data available that shows the amount of mercury being deposited over time?

A. Again, until I can get if map showing where these nine sites are, I can't be sure.

Q. I will reserve further follow-up for further testimony.

MADAM HEARING OFFICER: Absolutely.

DR. KEELER: It's very likely the answer is yes, but I just have to make sure because we did focus on Water Conservation Area 3-A, which is in the eastern portion of the Everglades. It was a very specific body of water which had fairly homogenous properties as if it was one big lake because it's a subsection on the Everglades.

MS. WILLHITE: Question 42: "Were the emission reductions at issue in either Florida or Mississippi study from electric-generating units?" South Florida had relatively few coal-fired electric generating units as sources in Southern Florida during the time of the analysis attributed 98 percent mercury loading in Everglades from atmospheric deposition, but identified municipal and medical waste incineration as their biggest emission sources. The Massachusetts -- the reductions in the Massachusetts study were not due to electric-generating units. The next question, "What were the sources of reduced air emissions in those

studies?" The answer is incinerators.

MR. BONEBRAKE CONTINUES:

Q. With respect to incinerators, I think you indicated, Ms. Willhite, that incinerators emit a higher percentage of the oxidized form of mercury than EGU's. Is that correct?

A. I don't remember saying that.

DR. KEELER: I said that.

MADAM HEARING OFFICER: Dr. Keeler.

DR. KEELER: I made a statement similar to that. I said that the tested incinerators have shown a higher fraction of their total mercury emissions in the reactive form than the average that have been reported for coal-fired utilities. However, there is variability in that, and so individual power plants could emit the same proportion, a very high fraction of their mercury in a reactive form.

Q. I'm sorry. I may have confused the two of your testimony.

MR. RIESER CONTINUES:

Q. Dr. Keeler, with respect to that last statement regarding emissions of -- can I call it RGM for coal-fired plants? Is that the right term? Is it your testimony that coal-fired power plants emit the

same high proportion of RGM's incinerators?

A. No, sir. That's not what I'm saying.

Q. Let me -- explain it, please.

A. Incinerators -- it will depend upon whether it's municipal or medical waste. Both of them will emit more 80 percent in the form of reactive mercury. The average that has been reported for utilities is something like 67, plus or minus 20 or 15. I can't remember the exact state of deviation, but that was reported by the industry, so it's a lower average than incinerators, in general, but I'm saying the range can be, for an individual power plant, it could be as large as 80 percent.

Q. Does that range depend on the type of coal burned in the power plant?

A. Yes.

Q. And with respect to sub-bituminous coal, would the range be less than 80 percent?

A. Sub-bituminous coal should have a lower fraction of reactive mercury.

Q. By lower fraction, what's your understanding of what that number may be?

A. Well, again, the average that I have seen reported was 67, plus or minus, 15 or 20 percent, so it

would be at the lower end of that, so less than 15 percent.

Q. In doing -- that will do it. Thank you.

MADAM HEARING OFFICER: Are we ready to go on to Question 43? 43 or 44?

MS. WILLHITE: I thought we were on 44. "In the second full paragraph on page 3 of Ms. Willhite's" --

MS. BASSI: That's 45.

MS. WILLHITE: "What is the percentage of anthropogenic emissions in Florida and Massachusetts from coal-fired power plants?" "According to the Florida study, power generation accounted for 0.4 percent of anthropogenic mercury emissions in south Florida. In Massachusetts, 40 percent of mercury emissions are identified as coming from electricity-generating units, including 11 percent from instate coal combustion and the remainder from out-of-state sources.

MR. RIESER CONTINUES:

Q. Ms. Willhite, the answer -- the question doesn't say a specific time, but are those numbers drawn from before or after both states discontinued their medical waste and municipal waste combusters.

A. Well, I believe that the Florida study occurred after the reduction. The Massachusetts study I believe is ongoing.

Q. So the numbers that you just provided, those percentages that are drawn from the two studies, the Massachusetts and the Florida study that we have been talking about?

A. Yes. I think, actually, the Massachusetts figure comes from their alternative TMDL document.

Q. Thank you.

MS. WILLHITE: "In the second full paragraph on page three of Ms. Willhite's testimony, she states that `Several of the lakes in Illinois that are listed for fish consumption impairment due to mercury and that have the highest fish tissue levels of mercury detected in the state have no point source discharges into the water at all.' With respect to the statement, A, what lakes is she referring to?" The lakes that are listed as impaired for mercury, but do not have current point source discharges are Lake in the Woods, Lake Arrowhead, Midlothian (phonetic) Reservoir, Monee -- M-O-N-E-E -- Reservoir, Kincade Lake, Campus Lake, Cedar Lake and Devil's Kitchen Lake. B: "What point source discharges are historically and what nonpoint sources,

currently or historically, discharge, or discharged to these lakes?" There have been no point source discharges into these lakes over the past 34 years. Our records do not extend beyond that time. Nonpoint source discharges would be storm water runoff from the surrounding watersheds of these lakes, mainly sediment and whatever is attached to the soil particles. Three of the four lakes in the southwestern part of the state, and those are Kincade, Cedar and Devil's Kitchen are surrounded, mainly, by forest land, Shawnee National Forest and Campus Lake is on the campus of Southern Illinois University. The lakes in the northeast part of the state, Lake in the Woods, Lake Arrowhead, Midlothian Reservoir and Monee Reservoir are in watersheds containing urban residential and park district land uses. I just wanted to review the question again. The question asked for what nonpoint sources currently or historically discharged to these lakes, and I mentioned runoff based on the way the question is phrased is, obviously, atmospheric deposition is another nonpoint source.

MR. BONEBRAKE CONTINUES:

Q. I think you said "nonpoint discharges have occurred to these lakes in the last 34 years."

A. According to our records.

Q. I'm curious. Are any of the lakes that you mentioned today, any of these lakes that you mentioned, receive any flow from any of the impaired streams or rivers that you haven't identified?

A. No, sir, not that I know of.

MS. WILLHITE: 45-C: "What are the contributions of natural mercury sources in out-of-state man-made sources to mercury levels in these waters and to fish in these waters?" The answer is as noted in the response to Question 25. We do not believe there are natural sources of mercury within the state that would be likely to influence mercury levels in fish tissue. We have not conducted any assessment of the contribution of out-of-state manmade sources to mercury loading to the lakes named above.

MR. BONEBRAKE CONTINUES:

Q. Just a clarification, when you say "we" in the last response, do you mean the Agency?

MS. WILLHITE: Correct.

MADAM HEARING OFFICER: Question 46.

MS. WILLHITE: "In the last full paragraph on page three of her testimony, Ms. Willhite states that other states that have drafted TMDL's on

mercury-impaired water, that is, Georgia, Minnesota, and Maryland, have allocated a high percentage of loading from atmospheric deposition. With respect to this statement, A, what is the basis for this statement, including what document, studies or reports is Ms. Willhite relying upon?" My testimony on the allocation by other state TMDL's of a high percentage of mercury loading to atmospheric deposition is based on my review of the draft, or final TMDL documents. I have reviewed the draft statewide mercury TMDL for Minnesota, which is entitled "Statewide Mercury TMDL Plan," and it's on the Minnesota Pollution Control Agency website. I reviewed three of the 25 mercury TMDL's developed for Georgia entitled "Total Maximum Daily Load for the Monee River"; "Total Maximum Daily Load for the Obechee River"; and "Total Maximum Daily Load for the Savannah River" found on the U.S. EPA Region 4 website. I reviewed two of the 10 mercury TMDL's developed by Maryland Department of Environment entitled "Total Maximum Daily Load for Big Piny Run Reservoir"; and "Total Maximum Daily Load for Long Raven Reservoir" found on the U.S. EPA Region 3 website. B: "What were the identified sources of this atmospheric deposition?" And C: "How much of this deposition was attributed by

Georgia, Minnesota and Maryland, respectively, to sources in other states and countries?" In the three TMDL's that I reviewed from Maryland, Maryland attributed 100 percent of the mercury loading to the waterbodies coming from atmospheric deposition. Power plant emissions were identified as the largest source of mercury emissions in the state. In its TMDL's, Maryland did not allocate loading between in-state and out-of-state sources. In the three TMDL's I reviewed from Georgia, 99 percent of the loading to the impaired waters was attributed to atmospheric deposition. Power plants were identified as the largest in-state source of mercury deposition. Georgia attributed, approximately, 36 percent of the atmospheric deposition as coming from global sources. Minnesota's two-draft statewide TMDL's, one for the northeast portion of the state, the other for the southwest part of the state, attributed 99.5 percent and 97.8 percent of mercury loading as coming from atmospheric deposition. Minnesota allocated 10 percent of the atmospheric deposition to in-state sources and 90 percent from outside the state. Question 47 -- I'm sorry -- D: "Is the Agency aware of states that have drafted TMDL's for mercury-impaired waters that have not allocated a high percentage? Tab one:

"If so, which states?" Two: "Why?" I'm not aware of states that have drafted TMDL's for mercury-impaired waters where atmospheric deposition is not the major contributor. Question 47: "In the summary on page four of her testimony, Ms. Willhite says that atmospheric deposition of mercury can be an important source of loading to impaired waters, and Illinois emission sources may contribute a notable portion of deposition within Illinois. With respect to this statement, what are the factors impacting whether, and to what extent, mercury entering the waterbody will ultimately end up in fish tissue?" The answer is, both, the amount of mercury loading, and the amount of methylation of inorganic mercury into methylmercury affects the extent to which mercury ends up in fish tissue. B: "What does the term "notable" mean?" Notable means worth mentioning. I will just add that "notable" can mean, perhaps in this context, that, even if only five percent of mercury emitted by Illinois coal-fired power plants is deposited in the state, that's still an order of magnitude 10 times higher than the amount of mercury that's directly discharged to Illinois waters according to our records. That would make deposition from Illinois emission sources a notable source of loading to

Illinois waterbodies.

MR. RIESER: I'm sorry. Could you read that answer back, please?

(At which point, the prior answer was read by the court reporter.)

MR. RIESER CONTINUES:

Q. Ms. Willhite, is your contention that all the mercury deposited by Illinois sources is automatically loaded to Illinois waters?

A. No. My contention is a portion.

Q. We don't know what portion that is, correct?

A. Correct. I wish we did. My goodness, wouldn't that make this afternoon go quickly?

Q. It might even support the Rule. In your discussion about five percent, even if five percent of the Illinois emissions -- that's just a hypothetical. That's not a number that is meaningful in this discussion, correct?

A. Correct. I picked a number that sounded pretty low.

Q. Thank you.

MR. BONEBRAKE CONTINUES:

Q. Your five percent comparison does not

include nonpoint source discharges. Is that correct?

A. No. I'm talking directly about emissions. If five percent of the emissions from Illinois EGU's is deposited in the state, then that's still a notable loading to Illinois waterbodies.

MADAM HEARING OFFICER: But that's a nonpoint source.

MS. WILLHITE: Correct. Did you mean other nonpoint sources?

MR. BONEBRAKE CONTINUES:

Q. You were comparing it to something, and I wasn't sure what you were comparing it to?

A. Point source loading directly.

Q. You were comparing it to point source loading?

A. Correct.

MR. HARRINGTON CONTINUES:

Q. Let's just make sure the record is clear. That does not include combined sewer overflows. Is that correct?

A. We do not monitor for mercury.

Q. Thank you.

MR. KIM: Before Ms. Willhite answers the next question, I have a stack of documents that -- I

have the Massachusetts and the Florida Reports and our Florida reports are in color, so they might actually, if you don't mind -- since we have already gone over this, in case it comes up again --

MADAM HEARING OFFICER: That would be wonderful. Then I am going to substitute the color as an exhibit, as Exhibit 20, as they said, it is identical and we will do that. The Massachusetts report that we have been discussing, I will admit as Exhibit 21, unless there is an objection. Seeing none, we will mark that as Exhibit 21. Ms. Willhite, you can continue.

(Exhibit No. 21 was admitted.)

MS. WILLHITE: 47-C: "What is the basis for her conclusion that a notable portion of deposition within Illinois may come from Illinois emission sources?" The basis for my statement that a notable portion of deposition within Illinois may -- may come from Illinois emission sources is based on my review of the work of various scientists. I have reviewed the results of modeling by the University of Michigan of mercury emissions sources that show the area of highest deposition as being closest to the source in Illinois and other Great Lakes states. I have reviewed the results of modeling by the National Oceanic

Atmospheric Administration that identifies Illinois and Indiana sources of mercury air emissions as being the most significant contributor to Lake Michigan, leading to their conclusion that areas closest to large mercury sources are going to be most impacted by local deposition, whereas, in more remote areas, deposition from global sources will be most important. I have reviewed the results of modeling by U.S. EPA that identified Chicago as a location of highest deposition in the state and that 63 percent of the mercury deposited there was coming from Illinois sources. I have seen a presentation by Dr. Keeler of the results of the Steubenville Deposition Monitoring Study indicating that 70 percent of mercury deposited there was from nearby coal-fired power plants. I have seen Pennsylvania's summary results of their deposition monitoring study that show that mercury deposition at a site downwind of a coal-fired power plant was 47 percent higher than at a site not influenced by power plant emissions. I have seen presentations on mercury monitoring by United States Geological Survey at a site in East St. Louis, which showed significantly higher mercury concentrations up to 10,000 times higher than remote settings, and that the specific mercury species

showing the increase are associated with sources, and that monitoring shows large spikes that change with the wind direction.

MR. RIESER CONTINUES:

Q. With respect to the study that you described regarding the impacts in Chicago, 63 percent coming from local sources, which study was that, please?

A. It was the results of REMSAD modeling that U.S. EPA did.

Q. And is that -- have you reviewed the CMAQ modeling that was introduced as part of the CAMR record?

A. I think I have seen the display, but I haven't reviewed the Technical Support Document.

Q. I'm sorry?

A. I said that I think I have seen results of CMAQ modeling, but I haven't reviewed the CAMR Technical Support Document.

Q. So you don't know whether the CMAQ modeling is consistent with the REMSAD modeling you were describing?

A. CMAQ is a large regional scale model, and what I have seen is that the predictions tend to be I think someone said complimentary.

Q. And REMSAD is not a large-scale model?

A. Well, this is the water program bureaucrat talking. My understanding is that there's, like, regional large scale modeling, and there's source apportionment modeling and I put CMAQ in the large regional scale model and REMSAD in the source apportionment model. That may not be correct, but that is my understanding.

Q. To wrap up, I suppose my questions about modeling would be better directed to Dr. Keeler?

A. Or somebody else, but me.

Q. Good enough. Thank you.

MR. BONEBRAKE CONTINUES:

Q. Just a follow-up to that. I assume, Ms. Willhite, that you do not consider yourself an expert in deposition modeling?

A. That's correct.

MS. BASSI CONTINUES:

Q. When Mr. Ross was testifying he said that we had to ask you, Ms. Willhite, specifically, why the deposition modeling was stopped for Illinois or why it was incomplete. Is that another question?

A. It is, actually.

Q. How about that for a segway?

A. I can answer it now or I can answer it

later, whichever.

MR. BONEBRAKE: Was that going to be in response to the next question, Ms. Willhite?

MS. WILLHITE: No. It's question --

MADAM HEARING OFFICER: It says 47-D.

MS. WILLHITE: Yes, you're right, it is. I didn't have my glasses on.

MS. BASSI: Sorry. I forgot that --

MADAM HEARING OFFICER: I think we are ready to move on to D.

MS. WILLHITE: "Has the Agency modeled or caused to be modeled mercury deposition in Illinois by Illinois sources?" One: "If so, over what period?" Two: "What where are the results?" Three: "Who performed the modeling? The Agency, itself, or some other entity?" Well, knowing that Illinois would need to submit a state plan to U.S. EPA by November, 2006, the Bureau of Water initiated modeling through a contractor in November of 2005 with a goal of looking at mercury deposition within the state from in-state sources, but before the project was completed, I decided that the large scale modeling was not going to be very useful at this point, and I would also add to that that the source apportionment type of modeling has its

limitations, as well. So I admit to pulling the plug on the project. I was paying for it so I get to do that. At this point, the Bureau of Water has concluded that monitoring would really be the most useful tool in trying to answer the question of deposition to impaired waters and that's what we are pursuing.

MR. RIESER CONTINUES:

Q. The type of modeling that you were doing was what type of modeling."

A. Camex, C-A-M-E-X, which I would call a regional -- large regional scale model.

Q. What were the problems that you saw with doing that type of modeling?

A. My impression was that it didn't answer the question sufficiently of what is the local deposition picture. That's my impression. The source apportionment, it also gives you an idea, but I just didn't feel it was -- either of those tools were really useful enough to help us understand. I've been persuaded that both of those, whichever kind of model you are talking about may not sufficiently take into account all factors, and that monitoring would really be the best tool to answer the question.

Q. When you use the term "source

apportionment modeling" is that the type of modeling that Dr. Keeler -- you understand Dr. Keeler did in Steubenville?

A. I don't know. I put -- and again, this is the end user's categories that I'm setting up here is I would put something like REMSAD or hy-split or something like that in those categories of source apportionment, and again, this is the end user's observation. I wanted to have this question answered because I need to understand what the loading picture is and what contribution that might be from sources within the state.

Q. And so in order to answer the question of what where the loading was coming from, you felt it was better that you get better information by doing fish tissue sampling? Is that correct?

A. No, deposition monitoring. Deposition monitoring, and I was particularly impressed by the type of monitoring that Dr. Keeler presented, which helped to understand what the source of the loading is, because I think we are all interested in that question.

Q. What have you started or had somebody start on working on the deposition of monitoring system?

A. No. We're in the beginning stages of

figuring out how we can go about that. Illinois, along with other states, are looking at trying to get some money through the Great Lakes Atmospheric Deposition Source, and we're also looking into procuring those services of monitoring just within Illinois, and that's a pretty long process.

Q. Do you know whether that type of deposition monitoring would help predict the impact of different regulatory choices, such as 90 percent reductions?

A. No. The question -- I believe that monitoring helps you understand what's going on now or what's going on during the course of the monitoring, and I think that modeling -- that's probably a tool that could be -- or a reason that it could be useful is to try and predict what would happen, but the question that I wanted to have answered is what is the situation now.

Q. Would the monitoring allow you to identify the source of the material that was being deposited in the monitoring?

A. Well, as I said, I saw a presentation that Dr. Keeler gave in February that suggested that there are monitoring approaches that can help you understand that through the trace element analysis that goes along

with the mercury.

Q. Thank you.

MS. BASSI CONTINUES:

Q. Would that -- following up on Mr. Rieser, then, and I think I might be repeating a question, but I didn't hear an answer that it sounded like was to the question. Would the results of this monitoring which it sounds like effectively could be some kind of source tracing back monitoring, help to guide regulatory decisions that the Agency might make?

A. Well, it would certainly help from the water program standpoint to understand what amount of loading, A, is coming to impaired waters and which is important to the TMDL process, and B, if we understand what the source is, then that helps us with the implementation of how you deal with that loading.

Q. And this may be a question -- I don't know -- perhaps Dr. Keeler is the person to answer this, but I thought -- does CAMEX have a source apportionment feature to it? Does anyone know?

DR. KEELER: Any of the deterministic or source-oriented models can keep track of the emissions that they emit from each source, so how much is emitted, they know the rate, and they can keep track

of those emissions, so they can, if asked, work backwards to determine how much mercury deposited over whatever -- either over the state of Illinois or over the state of Ohio, came from whatever is out there, so implicit it the model is the ability to do that type of work. All those models are source-receptor models, and they can answer that question.

MR. HARRINGTON CONTINUES:

Q. Exactly why would did you kill this study?

MS. WILLHITE CONTINUES: I'm not sure exactly. It was early spring.

MR. HARRINGTON CONTINUES:

Q. February? March?

A. Yeah.

Q. That range?

A. Yeah.

Q. Did you consult with the Bureau of Air at that time?

A. About pulling it?

Q. Yes. The effect of pulling it and development of rulemaking?

A. I didn't consult with them on that issue.

Q. Do you know if they represented in public meetings that there was such a model going on?

A. Yeah. I think I saw that.

Q. And if that was repeated, the model results would be made available?

A. Well, we said it was on, but I don't blame you for the conclusion that the results would be provided.

Q. If you were monitoring -- if you were developing a waste load allocation for a stream, would you do a model to determine which sources caused the exceedence?

A. No. The waste load allocation is what amount of loading from a point source is the highest amount that could be discharged to the stream and still meet water quality standards, and yes, you very often do use a model to try and come up with that allocations.

Q. Particularly, if you have multiple sources contributing to that stream?

A. Yes.

Q. Particularly, if there are, both, chemical and physical reactions that effect the concentrations of the pollution in the stream. Is that correct?

A. I'm not sure if they are sophisticated enough to take care of the interactions. I think it's purely a simulation of how it gets there.

Q. Thank you. That's all I have at this time.

MR. BONEBRAKE CONTINUES:

Q. Had any deposition modeling results been generated at the time that you pulled the plug on the project?

A. I got a preliminary look, yeah, but no final results.

Q. What was the form of that preliminary look?

A. A picture.

Q. Just a map showing modeling results?

A. Yeah.

MS. BASSI CONTINUES:

Q. Were those results not what you were expecting to see?

A. I wanted to be able to see, you know, down to really close to the plant, and this was showing me the whole eastern United States. It wasn't what I expected to see.

MR. BONEBRAKE CONTINUES:

Q. Do you recall what it demonstrated with respect to Illinois?

A. It demonstrated that I couldn't see what I

wanted to see. I couldn't see close -- I couldn't see the impaired waterbodies that were close to sources, what the situation was there.

Q. Did you provide that map to anyone else within the Agency?

A. It was provided to me -- I mean, I worked with Rob Kaleel to arrange for the modeling.

MR. RIESER CONTINUES:

Q. Did you recall who the modeler was who performed the study.

A. I don't recall. I'm sorry.

Q. And do you recall whether you had any discussions with the modeler about trying to improve the resolutions, so that you could focus on areas within the state?

A. That's what we had envisioned when we first contracted for it, but that we would go through at an iterate phase, but as I learned more about what the limitations were for modeling from my perspective, again, as the end user, I was convinced that monitoring would be more useful.

Q. Would it be possible to see a copy, have a copy submitted to the board?

A. Of --

MADAM HEARING OFFICER: The preliminary modeling I believe is what he's asking for, the picture you saw.

MS. WILLHITE: Believe it or not, I didn't retain a copy. I don't know.

MR. KIM: I don't know that there's any testimony that's been given that that was relied upon in generating the rule, so I'm not sure what the relevance of that would be, anyway.

MADAM HEARING OFFICER: I think it's -- personally, I would find it very relevant. It's one of the issues we're talking about, the deposition of mercury on surface waters and the effect of that. I think that whether you relied on it or not has some relevance in these hearings, and if the Agency does have a copy of that, I think we would all be interested in seeing that, so if you can check to see if there's another source than Ms. Willhite that might have it.

MR. KIM: We can look.

MADAM HEARING OFFICER: Thank you. Anything else on D? Moving on to E, then.

MS. WILLHITE: "What is the extent of loading to impaired waters from Illinois emission sources? What studies and reports support this

contention? Please provide copies of any such studies or reports." As previously noted, we have not noted -- we have not conducted this analysis. 48: "The Agency's TSD at page 73, states that the lakes where the ambient mercury levels were higher than the water quality standard are not the lakes with the specific fish consumption advisories, i.e. not listed as impaired. A: Of the 52 stream samples and 32 lake samples cited on this page of the TSD, were samples from only three streams and only two lakes above the water quality standards for mercury?" Yes. The significance is that the amount of mercury in water is not necessarily correlated to the amount in fish tissue. 48 B and C: "Which lakes and streams were above the standard? C: Are the locations of these two lakes and three steams identified on figures 4.3 and 4.2 respectively?" Yes. Question 49 --

MADAM HEARING OFFICER: You didn't answer B. Which lakes and streams?

MS. WILLHITE: I'm sorry. The lakes were Depew and Sunashwein (phonetic), both are shallow back-water lakes of the Illinois River. The three stream sites were Moveterre Creek (phonetic) which is identified as DDO-4 that's the watershed ID similar to

what you saw on the table earlier. The Sangamon River at Oakford, location E-25 and the Illinois River at Peoria, D-30. Samples from each of these sites --

MR. BONEBRAKE CONTINUES: I did, although were you still answering some part of 48?

MS. WILLHITE: Samples from each of these sites had exceedences of 0.012 micrograms per liter at high flows and spring samples. Samples collected from none of the three sites at the lower flow time, in the fall, had exceedences of 0.012 micrograms per liter.

MR. BONEBRAKE CONTINUES:

Q. I think you said that the level of mercury in the water, the ambient water, was not correlated to levels of mercury in the fish tissue. Is that right?

A. That's what I concluded from the fact that we didn't see in the lakes that had fish consumption advisories high levels in the water.

Q. Do you have an explanation for that lack of correlation?

A. Not entirely. It's like it must be some place else, in the sediment, or some place else.

DR. HORNSHAW: I just asked Ms. Willhite if the measurement is as total mercury or

as methylmercury? She indicated that it's total mercury and that pretty much explains why it has to really be in the methyl form before it can be significantly taken up by the fish.

MR. HARRINGTON CONTINUES:

Q. Am I correct that the methylation process takes place in a zone that's collected at the innerface of the water and sediment, primarily, in anaerobic conditions and the presence of sulfur.

MS. WILLHITE CONTINUES: Yeah. I mean, I would probably add to it that where ever you have anoxic conditions and sulfate type of bacteria, and most likely, that's at the innerface there. I suppose it could also happen in suspended particulates in the anoxic zone of a lake.

Q. So the mercury that usually is methylated is in the sediment, or at that point, in the water column, the sediment, water innerface, correct, just in general?

A. Where ever the critters are, yeah.

Q. So basically, the mercury -- to enter into this process has to be in a sediment form at the point the process is entered into?

A. I think it just needs to be where the

bacteria are located with the conditions that allow them to live, and that could be sediment. That could be suspended particulate.

Q. So we're talking particulate or in the water column at that point or in the form of sediment, correct?

A. Right.

Q. And in fact, I think you just said -- and correct me if I'm wrong -- that the high mercury levels in the streams were found at times of high flow springtime?

A. In the spring, yeah.

Q. Also, at the time of maximum runoff. Is that correct?

A. Sounds like it. I'm not certain.

Q. Usually, also at the time of maximum sediment in the stream. Is that correct?

A. Again, I'm not certain.

Q. Well, going back earlier today, you were asked questions about the role of mercury in the soil, sediment, sludge pads -- I don't think I mentioned those at the time -- coal waste entering into the waterway and attributing to methylmercury. Do you recall those questions?

A. I recall the questions.

Q. I think you are referring to some geologist that said they wouldn't be available.

A. I said --

Q. For methylation.

A. I said that in answering the question about natural sources. I said that there's a background level of mercury in soil, but there aren't significant deposits of cinnabar, which would be a significant natural source of mercury.

Q. Well, what I mentioned was coal waste, which does have the same amount of mercury as the coal that goes to coal-fired power plants I believe. Is that correct?

A. Yeah. My understanding is that it doesn't leach out of that matrix into the water.

Q. But the particles or sediment do get washed in the waterways. Is that correct?

A. Potentially.

Q. They end up in the sediment or in the water column as sediment. So does biological action possibly remove the mercury from this material and convert it into methylmercury?

A. I'm sorry. I -- this is just not my area.

Q. Thank you very much. I will reserve questions for later.

DR. HORNSHAW: I would just want to add one thing to what you're saying. You had mentioned that these levels occurred in the spring time. High flow situations and streams in the spring time, generally, oxygenate the water highly, so I doubt if you would have anoxic conditions in highly flowing water in the spring time.

MR. HARRINGTON CONTINUES:

Q. But you do have some periods deposits of sediment particularly in the back waters behind the dams for example, in the Illinois River. Is that not correct?

A. Yes, but these are water samples.

Q. Correct, but the water samples do filter those?

A. I don't think so, but I'm not the one to ask that.

Q. Thank you. Maybe one follow-up. If you're not the right person, or we need to go elsewhere, please correct me. You mentioned earlier that the discharge for BOTW's are low in mercury, correct?

MS. WILLHITE CONTINUES:

A. Correct, well, relatively. It's measurable.

Q. Are the influence to BOTW's low in mercury?

A. I'm not aware of influential data we have on the affluent.

Q. You're not aware of any of the data that's showing significant mercury in-flows from --

A. I hear what you're saying. I have not heard the information provided quite that way. What I understand is that, when you look at affluent data for mercury from BOTW's and look at what the sources are, that potentially, waste can be a big, by mass, portion of that.

Q. Biological processes in well-run treatment plants tend to remove that mercury and deposit in sludge, do they not?

A. I have heard maybe kind of a 50/50 split.

Q. Then that sludge then contains the mercury and the element that was removed in affluent?

A. A portion of it.

Q. Depending on how that's used and deposited of, that will, again -- is potentially available to the waterways, if it becomes part of the runoff?

A. Yes.

MS. WILLHITE: I believe we are to 49. "At page 69, the TSD states that the statewide average of all point source discharges of mercury 0.02229791 tons per year was only 0.745 percent of the base year total emissions of mercury, 2.99466 tons per year in Illinois. With respect to this statement, what is the base year used in these calculations?" By "base year" I interpreted that to mean that year of emissions was represented here, and I answered the question -- in the TSD, the year was 1999, and my testimony, the year was 2002. Question B: "What air emission sources were included in the calculation of air emissions?" And that was all coal-fired EGU's.

MADAM HEARING OFFICER: Mr. Forcade.

CROSS EXAMINATION BY MR. FORCADE:

Q. I have a series of questions on point sources which I can ask, if is the appropriate thing, but first, I would like to try and have a small housekeeping matter, if I could. Several times today there's been a reference to Kincade Lake. I believe that came from Dr. Hornshaw, originally. Could you tell me, geographically, where that lake is?

DR. HORNSHAW: Far southwest corner of

the state. It abuts on the Shawnee National Forest. I believe it's east of Carbondale.

MR. FORCADE CONTINUES:

Q. But more particularly, it is not --

A. I'm sorry, west of Carbondale.

Q. More particularly, it is not a lake adjacent to the Kincade generating plant?

A. The Kincade generating plant at Sanchris Lake?

Q. The one on -- south of Springfield.

A. It's on Sanchris Lake.

Q. Is that the Kincade Lake you're talking about?

A. No. That's Sanchris Lake, and there's also --

Q. This is how far from the Kincade generating station would you say?

A. Which lake?

Q. The lake Kincade you discussed as having high levels of mercury in the fish, in the sediments.

A. Versus the Kincade power station?

Q. Yes.

A. 150, 200 miles.

Q. I was just trying to put the distance in

there.

A. It's in I believe in Jackson County, if you know where that is. Kincade Lake.

Q. If I could, I have some questions for Ms. Willhite. Could you tell me how many NPDS point source discharges there are in the state of Illinois?

MS. WILLHITE CONTINUES:

A. I'm not sure I can tell you the total number of point source discharges. I can better tell you the number of NPDS permits. Sometimes they have several discharge points and that universe is around 4,000.

Q. Could you tell me the total number of annual gallons discharged by this NPDS per units?

A. No.

Q. Give me a rough approximation?

A. No. I'm sorry. I don't know. Millions and millions of gallons, kind of like McDonald's.

Q. Could you tell me what the detection limit in a typical NPDS limit for monitoring mercury?

A. No. I would speculate that it would need to be low enough that we can understand what the affluent is compared to the human health standard.

Q. Would a per part billion be in that

general range?

A. I would think it would need to be lower because our water quality standard is 12 parts per trillion.

Q. So part per trillion, perhaps?

A. Our lab gets down to .05 parts per billion so --

Q. A typical NPDS permit would be somewhat higher than your lab can give?

A. Say that again, please.

Q. Is the standard test protocol in NPDS permits for mercury detection, would you expect that to be a somewhat higher detection limit than the EPA lab can achieve?

A. I don't know.

Q. I will show you where I'm going, and earlier you were talking about the statistical analysis of fish samples and other samples, and I believe you stated that, when a nondetect was present, it was appropriate for statistical purposes to use, either detection limit, or one half of the detection limit for averaging?

A. Right.

Q. Is that correct? If I could direct your

attention to page 68 of the Technical Support Document.

A. Okay.

Q. I believe, in there, you calculated a series of loadings to Illinois streams for mercury for facilities where they were above the detection limit, and also -- or those where there was no detection limit. Do you know what that detection limit was for mercury?

A. No.

Q. You've also calculated, from that, a value of, approximately, 45 pounds of mercury per year. For the facilities that were not tested, what value did you assume in calculating the 45 pounds per year of mercury discharges from point sources in the state of Illinois?

A. For the facilities that weren't tested?

Q. That were not tested.

A. For mercury?

Q. Yes.

A. This is based on the data that we do have, the testing that was conducted.

Q. Absolutely. I agree with you there. What values did you assume in a statement that says, "The average annual loading of 45 pounds per mercury per year," what value did assume for the facility that did not have value testing?

A. I'm still not following you.

Q. You say that, "Waste water discharges contribute an annual loading of 45 pounds per year of mercury to Illinois streams." Is that correct?

A. Correct, on an average basis, yeah.

Q. Is that for all waste water discharges?

A. That is for -- my understanding is that all BOTW's test for mercury and industrial dischargers that we believe have mercury in their process, and so therefore, might have some mercury in their discharge, so it's for those point source discharges that are in those categories.

Q. And out of the 10,00, approximately, NPDS permits --

A. 4,000.

Q. 4,000, was it -- issued in the state of Illinois, how many of those have a requirement for mercury testing?

A. Like I said, I believe all BOTW's and the portion of industrial dischargers that we believe might have mercury in their discharge.

Q. So I'm getting for the facilities that do not have mercury testing, did you assume a value of 30 or are they simply not included in the calculation at

all?

A. They are not included in the calculation.

Q. You can't give me what proportion of the NPDS permit had mercury testing completed?

A. No.

Q. Would it be possible to get that number?

A. Get the number of --

Q. My suggestion is that the number may be higher if you evaluated at all NPDS discharges or all point source discharges in the state of Illinois and if you use the standard statistical averaging test that you use for your fish samples, which is one half of the defection limit, and multiply, by that, the total flow from all point source discharges, I believe you come up with a number that's dramatically higher than 45 pounds, so what I'm trying to explore is to what extent you have made any accommodation for the untested facilities and if so, did you use the same statistical protocol that you used when the information was evaluating fish concentrations of mercury?

A. No. We have not done that analysis.

Q. Would you be able to do so?

A. I could check and see.

Q. For the facilities that are required to

test for mercury and in their NPDS discharges, am I correct that that would be a filtered sample?

A. I don't know.

Q. Would it be possible to check on that?

A. I will check.

Q. Would it be correct to assume that, if we are not talking about methylated mercury, that there would be a portion of the mercury that would be adhering to any total suspended solids present in the discharge?

A. I don't know.

Q. Would it be possible to check on that?

A. Check on --

Q. Whether or not it is possible that some of the mercury would be adhering to the total suspended solids in the discharge. The question I'm trying to find out is if you done a full and complete job of evaluating the impact of point source discharge mercury on the streams of the state of Illinois by a simple statement that, "Of the facilities we tested, of the filtered, I believe, samples that we have evaluated the total is 45," and it seems to me that may be a misleading number if some of those assumptions are incorrect, so I'm just simply trying to find out what are those assumptions?

A. What was presented in the TSD and in my testimony is based on the data that we have.

Q. Yes, but that particular caveat is not present in that sentence, is it?

A. Where are you looking again?

Q. Page 69 and page three, I believe it is, of your testimony. It says, "All point source discharges," doesn't it? It doesn't say, "of those that we happened to look at."

A. Yeah. That would be a correct statement.

Q. Is appendix C of the Illinois 2004, Section 303-D, a document that's been entered into the record?

A. What about the 2004 303-D list, including all appendices.

MADAM HEARING OFFICER: Yes.

MR. FORCADE: This is where the compilation is located if I could --

MADAM HEARING OFFICER: I can tell you, specifically, it's document No. 17 attached to the Technical Support Document. I checked on that over lunch.

MR. FORCADE: If I could, I would like to reserve the right to ask additional questions, if the

Agency can provide some responses to the questions I asked so far.

MR. KIM: That's fine. I know Mr. Forcade asked if we could look into doing some additional -- I will be honest with you. I'm not sure what that entails. I will leave that up to Ms. Willhite to determine how time intensive, if at all, it will be. If it's something we can do, certainly we will try and do that, but I haven't had a chance to talk to her, so I don't know how much time and effort that will involve. We will try to get what we can done, if it's not going to be all that difficult.

MR. FORCADE: I will work all night on the Internet to see what I can find, too.

DR. GIRARD: I have a follow-up question. Is there a list somewhere of 195 point sources identified as contributors of mercury to Illinois surface waters?

MS. WILLHITE: Yes.

DR. GIRARD: Is that list in any of the documents already in the record?

MS. WILLHITE: I'm not sure if we provided it as an attachment to the TSD or not. I would have to check. I thought we had provided that. I can

check into that and find out, but I believe that list was generated as part of this book, from the look of things.

MR. FORCADE: I don't have the numbers for the two exhibits, unfortunately I got a copy that doesn't have the numbers on it. But one is entitled "Mercury Impaired Segments in 2004 303-D. And the other one is entitled "Current Level of Mercury in the Sediment and Waters Listed as Impaired Due to Mercury."

MADAM HEARING OFFICER: Those are Exhibits 16 and 17, respectively.

MR. FORCADE CONTINUES:

Q. I appreciate that. Is it possible for us to get some method of correlating the locations for the listing in Exhibit 17 with the location, either of the segment ID in 16, or more particularly, the identification of the facilities you believe may be contributing mercury to the stream, so that we can compare them?

A. Yes. I have already been asked to provide a key to how those segments are located on the river and I would think we would be able to provide which facility goes with which segment.

Q. Thank you.

MADAM HEARING OFFICER: Anything further?

MR. ZABEL CONTINUES:

Q. Just a follow-up of Mr. Forcade. As I read the TSD, 195 sources are sampling from mercury. 177 had detects; 58 did not. Mr. Forcade I believe asked about all NPDS sources in the state. I'm curious about the 58 that you actually had sampled are, presumably, below the detection limit. Did you make any assumption as to their mercury contributions to the waterways.

A. I would have to check back with the person who did the calculation and find out the answer to that question.

Q. It may be a subset of what Mr. Forcade was asking, but I wanted to be clear.

DR. HORNSHAW: I would like to make a follow-up statement to Mr. Forcade. You said that it seems reasonable to assume the entire universe of permits have one half the detection limit as their discharge, similar to what we do in the official advisory program. For the fish advisory program, we think it's a reasonable assumption that assume that there is some mercury present in all the fish filet 's

because mercury is a naturally-occurring element, has got to be present in sediments at some level, and because of that, we assume that it's going to be present in fish tissue at some level, and since our lab has changed over to detection limits that used to be .1 milligram per kilogram, and now they are achieving detection limits in the range of .01 to .03 parts per million, the little bit of data that we have with these new detection limits seems to bear that out because there is very few samples now that are less than the new detection limits. I'm not sure that it's appropriate to make the same assumption for all of the dischargers in Illinois, at least, the industrial dischargers because if their processes do not include mercury, it doesn't seem reasonable that their discharges would contain mercury, the same as what we make the assumption in the fish advisory program. In other words, I don't think there's much naturally-occurring mercury that would be of an industrial process, versus in sediments.

MR. FORCADE CONTINUES:

Q. I believe my question was posed towards a statistical evaluation method and if that method is not true, I would appreciate it if we could walk over to the Land Division where I'm arguing that issue and I could

certainly use the support.

DR. HORNSHAW: Was that a question?

MR. RIESER CONTINUES:

Q. I have a question. What when you talk about naturally-occurring mercury, is there any quantification of that?

A. In sediments?

Q. Yes.

A. The Bureau of Water has data on concentrations in lake sediments and stream sediments across the state. I don't recall whether mercury is one of the elements that's included in that survey data. We do have information for some samples across the state for soils, and that information shows mercury consistently less than one part per million in soil that is are considered to be background. I would have to look at the Bureau of Water data to know whether they have information, as well, on sediments.

MR. HARRINGTON CONTINUES:

Q. You said one part per million in soils?

A. In soils across the state, yes, considerably less than one parts per million.

MR. BONEBRAKE CONTINUES:

Q. Is there a level that's considered

background methylmercury in fish?

A. Not that I have ever seen.

Q. I have a follow-up for Ms. Willhite, as well, as it relates to Table 4.7 on page 68 of the TSD.

A. Okay.

Q. Your testimony that's reflected in Question 49 that you read previously refers to point source discharges of mercury .02229791 tons per year, and that number is reflected in one of the columns in Table 4.7. Is that correct?

A. Yes.

Q. That's identified as the average load?

A. Correct.

Q. There's also a column to the right of that that is identified as maximum load tons per year?

A. Correct.

Q. The number there is 1.48999215 tons per year. Is that correct?

A. Right.

Q. If we compare that number to mercury air emissions, we're pretty close to 50 percent, aren't we, relating back to your Question 49 where, in your testimony, you had identified about three tons per year of mercury air emissions?

A. Right, correct.

Q. Can you describe for us how the maximum load of 1.5 tons per year was calculated?

A. Yeah. I'm just trying to refresh my memory on that one.

(A small break was taken.)

MADAM HEARING OFFICER: I believe we had a pending question for Ms. Willhite.

MS. WILLHITE: Yeah. We were looking at the TSD, page 68, Table 4.7, and I was asked what's the difference between the average load and the maximum load columns there. And this represents sampling data between 1986 and 2005. The average load represents what the average load from the facilities within that watershed are. The maximum load was, if you took the maximum value from every facility, and assume that that was the load to the waterbody, that's what the maximum load is, but I think that that's the answer.

MR. ZABEL CONTINUES:

Q. This is probably for Dr. Hornshaw. Your response to Mr. Forcade about the appropriateness of looking at all NPDS permits. What I'm focusing on are the 58 facilities the Agency apparently believes there's some reason to require mercury sampling for. Those 58

were also below the detection limit. Would your response be the same for those?

DR. HORNSHAW: For those, I would say it would be appropriate to use half the detection limit or some other substitute value for purposes of statistical calculations. That would be appropriate because you would have a reason to suspect mercury could be present at some concentration.

Q. Was that done, determining the 45 pounds?

A. I can't answer that.

MS. WILLHITE: I don't know, either.

MR. ZABEL CONTINUES:

Q. One follow-up, Mr. Hornshaw. Would be appropriate for 29 of them to be from zero, to half the detection limit, and the other 29 from half to the detection limit?

DR. HORNSHAW:

A. I think that would be appropriate, or just use half the detection limit for each one of the values.

MR. BONEBRAKE CONTINUES: The maximum load discharge column that you just mentioned, Ms. Willhite, is the maximum data -- the maximum levels of mercury in the discharge or is it maximum permitted level of discharge.

MS. WILLHITE CONTINUES:

A. It's in the discharge. It's the measure level times the flow.

Q. Is the maximum -- the highest concentration of level in the discharge or highest level of flow?

A. I don't know.

MR. RIESER CONTINUES: I have another question for Dr. Hornshaw that goes back to something he said before the break. I think you were asked by Mr. Bonebrake about whether there was a background level of methylmercury for fish and I think you said that you weren't aware of one was your answer.

DR. HORNSHAW CONTINUES:

A. That's correct.

Q. If -- am I correct that it's your assumption, based on the information you have, that, because of the presence of naturally-occurring mercury in sediments that you would expect to see a certain level of methylmercury in all the fish that you observed?

A. Correct.

Q. If that's the case, wouldn't there be -- wouldn't it be possible to derive a background level of

methylmercury from fish?

A. If you had detection limits low enough, yes.

Q. So when you say that you weren't aware of one, what you were saying was that you weren't aware of any scientific study or anything of that nature that had derived such a background limit?

A. That's what I meant, yes.

Q. But in fact, you do expect to see a certain amount of methylmercury in all fish due to naturally-occurring mercury in the sediments?

A. Yes.

MADAM HEARING OFFICER: Anything further? Close No. 50.

MS. WILLHITE: "In her testimony summary, Ms. Willhite also states that `Failure to control particular units that significantly contribute to local deposition means that the source of loading will remain and elevated levels of fish will continue.' With respect to this statement, A, what particular units in Illinois quote significantly contribute to local deposition?" B: What is the evidence of such contribution of these -- by these units? C: What specific fish population is being referred to in this

statement?" I wasn't referring to any identified unit, but rather making the general statement about EGU's that contribute loading to impaired waterbodies. If you read the sentence in the context of where it was in my testimony, maybe you will get a better sense of the point that the Federal CAMR allows compliance with emissions cap by permitting coal-fired units to purchase credit, and thereby do not have to control its mercury emissions. If that particular unit in that situation emits mercury that deposits locally to ambient water, then failure to control that unit will result in ongoing mercury loading to the impaired waterbody from the uncontrolled source. My point is that the trading process impairs my ability to deal with impaired water.

MS. BASSI CONTINUES:

Q. Is it the trading process or is it the controlling process that effects impaired waters.

A. My understanding of trading is that one can purchase allowances to avoid controlling, so the failure to control.

Q. So if one controls, trading is a nonissue. Is that correct?

A. From the perspective of loading, yes.

Q. Thank you.

MADAM HEARING OFFICER:

Mr. Harrington.

MR. HARRINGTON CONTINUES: Coming back to that statement, could I have that long answer read back.

(At which point, the previous answer was read by the court reporter.)

MR. HARRINGTON CONTINUES: If a unit is controlled to 80 percent, rather than 90 percent, is that going to cause a particular problem?

A. I think you asked me if it was 80 percent, instead of 90 percent, does that continue to present a problem? Was that a rephrasing?

Q. Yes.

A. 80 versus 90 is an issue of how far can we go? You know, what's the best that can be achieved, and as I have said before, we are in a situation where according to our calculations, we have to get 90 percent reduction in fish tissue levels in order to get below advisory levels, so it would be helpful to go as far as we can.

Q. 90 percent reduction in fish tissue levels is not, in any way, based on 90 percent reduction from each EGU. Is that correct? They are two independent

numbers?

A. The 90 percent reduction in fish tissue levels is what I need in order to get below advisory levels, and get out from under the impairment issue.

Q. So as I understand it, what you're saying, from your point of view, what you need is the most reduction that you can get that are technically feasible from the various units that are involved?

A. Yes.

Q. And would it be fair to say that the language of the Environmental Protection Agency "technically feasible and economically reasonable from those units"?

A. I have no opinion on that.

Q. On trading, back up. Units electrical -- are you familiar with the electrical generating units in Illinois, their respective sizes, etc.?

A. I haven't met a single one.

Q. We'll reserve those questions for somebody else. Thank you.

MR. RIESER CONTINUES:

Q. Is it fair to say that your answer to this question as to what particular units significantly contribute in Illinois significantly contribute to local

deposition is that you don't have any data that ties a specific unit to specific deposition?

A. Correct. I'm making the general statement that, in order to reduce loading, if you have deposition from those particular units, you need to reduce the emissions, so we can reduce the loading.

MR. BONEBRAKE CONTINUES:

Q. Is it also true, at this point, that you don't know the level of mercury deposition into Illinois waters that's attributable to out-of-state sources?

A. That's true.

Q. Is it, therefore, true that the contribution of mercury deposition from such sources could continue to cause elevated mercury levels in fish tissue, even if 90 percent reductions in emissions from EGU's in the state were to occur?

A. It's possible. I suppose if you had really intense deposition, very high levels, 90 percent might still not get below advisory levels.

Q. Well, if, for instance, 10 percent of the mercury deposition in the state was attributable to out of state sources -- that's purely a hypothetical number -- then that 10 percent would continue, notwithstanding, the reductions that would be accomplished for in-state

EGU's with the proposed rule. Is that right?

A. Yes, as I have mentioned before. I believe that has been identified in other states that we are likely getting deposition from in-state sources and out-of-state sources, and this rule is going to help us focus on what we can do for in-state sources, but it will not deal with sources outside the state.

Q. Therefore, isn't it likely that Illinois would continue to have impaired waters for mercury, even following a 90 percent reduction rule for EGU's in Illinois?

A. It's possible. It really depends on what amount of loading at a particular waterbody is coming from an in-state source, versus an out-of-state source.

Q. At this point in time, you simply don't have that information?

A. No.

Q. I think you mentioned earlier that, at least, in some states that have confronted this issue they have acknowledged that control of emissions mercury emissions from other states was going to be necessary in order for them to eliminate their impaired waters for mercury. Is that correct?

A. Yes.

MADAM HEARING OFFICER: Anything further? Question 51.

MS. WILLHITE: "How many currently identified impaired waterbodies in Illinois would no longer be impaired if the Illinois mercury rule proposal is adopted? A: When would such waterbodies no longer be considered impaired? B: Which waterbodies would no longer be impaired? C" would the failure of neighboring states to adopt a rule similar to the Illinois mercury proposal change Ms. Willhite's answers to these questions? D: Please explain the basis for Mr. Willhite's answers." I kind of feel like I have answered this question.

MADAM HEARING OFFICER: Ms. Geertsma.

CROSS EXAMINATION BY MS. GEERTSMA:

Q. I had a question that's sort of related to 51-C. Do you believe that Illinois passing this rule will have any influence on other neighboring states passing a similar rule?

A. I don't know.

Q. Do you believe that, if neighboring states did pass similar rules, that there would be an additional cumulative benefit if Illinois were to pass this, as well?

A. Yes, from the standpoint of if -- by "similar rule" you mean a rule that would go further than the federal rule because all states, of course, have the obligation to adopt the federal rule or some state alternative. If neighboring states were to adopt a rule that required every unit to control, by a large degree, that would be an improvement over a situation where, within Illinois, we would be controlling to 90 percent with no trading allowed, and that would be particularly important for those impaired waters that might be impacted by surrounding states and surrounding EGU's that might not have to do the controls under the federal program.

MR. RIESER CONTINUES:

Q. We certainly did talk about the issues in 51 a great deal, but just to summarize for the record the answer of how many currently identified impaired waterbodies would no longer be impaired if the Illinois mercury rule proposal is adopted is the Agency doesn't know.

A. Correct.

Q. Thank you.

MADAM HEARING OFFICER: Moving on to question No. 52.

MS. WILLHITE: "How many currently impaired waterbodies would no longer be impaired if the CAMR is adopted in Illinois? A: When would such waterbodies be no longer considered impaired? B: Which waterbodies? C: Explain the basis for Ms. Willhite's answers." We have not identified which waterbodies would be no longer impaired as a result of CAMR, and nor have we identified when or which waterbodies would no longer be impaired. It pretty much goes along with the answers we have been discussing.

MADAM HEARING OFFICER: Question No. 53.

MS. WILLHITE: "At page 61, the TSD states that TMDL's are complicated. The mechanisms controlling mercury accumulation in fish tissue are variable and difficult to model resulting in questionable results. Finally, state water programs are challenged in addressing atmospheric loading of mercury which has been shown to be a dominant contributor to many waters because the sources may be outside the watershed state or nation. With respect to these statements, A, what is a "dominant contributor"? Dominant contributor means most important. As noted above, most states that have evaluated loading to

impaired waterbodies allocated 98 to 100 percent loading to atmospheric deposition. B: "What are the mechanisms that control the accumulation of mercury in fish tissue?" I think we have noted pretty well what factors are related to methylation. C: "Has the Agency performed any studies, or is it aware of any study concerning these mechanisms in Illinois waters?" No. D and E: "Why are these mechanisms difficult to model and why are these results questionable?" I think that Dr. Keeler did a really good job of answering this question in saying that it's difficult in resource intensive to model these mechanisms because they are numerous. They are interdependent and they are, in some cases, poorly studied. If you want to have an accurate model result, you would have to assure what the parameters in the model, or the suite of parameters that are important in a particular waterbody, and that you have site specific data to input to the model. Results may be questionable, but there was not much site-specific data to support the model and the default values and assumptions were used instead.

MR. BONEBRAKE CONTINUES:

Q. A follow-up question with respect to your answer regarding the question of why are the results

questionable, is it your view then, Ms. Willhite, that there is some uncertainty regarding the results of modeling efforts that have been undertaken to project levels of methylmercury in fish tissue?

A. There can be, if there's not good data underlying the model effort.

Q. And at this point in time, are you aware of any model that doesn't have, at least, some level of uncertainty?

A. I'm not aware of any model that doesn't have some level of uncertainty.

MS. WILLHITE: "What models are available to assess these mechanisms?" This is F. We have not explored what models are available to simulate methylation. G: "Has the Agency used any of those models to support its proposed mercury rule? No.

MS. BASSI CONTINUES:

Q. Dr. Keeler, is the model water cycling model you were taking about earlier one of these mechanisms for one of these models?

DR. KEELER CONTINUES: As best as I understand the question, yes. It is a model that does have methylation process mechanism built into it.

MADAM HEARING OFFICER: Anything

further?

MR. KIM: I believe, if there are no other questions, concerning the Dynegy questions that were presented to Ms. Willhite, there are a couple other sets that she was going to answer, as well. First of all, I think there was one question I think was presented to her by Prairie State, and actually reading this, it seems to me that, in one answer or another, she's probably answered it, but she can speak to that.

MADAM HEARING OFFICER: Let's read it into the record.

MS. WILLHITE: "Has Illinois conducted a detailed analysis to show the incremental reductions in mercury deposition, what the incremental reductions in mercury deposition would be in going beyond CAMR to the proposed standard? If so, has IEPA analyzed how these reductions, assuming reductions will occur, affect mercury levels in fish in Illinois?" The answer is no.

MR. KIM: And then, in the general questions that I believe Dynegy presented to the Illinois EPA, we identify questions four, five, six, seven and eight as arguably irrelevant. However, in the interest of trying to provide as much information to the Board, Ms. Willhite will be answering those questions

now, if that's okay to do so.

MADAM HEARING OFFICER: That's great. Let's do that.

MR. KIM: And question four, too, if I didn't say that. She can answer four. Otherwise, she would be doing five and I have exhibits associated with these questions. As long as I'm making the walk, we had discussed earlier during Dr. Rice's testimony that there was a Motion for Reconsideration that had been filed by the state of California in regards to the lawsuit that was subject of some discussion, and I think we had said we would try to get a copy of the Motion for Reconsideration for the Board and we have that, as well. It's kind of out of place, but we just got copies. Do you want me to give you that now?

MADAM HEARING OFFICER: Sure.

MR. BONEBRAKE: Are you aware whether a response to that motion was filed?

MR. KIM: We don't know at this point. I don't think we have anything.

MADAM HEARING OFFICER: Rather than mark these now, I will mark them as Ms. Willhite gets to them, and they will be 22, 23, 24, but we'll wait and mark them as she gets to them. I think we should start

with Dynegy's Question No. 4.

MS. WILLHITE: I don't know the answer to Question No. 4.

MR. KIM: I apologize. I should have -- Question No. five.

MADAM HEARING OFFICER: Question No. 5.

MS. WILLHITE: There were four questions that were asked for four different lakes. Question five is related to Clinton Lake. Question 6 is related to Sanchris I think, Springfield, Sanchris and Baldwin. Were the exhibits provided?

MR. KIM: Yes.

MS. WILLHITE: So we answered the questions in tabular form for each of the four lakes and the first question is, "What type of bottom do the lakes have?" And the answer for all of them is the bottom subtracers are composed of fine particle sediment.

A. The next question is "What is the typical ambient water temperature in the lake?" And that information is summarized I guess on the first exhibit or is it --

MADAM HEARING OFFICER: We'll make it the first exhibit. "The Typical Ambient Temperature in

Sanchris, Clinton and Baldwin Lakes" will be marked as Exhibit 22, if there is no objection. Seeing none, it is Exhibit 22.

(Exhibit No. 22 was admitted.)

MS. WILLHITE: So these are temperature measurements that have been taken at various times showing the range of ambient temperatures for the lakes. The next question is "Would the lake be a likely spot for mercury methylation?" And the answer is, with any lake, yes.

MS. BASSI CONTINUES:

Q. When you say "with any lake" you mean any of these four or do you mean any lake in the whole state of Illinois, including Lake Michigan?

A. When I asked my lake expert that question, that was the answer that they gave me. Question D: "What is the mercury content of fish in Sanchris, Springfield, Clinton and Baldwin Lake?" And that is the next exhibit.

MADAM HEARING OFFICER: We will mark that as Exhibit 23, if there's no objection. Seeing none, it is Exhibit 23.

(Exhibit No. 23 was admitted.)

MS. WILLHITE: I think that concludes

the questions.

MR. RIESER CONTINUES:

Q. Ms. Willhite, the data with respect to the mercury amounts, mercury content in Exhibit 23, is that data taken from Dr. Hornshaw's exhibits, which were, like, 15, 16, 17?

DR. HORNSHAW CONTINUES:

A. It's from the same database, but a current printout. The stuff I presented earlier ends at around 2000, and the data that are in this table are current through whatever day last week I printed it out.

Q. Do you know whether there are multiple fish involved in each lake? Does this mercury content represents an average or is this one sample per lake?

A. In each of those represents an individual sample. All of the samples that we use in a fish contaminant program of, at least, the filet samples are composites of, hopefully, five fish, but at least, three fish of similar size. That information was in the printout I presented, and it looks like they edited it out. They are only presenting weight, length, and mercury concentration. The printout that I gave you earlier for Sherman Park Lagoon is what I provided to the Bureau of Water and they have edited it.

Q. Is the complete database on fish mercury content in fish that you're discussing, has that been presented to the Board in this proceeding, as part of the TSD?

A. The complete data base?

Q. Yes.

A. No.

Q. So we have just seen bits and pieces of it?

A. Yes.

Q. Is there some way to present it in a way that doesn't overwhelm the Board? Do you have it by --

A. All 11,300-some samples? No.

Q. That's what I'm asking.

A. The answer is no.

Q. The answer is no, but if we wanted samples from individual lakes, those could be presented for individual stream segments?

A. Yes.

Q. Thank you very much.

MADAM HEARING OFFICER: Anything else?

MR. KIM: If there are no further questions for Ms. Willhite, the next witness that we have would be Dr. Keeler. And since we are fairly close

to quitting time, I was wondering if it would be a good idea to start with him fresh in the morning.

MADAM HEARING OFFICER: Before we do that, we are going to mark the Motion to Reconsider as Exhibit 24? No objection? It's marked as Exhibit 24.

(Exhibit No. 24 was admitted.)

DR. GIRARD CONTINUES:

Q. Could we go back to Exhibit 23 and ask a few more clarifying questions and that's the mercury content of the fish, Dr. Hornshaw. I have some questions just to clarify here. For instance, at the top of this table, we have got four largemouth bass samples from Sanchris Lake and we have got sample, weight and sample length, so sample weight would be an average weight of four or five fish.

DR. HORNSHAW CONTINUES:

A. Correct.

Q. And the length then would be --

A. Yes.

Q. -- a sample and then, so we don't have any years associated with this. This was just pulled off the database?

A. There are years with the original table that I presented. They have cut that out, as well.

Q. And then I also notice over in the mercury levels that we have a nondetected 0.1 milligrams per kilogram of fish weight. I assume that's probably an older one because I notice we have some detection limits, like 0.05 and 0.02, so I would assume that those would be numerous samples with the newer equipment.

A. That's not necessarily true. There are a hand full of values in the older database that are less than .1, and I don't know why the lab reported values less than .1 for certain years, and most all the rest of the years they reported is just less than .1. I think, from my recollection of the database, that where there are values less than .1 in the older data it's all from one particular year and I don't know why that is.

Q. So there are no notes in there whether that was sent out to another lab?

A. I could probably find that out from the raw data sheets because that would have an indication of which lab did the work.

Q. So the data -- the raw data, itself, talks about which lab did the work?

A. Yes.

Q. Thank you.

MADAM HEARING OFFICER: Anything

further? Then I do think we will adjourn for the day.

STATE OF ILLINOIS)
COUNTY OF ST. CLAIR)SS

I, Holly A. Schmid, a Notary Public in and for the County of Williamson, DO HEREBY CERTIFY that pursuant to agreement between counsel there appeared before me on June 15, 2006, at the office of the Illinois Pollution Control Board, Springfield, Illinois, Marcia Willhite, who was first duly sworn by me to testify the whole truth of her knowledge touching upon the matter in controversy aforesaid so far as she should be examined and her testimony was taken by me in shorthand and afterwards transcribed upon the typewriter, and said testimony is herewith returned.

IN WITNESS WHEREOF I have hereunto set my hand and affixed my Notarial Seal this 3rd day of July, 2006.

_____

HOLLY A. SCHMID
Notary Public -- CSR
084-98-254587