ILLINOIS POLLUTION CONTROL BOARD
June 16, 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 DR. THOMAS HORNSHAW

BEFORE MARIE E. TIPSORD
HEARING OFFICER

The testimony of Dr. Thomas Hornshaw, a witness called in the rulemaking proceeding before the Illinois Pollution Control Board taken on June 16, 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.

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E X H I B I T S

Q. MADAM HEARING OFFICER: I would just note that Dr. Hornshaw has previously been sworn in, and his testimony entered as Exhibit 9, and with that, we will begin with Dynegy's questions, and I understand that Mr. Bonebrake can identify several that we have already answered.

MR. BONEBRAKE: We were talking about a number of questions that -- these are from the Dynegy and Midwest Generation -- that had been proposed to Dr. Hornshaw that we believe had been adequately addressed in prior testimony, and so forth in this proceeding. I can identify a number of these for the record. It may be that there will be some additional questions or subparts of questions that also will fall within this category, but I thought I could identify a number of them up front. These are Questions 15, 16, 17, 18, 19 and 20 subpart D.

MR. KIM: I think we are going to start with the Dynegy questions first, and there were a few other questions presented to Dr. Hornshaw from Prairie State, and I think that's only a hand full.

MADAM HEARING OFFICER: Two questions, actually, and one of those he has already answered.

MR. KIM: Before Dr. Hornshaw begins,

I guess I just wanted to raise my concerns about questions one through 6, the Asian carp questions. We were just wondering about the relevancy of the questions, and he did not make any statements concerning Asian carp, and he was just as perplexed as we were of the significance of the questions.

MR. BONEBRAKE: You have raised -- actually, one is relevancy, and the second is the knowledge of the witness on the question. Regarding relevancy, there has been some indication in the TSD that, if mercury issues are addressed in the state, somehow fishing revenues would increase in the state. There's a suggestion that that might happen. It wasn't entirely clear to me, but it seemed to include the possibility of increasing commercial fishing in the state, and so, therefore, things like the presence of this species that have impacted what might be viewed as a desirable fish species seems to be relevant to that economic question, and the reason these were directed to Dr. Hornshaw is our understanding that I think it's been born out through some answers he has already provided in his testimony that he has some knowledge regarding fish in the state, and so he seemed to be a natural person to whom we could pose these types of questions.

MR. KIM: Again, the concern we have is just the relevance of the questions. Dr. Hornshaw can attempt to answer these, but it was not, specifically -- that particular species of fish was not addressed. There's no -- I don't think we have any great body of information on that. I understand now where the questions are coming from, and I appreciate the explanation, but we would just I guess officially raise an objection, if you will, of relevancy to questions one through 6.

MADAM HEARING OFFICER: I think we will let Dr. Hornshaw answer them as best he can.

DR. HORNSHAW: Question No. 1: "Are Asian carp present in Illinois waters?" Do I have to answer that? Unfortunately, yes. "Are they destructive to Illinois waters?" Unfortunately, yes. Question 3 --

CROSS EXAMINATION BY MR. BONEBRAKE:

Q. Dr. Hornshaw, can you describe in what way they are destructive?

A. The answer to that is the answer to No. 3. "Are they displacing the other fish, and if so, which ones?" The answer is, unfortunately, yes. They are displacing any of the fish species that are a native to the Illinois, the filter feeders, as are the Asian carp.

"Are they eaten by Illinois fisherman?" The answer is yes, not enough.

MR. BONEBRAKE CONTINUES:

Q. Just a follow-up question. Are Asian carp eaten less frequently -- do you know, Dr. Hornshaw -- than the native fish species that are being displaced by Asian carp.

A. Yes. I can't answer that. Wait. Did you say are they eaten more frequently?

Q. Less frequently.

A. The answer is yes. They are eaten less than the native carp, for instance, which actually have a commercial market. The Asian carp they are trying to develop commercial markets, unfortunately, not enough at this point, but the answer is yes.

Q. Are Asian carp viewed to be garbage fish that are not desirable from a consumption perspective?

A. Not from what I heard. In some discussions I have had with DNR personnel who have tried them, they said they are better than native carp that are swimming in our waters. There is a commercial market for smoked Asian carp that has developed, and I've been told by several people that those are actually pretty good. Unfortunately, they are not able to

harvest and sell enough of them. I think I just answered 4-A and B.

MR. BONEBRAKE: That's fine.

DR. HORNSHAW: Five: "Did the number of commercial fisherman in Illinois drop from the mid 70's to 1995?" I have no way of answering that. You would have to ask DNR that. 6: "Were fewer fish caught in Illinois waterbodies in 1995 and sold in the commercial market than in 1979?" Again, I have no way of answering that. You would have to ask DNR. 7: "What were the number of fishing licenses issued in Illinois for each of 1985, 1990, 2000 and 2005?" I can only answer as I have already testified. DNR has told me for the last several years they have sold over 700,000 fishing licenses per year.

MR. BONEBRAKE:

Q. Dr. Hornshaw, to your understanding, is that number has been, essentially, flat over the last several years?

A. That's what I've been told, and that doesn't cover everybody because children under 16 or 17 -- I'm not sure what the exact age is -- are not required to buy a fishing license and military personnel on active duty, but on leave are also not required to

purchase a fishing license, so somewhat greater than 700,000, and I can't answer better than that.

CROSS EXAMINATION BY MS. BASSI:

Q. Your answer to a couple of these was you don't know; we have to ask DNR. Do we get to ask DNR?

MR. KIM: We don't have them on our witness list, but I think you have a hearing coming up sometime soon.

DR. HORNSHAW: "Has Dr. Hornshaw published any ecological or health risk assessment studies in any peer-reviewed publication?" The 1983 publication that's in my curriculum vitae attached to my testimony. The paper that's in "The Journal of Toxicology and Environmental Health" deals with potential risks to make from eating environmentally contaminated fish, fish contaminated with PCB's. Nine: "Did Dr. Hornshaw draft or assist with drafting any portion of the TSD? If so, which portion?" I drafted the portion of Section 4.2 and all of 4.5. "Are the duties authorities, powers and procedures of the Illinois Fish Contaminant Monitoring Program set --

MADAM HEARING OFFICER: I apologize for interrupting. We have been notified that there's a white Audi with its alarm going off.

(Discussion was held off the record.)

DR. HORNSHAW: "Are the duties, authorities, powers and procedures of the Illinois Fish Contaminant Monitoring Program set forth or described in any statute or regulation?" I think I have answered this before. No. 11: "Do the decisions and determinations of the Fish Contaminant Monitoring Program, such as fish tissue mercury levels that trigger fish consumption advisories, have the force of law in Illinois or are they merely to guidance to the public?" Guidance, and A: "If the Agency contends that any such decisions are determinations do have the force of law please describe the basis for that contention." Guidance. 12: "Is there any public involvement in the decision-making process used by the --

CROSS EXAMINATION BY MR. RIESER:

Q. Just on that last one, Dr. Hornshaw, you said that, if I recall, if the Agency has information suggesting they have a force of law, please say what those are. That's guidance. Is that correct?

A. That's correct.

Q. It's correct, isn't it, that the Agency's determination that the TMDL process that Ms. Willhite talked about Wednesday was driven by the fact that fish

advisories had been issued for many Illinois streams, isn't it?

A. I believe that's what she said, yes.

Q. So and is the Agency -- do you know -- I'll ask you -- do you know whether the Agency has discretion to not move forward with the TMDL process for mercury, in light of those fish advisories?

A. I have nothing to do with the TMDL process, so I can't answer.

Q. Thank you.

DR. HORNSHAW: Question 12: "Is there any public involvement in the decision-making process used by the FCMP? I believe I have also answered this before. The answer is no. 13: "Are the decisions of the FCMP subject to any peer review by persons or entities other than the Agencies that are part of the FCMP?" Again, no. 14: "At page one of Dr. Hornshaw's testimony, he states, `I am familiar with the fish contaminant data generated by FCMP, and maintain database of these laboratory results.' With respect to this statement, A, is this database publicly available?" I believe I answered this already.

MADAM HEARING OFFICER: Just to refresh my memory, I'm sorry.

DR. HORNSHAW: My database -- well, I will just read the answer I prepared. The database referenced in my testimony was created several years ago to provide easier access to the fish contaminant data than what is available from the main database, which is contained in Storet, S-T-O-R-E-T. It is not readily available to the general public, since it is a condensed version of the data in Storet, which is available to the public. Also, this database would be practically unusable to the public because it contains abbreviated entries that are understand by the members of FCMP, but would require explanation before members of the public would be able to use it. For example, all the waterbodies are identified only by the station codes given to them, instead of by name. Nevertheless, this database had been made available upon request through FOIA with lots of explanations and additional material. It is not available on U.S. EPA website.

MR. BONEBRAKE CONTINUES:

Q. A follow-up question. You reference something called Storet?

A. Yes.

Q. Can you -- is that a database of information?

A. It's a U.S. EPA database. It's the database that the Agency stores water quality data in, including fish tissue. As a personal editorialization, it's the least user-friendly database ever created, which is why I have to have a database made up that I could actually use.

Q. To your knowledge, is all of the fish tissue in your personal database also contained in this Storet database?

A. As far as I know, yes.

Q. As far as you know, is the fish tissue data in the Storet database with respect to the Illinois tissue levels in Illinois correct and accurate?

A. Correct and accurate.

Q. I'm just trying to get to whether you have any knowledge of any errors in the Storet database with respect to Illinois fish tissue sampling?

A. I'm certain there probably are errors. There are data entry errors in any data.

Q. But are you, personally, aware of any?

A. Like I said, I don't use Storet. You can't use Storet.

Q. But you're not, personally, aware of any errors. You just think there may be some?

A. I would be extremely surprised if there weren't.

CROSS EXAMINATION BY MR. ZABEL:

Q. Just as a follow-up, you did say you extracted your database -- data from Storet. Is that correct?

A. The data prior to 1997 was entered into my database from a database that originated from Storet that the Bureau of Water keeps to keep track of their fish stuff. Everything since 1997 has been entered by my secretary.

MR. RIESER CONTINUES: If this is a decent stopping place for Mr. Bonebrake, we would be prepared to proceed with the questions of the last questions for Dr. Keeler.

MADAM HEARING OFFICER: Okay. We'll start at 14-B with Dr. Hornshaw. Dr. Keeler, welcome back. It's been a long time. I remind you you are still under oath, and thank you very much.

(At which point, Ameren's questioning of Dr. Keeler resumed.)

MR. RIESER CONTINUES:

Q. Dr. Keeler, looking at Exhibit 32, which is entitled "Mercury Deposition of the Great Lakes

Region" dated February 22, 2006, and it's correct that this is the Powerpoint slash presentation you gave at LADCO?

A. That's correct.

Q. Turning to the page, these are not numbered, but turning to the page that says "Source Apportionment Results, Steubenville, Ohio" --

A. Yes.

Q. Are these values on this page for the measured PMF estimated CFUB and unmixed estimated CFUB, are these the numbers that are contained in your Steubenville report?

A. In the manuscript that was submitted?

Q. Correct.

A. Actually, I don't think they are. These are the numbers from the preliminary work that was done on the 2003-2004 combined data, but they are not very different. I mean, they are not substantially different than this.

Q. Turning further in there is a page called "Analysis of NISTSRN, 1633 (fly ash)". Do you see that?

A. Keep going back?

Q. Yeah. It's passed the leaf stuff.

A. Yes. I see that.

Q. Could you repeat that? It's the analysis of NISTSRN 1633, fly ash. It's probably two-thirds of the way through. Could you describe what this is?

A. Sure. One of the things that we enjoy doing in my laboratory is developing new analytical and sampling techniques to more properly measure quantify, speciate the forms of mercury in the environment and all media, and one of my doctoral students, Mary Lynam, working together with research scientists in the Department of Geological Sciences at the University of Michigan developed a new technique that's fairly sophisticated using high resolution, ion-couple plasmatometry (phonetic) and a thermal decomposition technique to, basically, get profiles for various mercury compounds that are absorbed into particles in the atmosphere, trying to understand what is the process by which mercury clung onto particles before they deposit or go into rain, so it's an approach to determine more information on the form of mercury, and so this plot was just representative of we took -- "NIST" is, of course, National Institute for Standards and Technology, and they provide SRM's, which are standard reference materials. Each one of them has a number. In this case, the number of the reference

material is 1633, and it is composed of fly ash, and the fly ash year was chosen because it's a particulate standard, and that's what we were looking at, in terms of trying to develop the technique, and this just shows the thermal profile as you put the sample into this very precise, small oven, as you ramp the temperature up, the levels of mercury that are released from the sample as a function of temperature, and so the point here was, at 320 degrees Celsius, we got the maximum amount of mercury released from this FRM (sic), and then we also quantitated how much came out and compared it to how much NIST was found, so we used the NIST value and how we quantitated it, and provided the concentration provided by NIST, and then the concentration that we provided using our technique which has that -- I'm not going to try to say the acronym, but the C-V-I-D-T-A-H-R-P-M-S (phonetic), the one down at the bottom, that's the method we developed, and you can see that the agreement is outstanding, well beyond the precision necessary to quantify anything in the environment, so that's what that's all about. Just a slide as an example of what a profile would look like using a reference material, and shows that it is not as quantitative -- I mean as quantitative, in terms of its

ability to determine the amount of mercury, but it also gives you some other information, in terms of the profile, so that's what that's about.

Q. Turning a couple pages forward -- I would say three to be precise -- to the Mercury Atmospheric Chemistry. Could you describe what this graph is, please?

A. Sure. I use this graph in the presentation to illustrate a finding that we had again in some actual observed measurements from our site in -- it says Ann Arbor, Michigan -- and so on what is plotted here in red is the reactive gaseous mercury concentration and picograms (phonetic) per cubic meter, and that's the axis that you see there on the Y axis.

On the bottom, there are two, three-day periods. One is June 22, 23 and 24 in 1999; the other is July 11, 12 and 13, 1999; and these two periods were picked out and put together to show the relationship that we found in the data between reactive gaseous mercury and the concentration of ambient ozone at that site, and to show that, A, that the two are correlated, and that when we first saw this, we were surprised because we had thought that we would see an end correlation in these, and so finding this

correlation, we started to investigate further to look for what atmospheric chemical reactions could possibly be causing a positive correlation between these two species, so that's what that figure is showing.

MS. BASSI CONTINUES:

Q. Have you -- since you did not expect to see this particular correlation, have you pursued this to see that it occurs in other situations, as well? In other words, have you done this again?

A. Oh, yeah. We now see this repeatedly at other places. What's interesting about this is that we found that, if we tend to not see a really high RGM concentrations, unless the ozone is significantly above 60 parts per billion, so when we see a more focally active air mass we tend to see a more reactive mercury in that air mass, so yes, we have seen it in additional years. This was just an example of one we had plotted up from 1995 that I showed.

Q. So then can one conclude from that statement then that you see less RGM in the winter than you do in the summer?

A. At rural sites, we see less RGM in the wintertime.

Q. At rural sites?

A. Yes.

Q. What about urban sites?

A. Not very much finality in the reactive and particulate mercury. There is some, but I don't believe it's statistically significant.

Q. What do you attribute that?

A. Direct emissions of reactive mercury from sources.

Q. What do you attribute the other from, then, in the summer?

A. In the rural locations?

Q. Yes.

A. Some of it is transport, and some of it is this phenomenon where we are seeing some photochemical production. We ascribe this actually from creating reactive mercury from elemental mercury during photochemically active transport. And what's significant about this is that it tells us that the forms of mercury, not just reactive, particulate forms are important to take into account from all sources, including power plants, but the elemental form can also be chemically reacted on regional scales and deposited to watersheds.

Q. Would a reduction then in regional ozone

levels, arguably, result in a reduction in regional RGM levels?

A. I would say yes.

MR. RIESER CONTINUES:

Q. In evaluating this issue, have you looked at whether the RGM transports are the same as ozone.

A. Good question. If you look at the plots, and you kind of look at the width of the plume, or the width of the reactive mercury elevation in each of these situations, one of the reasons why I picked these out is because it tends to be longer-lasting as it indicates that there's longer transport with a higher aerial extent to the plume. These are things that you see commonly when you look at air quality data, and to our surprise, they had more in common than they did not. When we see specific plume impacts, the plumes tend to have a very short half width. In other words, you see less high bars, and they are not these big, wide bars that take up a half of a day. The whole like late morning to early afternoon to early evening. They tend to be two or three hours worth of extended, so you can see a very different behavior and ozone doesn't correlate with them during those situations.

Q. Ozone does or --

A. Does not correlate with reactive mercury plumes when they are shorter durations. They tend to be higher concentrations. In those cases, the plume tends to be higher than the 120 that you see here, but when they are shorter they have a very different transport characteristic.

Q. Does that -- I'm sorry -- suggest anything to you with respect to RGM? I mean, did you take any --

A. It helps me to straighten out primary RGM emissions from secondary, and tells me somewhat about RGM that RGM can get transported over regional scales fairly effectively, and the interesting thing, as you notice the RGM goes down to nothing, so at night, all this RGM is gone, so those photochemical air masses that have all these mercury gone at night, all that reactive mercury goes to the surface, so that's important because that was the question that was asked earlier. The elemental forms that come out of surfaces also can regionally react, and deposit on regional scales, and all of these environmental problems tend to have common trends and photochemistry and production of ozone and production of particulates, lowering those emissions will result in lower the reactive mercury burden and also the lower the amount of mercury dry deposited and

probably wet deposited into the ecosystem.

MS. BASSI CONTINUES:

Q. I'm sorry. I don't have -- my notes are not that well organized, and I can't find whether you said this or someone else said this, but there was something said one of the past days this week that there were reactions that take place in mercury, and maybe it's from elemental to reactive in clouds, as opposed to photochemical type reactions, and yet, what you are talking about now sounds like photochemical type reaction. Was that you?

A. Yeah. I mean we had some type of discussion like that. There are reactions that occur in the cloud droplets in the aqueous phase, in addition to ones that occur in the ambient environment. When I started doing mercury atmospheric work in 1990, the thought was that gas phase reactions to two gaseous molecules colliding and chemically reacting was not important for mercury, that all of the chemistry was occurring in cloud droplet, so ozone and cloud droplet would transform elemental mercury into reactive mercury and it would be removed, and what we have learned over the past 16 years, plus, is that, in fact, there appears to be other reactions that occur in the gas phase. What

we haven't been able to determine, yet, is whether some of these are heterogeneous reactions. In other words, they occur on the surface of particles, and hence, why we were trying to develop new techniques to be able to look at a chemistry that occurs on the surface of these properties, so look at heterogeneous. That's what that means, gases interacting with particles that are in the atmosphere. So we're just uncovering that, and these are the things that really add to the uncertainty, and source type of model. This is why I don't believe that CMAQ and the other Eulerian type source models adequately depict what happens in terms of what comes from this source and goes there. I mean, we just do not have a very good handle on all of these processes and the observations are telling us we don't have a very good handle on this. We have tried to take the mechanism, the chemical mechanism, that was originally in CMAQ and reproduce it, and we cannot do it, so just to give you an idea, so we take a numerical model, take the actual data for these days, and we cannot reproduce the data we have here for ozone or reactive mercury, so this is why I have a strong disbelief in the left side of me, which is the modeling side, and the right side keeps saying I better keep taking measurements because,

at least, I know those are good and are telling us what's really there in the environment. I'm hoping one day we'll be able to have this type of predictability, but I don't believe it's mature enough to be used at this point.

MR. RIESER CONTINUES:

Q. I will continue on to the summary, which is four pages towards the back. Does the discussion you just had with respect to Ms. Bassi's question that supports this bullet point that atmospheric transformations in mercury can significantly effect mercury deposition. Is that correct?

A. Yes, that's correct.

Q. And that's what that quote is about, and then is sub-bullet is Regional Scale Photochemistry RGM Production. That was the phenomenon you just described. Is that correct?

A. Yes. That's referring to the discussion I had in my presentation.

Q. And then you just talked about the issues with -- you had with CMAQ, and then two pages, again, towards the back, you have a slide titled "Community Model for Air Quality CMAQ UM Modifications for Mercury." What does this slide describe?

A. We have had two grants from the United States Environmental Protection Agency to gut CMAQ and replace it with chemical scheme, and a process for mercury wet deposition and dry deposition that, basically, help improve what the original CMAQ had in it. CMAQ is a model that tried I think to capture everything for everyone, and so therefore, it doesn't please anyone at any time, and so there are a lot of things that were done in CMAQ that I think were of a high quality. I'm not being critical of the people that did the work. I think they did a fabulous job with a difficult task, but the model, as it stood when we got it, had many flaws, and so working with Sandy Somen at the University of Michigan who is a well known photochemical modeler, and has been for more than 20 years, and has been published extensively in the peer-reviewed literature, he has taken his chemical mechanism and taken out the chemical mechanism that was in CMAQ and replaced it with Sandy's chemical mechanism, which is completely different, and which is somewhat described here we improved the way the clouds are parameterized to try to improve the wet deposition parameterizations, and when we spend some additional time trying to focus on making sure that the emissions

inventory and the speciation used was more in line with what the literature and the community is all using because that's constantly something that's going to change and very important to make sure you are on top of. You don't want to use the 1990 emissions inventory for speciation because it's all wrong, so we have made major modifications to CMAQ, and we're -- and the one thing that we haven't done to date is that we're using this as a tool to try to understand the chemistry and the deposition, and so we will look at small-scale scenarios. We will model for a couple weeks during a period where we have an observation on multiple sites and see where the models are working well, and when I mean "the model" I mean the modified model now, and then try to go in and see if we can't improve the parameterization that we have in the model to better describe what we are seeing, and then rerun the model, and see how much you have been able to improve. This is how science is done is observations to modeling, and this work is difficult, but we're making great progress and with Sandy's improvements, we actually are able to reproduce some of the things that we're observing in terms of the photochemistry, so we have run some scenarios looking at that.

Q. Do you have a sense of when you expect that work to be at the point where there will be a revised version of CMAQ that the public can use, or the U.S. EPA can use?

A. I guess I don't really know how that answer. I don't know what the answer to that would be. We -- our current grant ends at the end of the year, and we usually ask for a one-year extension, and so I'm hoping that this phase of the model improvement will be done sometime at the end of 2006 is my answer, and there are other groups working on CMAQ. Everyone has their pet thing that they like, whether it's surface reemission, or cloud chemistry, so we just have expertise in the chemistry end, and so we are spending a lot of time with that.

MR. HARLEY CONTINUES:

Q. One question. I believe he's answered this, but going back to the Steubenville EPA PMF slide within the Powerpoint presentation, about nine pages down. Throughout your testimony, you spoke about the process of fingerprinting for different source categories?

A. Yes.

Q. And is that what is reflected in this

slide?

A. It's the one that has "Steubenville EPA PMF Apportionment Results, 2003-2004" and has a list of all the trace elements, major, ions and mercury and so forth. Yeah. This was meant to be an example, and I think this example that was given is similar to the one that I think Dr. Landis had, and I think I borrowed that from his presentation, and it really is to reflect the elements that were used in our analysis together with the ones that you can see are sticking out, in terms of the different sources. One of the points that's important to make here is that we do not use one element for a source category. We try to use a variety of elements, and it's really the multitude of multiple elements that goes into defining the contribution from a specific source, and it's really, and one of the things that is accomplished in this goose-tracking uncertainty method is that it actually propagates uncertainties through these elemental compositions to allow you to see how sensitive the results are to any one element, or whatever, but we do not go in and say we want, for example, selenium to be the only tracer for coal combustion. That's not how it's done. It uses all these elements together in a multivariant sense.

Q. So by corresponding these other elements with typical emissions from different source categories, you are then able to conclude that the mercury that you are reading corresponds with a source category?

A. Yeah. Basically, we look to see if the elements that are emitted or identified with a factor analysis, or the PMF analysis in this case, correspond to source profiles that have been published in the literature or from previous studies that we have done where we have actually collected samples from various sources, and what you see here reflected is the average of all of those samples and the relationship that we got from the 162 samples that we looked at, so what's not shown here just because it's already a horribly miserable slide to make at a presentation because you can't see anything, so I didn't spend a lot of time on this, but there are uncertainties associated with each one of these elements, as well, so for every number that's on here, there's plus or minus with a number written next to it, and it's just unruly when you're making a presentation, but the uncertainties here are really not what's important in terms of the point.

Q. If this is sort of a Rosetta Stone slide fingerprinting or source categories, could you please

describe the meaning of the bottom column that says, "Percentage mercury and how the percentage mercury was then traced to different categories in Steubenville"?

A. Well, this, by no means, a Rosetta Stone because one of the things what we find here is representative of the sources that -- the most important sources in the Steubenville area, but basically, what it does is calculates the source profiles, and for each sample, then, it has a calculated amount that each one of these factors -- you can see factor one, factor two and so forth -- each one of these factors contributes to the quantity of each element in each precipitation sample, so you have got this huge matrix with six contributions to, in this case, manganese for every single 162 samples, and then it goes on, and does that for aluminum, and it's as simple as you can add those contributions up for each one of the samples, and then divide by the total to get the fraction that you have compared to the total from each one of these source categories. I've simplified the mathematics, but that's, in essence, what it does, and again, because the model propagates uncertainty through the entire mathematical algorithm, it also gives us an uncertainty number that's reflected in that number.

Q. Reading the slide, am I to conclude that the contribution of the iron steel industry to the total observed mercury would be 4 percent, plus or minus, 3 percent?

A. Yes, that's correct. For this wet deposition result, that's what we found.

Q. And this seems to indicate that the contribution of the coal source category dwarfs by 20 or more times than the nearest other source category. Is that correct?

A. That's a correct interpretation, yes.

Q. Thank you, Doctor.

MR. ZABEL CONTINUES:

Q. On something I noticed in the slides, Doctor, the Cardinal Plant looks almost as close to Steubenville as Sammis. How far is it? Do you know?

A. You're right. It's within a couple of miles, seven to nine miles. What we were asked to do was to make sure there were, at least, three plants within some distance from the selected site, and so those two plants, clearly, are both within 10 miles of the plant.

Q. Cardinal is on the river, as well?

A. Yes.

Q. Do you know the size of those two plants?

A. Again, I do have a complete list. They are both fairly large plants. I know the Sammis Plant is fairly large plant, one of the largest in the area.

Q. Coal-fired, are they not?

A. Both coal fired, yes.

MR. RIESER CONTINUES:

Q. Looking at the same slide that Mr. Harley directed you to, under the factors, you have got descriptions: Factor one: Iron-steel; Factor 2: P sources. That's the phosphorus source? It says "P source." Is that phosphorus?

A. Yes.

Q. Factor three is coal. Is that coal combustion?

A. Coal combustion, yes.

Q. Is that specific to any type of coal combustion? In other words, specific to any type of operation using coal combustion?

A. We, again, I apologize if I wasn't clear in my explanation of this yesterday. This is where we then take and do an emissions reconciliation where we then say, "What other information is at our disposal to help us interpret what we find in the receptor models?"

and we go and look at emissions that are in a region around the site that could have contributed and it turns out that based on the EPA emissions inventory, something, like, greater than 98 percent of the coal combustion that's done is in coal-fired utilities, so that's -- so yes, it's coal combustion, and then we determine that it's primarily a coal-fired utility because that's the largest consumer or combuster of coal.

Q. So you use the fingerprinting, the signature-fingerprint process that we described, and it allows you to identify mercury associated with coal combustion, and then you use the emissions inventory to identify the sources of coal combustion within a certain region of the sampling location?

A. To help us, in terms of identifying that we believe that that's, again, greater than 98 percent from coal-fired utilities.

Q. But the fingerprinting doesn't identify the coal combustion as a utility source. It just identifies coal combustion.

A. That's correct.

Q. And then so you use these other tools that you've --

A. Spacial analysis, and then understanding what the inventory tells us and so forth.

Q. Thank you.

MADAM HEARING OFFICER: Dr. Keeler, again, thank you.

(A small break was taken.)

MADAM HEARING OFFICER: I have had several people inquire about our schedule, and they are all gone. Everybody who was asking left. One thing we will begin at 9 a.m. on Monday. I think we can still have a lot to do, and I think we are going to --

MR. KIM: I believe what we are going to do is -- I have been asked the same question, as well. I think what we are going to do is Jim Ross has some questions that, in addition to the Dynegy questions that he already answered, he has questions that are directed to him from other utilities that also have some general information and some information that will be addressed later on in the week, and so he will probably try and answer the general stuff as quickly as possible, and then Jim Ross, after he's done with that, Mr. Ayres had some general questions addressed to him, so we will try to get those taken care of, and then what we were going to do -- our thought, as far as a progression of

information, was to, first, present the testimony concerning the emission standards, and then move to the technical feasibility, which would include technology availability, as well as some economic testimony, and that would be Mr. Staudt or Dr. Hausman, Mr. Nelson Mr. Forter and then we would conclude with the sort of the miscellaneous category, but my anticipation is that throughout the week, with the exception of Mr. Nelson and Mr. Forter, I think Mr. Ross, Dr. Staudt, Mr. Ayres, and I think even Dr. Hausman are pretty much have committed to be here all week, so it's not like they are not going answer something, if it comes up. That's sort of the order that we had anticipated.

MADAM HEARING OFFICER: At this point, I think when Dr. Hornshaw is done today, we'll adjourn for the day and get back to it on Monday.

MR. HARRINGTON: Just clarifying, Dr. Staudt, at the earliest, will be late Tuesday.

MR. KIM: My guess would be, yes, late Tuesday at the earliest, and I indicated to counsel during the break that I know that they have some people that they are going to come in, and they would like those people present when some of our witnesses are questioned and to the extent that we can, I'm sure we

have got -- if Dr. Staudt's turn on our little schedule comes up, but some of their people haven't arrived, yet, we will rearrange things, so that we don't begin Dr. Staudt, until they have the people here.

MR. BONEBRAKE: We appreciate that courtesy.

MADAM HEARING OFFICER: I think we are ready for Question 14-B.

DR. HORNSHAW: Before I go to 14-B, I would like to circle back and add a little bit to the record. The question I responded to on No. 8 that I talked about the publication that I have talking about risks. I forgot to mention that that paper was published while I was a graduate student at Michigan State University, and I would also at this time like to express my appreciation for the work that Dr. Keeler has done. He's done quite well for a University of Michigan guy. I had to do that because he put a sticky note that said "Go Blue" on my Michigan State pen.

14-B: "How many total sample results are contained or reflected in this database? Again, this is my database. Currently there are 11,349 entries in this database.

MR. BONEBRAKE CONTINUES:

Q. Does that reflect, approximately, 800 fish tissue samples?

A. That's 11,349 individual fish samples going back to 1974.

Q. Will all of these samples then be on the Storet database, as well, all of that data?

A. I believe, yes.

DR. HORNSHAW: C: "During what period of time were these results collected?" 1974 through the present.

MR. BONEBRAKE CONTINUES:

Q. Just a related question, how often is the Storet database updated, Dr. Hornshaw.

A. Approximately, the same amount of time as my database is updated. When we receive the results from our laboratory, my secretary enters them into my database, and whoever does the data entry in the Bureau of Water similarly enters it into the Storet database.

Q. Multiple times during the course of a year?

A. Yes. D: "What information is provided in this database with respect to each sample?" And I have already provided a printout of what's in my database, so you can follow along, if you want. It's the one that

was submitted for Sherman Park Lagoon Wednesday I think it was.

MADAM HEARING OFFICER: Exhibit 19. Thank you.

DR. HORNSHAW: This database contains station code; sample date; rotation on whether the sample is whole fish or edible fillet; water body name; common F collection; sample location within the water body; number of individual fish in the sample; weight; length; chlordane level; DET level; DL level; PCB level; mercury level and lipid content of the sample. All of the chemical analites (phonetic) also have a box that, if checked, means the chemical was not detected, and the reported value is the detection limit.

MR. BONEBRAKE CONTINUES:

Q. The station code on this exhibit, does that correspond with the sampling location?

A. Yes, it does.

Q. So would you have this kind of information, then, for each sampling location in your database?

A. The station code?

Q. The type of information under each column that you just described on this exhibit.

A. Yes.

Q. Would you have that same kind of information in your database with respect to each sampling location?

A. Yes, although, in quite a few cases, the entry for fillet or whole has not been checked, and pretty often the sample location within the body is not indicated, especially if it's a lake. E: "Does this database contain all fish contaminant data for the state of Illinois? And Roman one, if not, what data is not included in that database?" Roman two: "How can that data be accessed by the public?" This database does not contain all fish contaminant data for Illinois. Radioactive compounds in fish are determined and maintained by Illinois Emergency Management Agencies. I believe it's the Division of Nuclear Safety, and I do not know how that data may be accessed. Also, U.S. EPA and/or ORSANCO, it's an acronym for Ohio River Water Sanitation Commission (sic), I believe, analyzed fish taken from the Illinois waters of Lake Michigan and the Ohio River, respectively, and these results are available to the public through those agencies.

MR. BONEBRAKE CONTINUES:

Q. Dr. Hornshaw, do you know if ORSANCO data

is available on Storet?

A. Pardon me?

Q. Do you know if the ORSANCO I think was --

A. ORSANCO.

Q. Is that information available on the Storet database?

A. I don't think it is.

Q. So do you think what database it's available on?

A. ORSANCO's database.

Q. So is that database maintained by U.S. EPA?

A. No. ORSANCO is a water sanitation commission created by Congress specific for the Ohio River.

Q. So it manages and maintains its own database?

A. Yes, it does.

DR. HORNSHAW: F: "What other data. Such as water column or sediment sample data, was contained in this database?" No other data are contained in mine, other than the fish data. G: "Has fish sampling frequency changed over time?" I cannot speak to sampling frequency prior to my involvement with

the Fish Contaminant Monitoring Program beginning in late 1988. In the time I have been involved with the Fish Contaminant Program, it has been the goal to obtain around 400 fish samples per year. However, in 1992, U.S. EPA funding that paid for the analytical costs began to diminish and by 1993, it was gone. Thus, there are fewer samples than normal for 1992, very few samples for 1993, no samples for 1994, and only Lake Michigan samples for 1995. In 1996, the member agencies attempted to secure state funds to resume operation of the Fish Contaminant Program, which included analysis of 50 samples from waters with existing consumption advisories with a costs donated by the Illinois EPA laboratory to convince the Legislature that there were still concerns about contaminants in sport fish. As a result state funds were appropriated for fish analyses and beginning in 1997, the Fish Contaminant Program resumed its goal of 400 samples per year. Regarding mercury, I have been told that the almost total lack of samples in the 1970's, to early 1980's time frame that exceeded the Food and Drug Administration action level of one milligram per kilogram, which was used in this time frame by the Fish Program as the level of concern for advisories resulted in curtailing mercury analyses

in the 1984, through 1987, time period to just a few samples.

Beginning in 1988, the Agency began collecting water sediment and reduced number of fish samples for mercury analysis in selected water bodies as part of its efforts to update the surface water criteria for mercury. With the resumption of regular sampling efforts in 1997, like I mentioned before, mercury samples we are again collected at the usual rate.

MR. BONEBRAKE CONTINUES:

Q. Do you have a copy of the Technical Support Document available to you over there, Dr. Hornshaw?

MR. KIM: Do you have a page number?

MR. BONEBRAKE: Page 61, please. It's the first sentence of Section 4.3.1 that I am interested in.

DR. HORNSHAW: I'm on page 61 now. Which part did you say?

MR. BONEBRAKE CONTINUES:

Q. Section 4.3.1, first sentence.

A. Yes.

Q. Reads, "There are a total of 815 samples for mercury concentrations in fish tissue," and it goes

on from there. Do you see that?

A. Yes.

Q. Just a clarification question for you, when we were talking about the number of total samples that were in your database, I think you earlier mentioned it was some number over 11,000?

A. Yes.

Q. Does this sentence in Section 4.3.1 that I just referred to then mean that, of those more than 11,000 samples, 815 of them relate to methylmercury fish tissue levels?

A. That's correct.

Q. And the remainder relates to sampling for some other compound?

A. Yes, compounds.

Q. Thank you for that clarification.

DR. HORNSHAW: H: "Have the analytical methods for analyzing fish tissue changed over time?" Prior to 1985, any of four laboratories, EPA's, Public Health's; Agriculture, and a contract laboratory were used for fish analyses depending on laboratory demands. I have been told that there were no discrepancies and I believe I discussed these in the previous day, and some of the results between the labs

beginning in 1985 all analyses were done by the IEPA lab or by a contract lab under our supervision. Analytical methods since 1985 have been, basically, unchanged, other than a reduction in the mercury deduction limit from 0.1 milligrams per kilogram to a range of 0.01 to 0.03 kilograms beginning in 2004.

MR. BONEBRAKE CONTINUES:

Q. When you say "Basically unchanged," Dr. Hornshaw, what do you mean?"

A. It means the laboratory has gone through method development, and once that method development has been certified, then they are not going to change it, unless there's a really good reason to change it, and to my knowledge, the only major change that's been done in this time frame has been the reduction in the mercury deduction limits.

Q. Again, for purposes of that answer, "this time frame" means, from 1985, to the present?

A. That's correct.

DR. HORNSHAW: I: "What percentage and number of Illinois waterbodies are and have been subject to; one, fish tissue samples; two, water column samples; and three, sediment sampling?" I can't answer for water column sampling and sediment sampling and I

think I explained before how I can't really quantify fish tissue sampling because ponds and other private waters are not eligible for sampling.

Q. I believe we had a conversation about fish tissue sampling earlier in the week.

A. Yes.

MADAM HEARING OFFICER: Question 15, 16 and 17, 18 and 19 and part of 20 have been answered so jump to 20-A.

DR. HORNSHAW: 20: "Dr. Hornshaw's testimony on page two refers to "Protocol for Uniform Great Lakes Sport Fish Consumption Advisory," a 1989 "memorandum of agreement." Policy determinations adopted by the FCMP over time. With respect to these references, A, the Protocol appears to address appropriate fish advisory levels for PCB's. How is the process and modeling set forth in this document applied to mercury?" It's applied exactly the same way, except there's no assumption of a reduction in levels, contaminant level, in mercury due to cleaning and cooking, and Roman one, "Is there any similar document that, specifically, addresses mercury?" The Great Lakes Fish Advisory Task Force is in the process of adding a mercury addendum to the Great Lakes Protocol. That's

anticipated that will be accepted by all eight Great Lakes states by the end of this year. It's in the final draft form at this point.

MR. BONEBRAKE CONTINUES:

Q. Do you have a copy of that final draft, Dr. Hornshaw?

A. I do.

Q. Can we have that added into the record?

MR. KIM: We'll have copies made and have it submitted next week, if that's okay.

MR. BONEBRAKE: It's hard to know if you're going to have questions without looking at the document.

MR. KIM: We can have some copies made right now. It's not that long.

MADAM HEARING OFFICER: We can reserve questions on that and continue for now.

DR. HORNSHAW: B: "With respect to the policy determinations, Roman one, are they in writing: No. Roman two, "Who makes them?" Fish Contaminant Monitoring Program members discuss whatever issues are important at meetings and vote on whether to accept, as policy, the issues were discussed so as issues come up.

MR. BONEBRAKE CONTINUES:

Q. Is there any written record, then, of the manner in which the FCMP drives fish advisory standards?

A. Well, what we do is we operate under the Great Lakes Protocol in the old memorandum of understanding. That's the written portion of it. There are sometimes meeting notes written up; sometimes not. You have to understand that the Fish Contaminant Program, other than the funding that pays for laboratory work, is entirely donated from the member agencies' time, and if, for instance, I have time to write meeting notes, I will do that. Most of the time I don't have time. The rest of the members understand this, and they have not pressed me to bring up meeting notes every time we have a meeting.

Q. Does that mean, Dr. Hornshaw, that there's no written record of the deliberations and methodology by which the FCMP determined the fish advisories relating to methylmercury?

A. At the end -- at the beginning, to the middle of October, we usually have the annual meeting to address updates, new advisories , rescinding advisories, if appropriate, and that's done in order to meet the DNR's printing deadline. They have to have that booklet

that's been entered into the record ready to go to their printers by the end of December, so we have to have all the decisions made, and what I do prior to this annual meeting is print out tables of all the fish data that needs to be considered for that year's advisories. That is given to each of the members, and that's what we base the decisions on.

Q. But an answer to my question is there is no written record of the deliberations and methodology by which you determine --

A. That's correct, other than whatever notes people jot during the meeting. C: "Are they publicly available? No. C: "The MOA at page G-1 lists action levels for a number of substances, but omits mercury and methylmercury. Why were mercury and methylmercury omitted?"

MADAM HEARING OFFICER: For the record, it's the Memorandum of Agreement.

MR. BONEBRAKE: It is Exhibit B I believe, if you can confirm that for me, to Dr. Hornshaw's testimony.

DR. HORNSHAW: Yes. That's Exhibit B attached to my testimony.

MADAM HEARING OFFICER: Thank you.

DR. HORNSHAW: I can't answer that. I had no part in drafting the MOA.

MR. BONEBRAKE CONTINUES:

Q. Has there been any supplementation or addendum to this MOA to address methylmercury?

A. No, there is not. The addendum that we are going to be making an exhibit out of for the Great Lakes Protocol will take the place -- or that will become the mercury Protocol for us, as well, since we are following the Great Lakes Protocol.

Q. That addendum relates to the Protocol, as opposed to the MOA. Is that correct?

A. That's correct. D: "The MOA sets forth various quality control protocols" -- you answered that. Question 21.

DR. HORNSHAW: 231 "At page three of his testimony, Dr. Hornshaw states that the MOA specifies the use of U.S. Food and Drug Administration's arc levels as criteria for determining the need for advisories. However, the process developed in the Protocol has been used to replace the FDA criteria for polychlorinated biphenyls, PCB's, mercury and chlordane. The Protocol determines a health protection value, HPV, for a contaminant, which is then used with five assuming

meal frequencies: unlimited, or 225 meals per year; one meal per week, or 52 meals per year; one meal per month, or 12 meals per year; one meal every two months, or six meals per year; and do not eat, zero meals per year. To calculate the level of contamination in fish that will not result in exceeding the HPV at each meal frequency. With respect to these statements, A, the MOA contains no action level for mercury or methylmercury. What process, if any, was used to determine fish advisory levels for mercury or methylmercury prior to the 1993 Protocol?" The FDA action level was originally used as -- I think I have mentioned from the beginning of the Fish Contaminant Program -- and this was changed by the Department of Public Health in the late 1980's, as I think I have already also mentioned. B: "This testimony indicates that the HPV is for "mercury." Is the HPV used for fish advisory related to mercury or methylmercury?" Methylmercury. "What is the HPV for mercury or methylmercury?" As I testified about 20 times now, 0.0001 milligrams per kilogram per day. D: "The Protocol, specifically, addresses PCB's, but does not appear to expressly set a process to determine the HPV for mercury. How does the State of Illinois determine the HPV for mercury or methylmercury as the

case may be?" As I mentioned before, we have adopted the FDA U.S. reference dose as the HPV and I think it's also discussed in the addendum that we are making an exhibit out of. E: "What quantity of fish comprises a meal for purposes of fish advisories?" Eight ounces of uncooked fillet. Roman one, "What is the basis for that quantity?" The Great Lakes Protocol. F --

MR. BONEBRAKE CONTINUES:

Q. Dr. Hornshaw, you mentioned that the basis for the meal quantity was the Protocol.

A. Yes.

Q. What was the basis upon which the Protocol arrived at that number?

A. That was an assumption that members of the Great Lakes Fish Advisory Task Force agreed was an appropriate meal size for an average meal.

Q. What was the basis of that assumption?

A. Common experience, probably. I couldn't answer that accurately. If we were to use my fish consumption, it would have been slightly larger.

Q. Do you know if the U.S. EPA has an assumed fish meal quantity as determined as an assumed fish meal quantity?

A. What do you mean by "quantity"?

Q. Well, eight ounces.

A. Eight ounces?

Q. Yes.

A. I'm pretty sure, for the joint EPA/FDA fish advisory, they assumed six ounces of cooked fish, which is, roughly, equivalent eight to ounces of raw fish.

Q. So you view the Illinois state standard and the U.S. EPA/FDA standard to be roughly equivalent?

A. Roughly equivalent.

DR. HORNSHAW: I think I just answered F. 22: "In the bottom paragraph, on page 3, the testimony asserts that `HPV's currently used by the Fish Contaminant Monitoring Program for methylmercury are derived from U.S. EPA criteria.' A, please describe this derivation." Again, adopted the reference dose from the EPA. B: "This paragraph indicates that the Agency uses the U.S. EPA's RfD to determine the applicable HPV. Does the Agency agree that U.S. EPA's RfD is protective of human health?" Yes. C: "Table 4.3 at page 58 of the TSD appears to list various fish advisory levels in Illinois. What is the quantity of a fish meal assumed in this table?" Again, eight ounces uncooked. "What is the basis for that quantity?" Again,

Great Lakes Protocol. D: "Does U.S. EPA use a different quantity of assumed consumption for each meal to identify a fish advisory level of 0.3 parts per million?" Again, six ounces of cooked fish. E: "Table 4.3 assumes an HPV of --

MR. BONEBRAKE CONTINUES:

Q. Dr. Hornshaw, Question D referred to a U.S. EPA fish advisory level of .3 parts per million. Are you familiar with that advisory level?

A. Roughly, yes.

Q. Is it your understanding that that is, in fact, U.S. EPA's current fish advisory level?

A. I'm pretty sure that's what it is, yes, six ounces of uncooked fish, you know, cooked fish, sorry.

Q. That level of .3 parts per million, is that less stringent than the fish advisories currently in place in Illinois?

A. It depends on what the assumed meal frequency is. If we assume that meal frequency is unlimited, then we're talking about 25 meals per year of concentrations not to exceed .05 parts per million. I'm not sure exactly what the .3 parts per million value is supposed to protect as far as meal frequency goes, so

that's the best I can answer.

Q. So you don't know if the .3 part per million standard is associated with a number of meals over a given period of time?

A. I would prefer to read what the description of how that was developed by U.S. EPA before I answer that, and I have tried to find that. It's hard to find.

Q. That's one of the reasons I was asking the question.

DR. HORNSHAW: Roman I think E, "Table 4.3 assumes an HPV of 0.1 micrograms per kilogram per day for sensitive populations and 0.3 micrograms per kilogram per day for other populations. Roman one: Does the 0.1 microgram per kilogram per day HPV correspond to methylmercury?" Yes. Roman 2: "How is the 0.3 microgram per kilogram day standard derived? This was developed from the previous reference dose that U.S. EPA had and subsequently withdrawn when they changed the new reference dose of 0.1 microgram per kilogram per day. The old reference dose was based on effects on adults, so we considered that to be appropriate for the nonsensitive population. F: "Do other federal and state agencies use and publish

different HPV's or reference doses?" I believe I have spoken before for the Great Lakes states that they all use the same one, and I can't answer for other states or other federal Agencies. G: "Are any of those HPV's or reference doses less stringent?" Again, I can answer for all Great Lakes. It's all the same. 23: "Has the state issued a fish advisory based on the presence of PCB's in fish tissue?" Yes, and those are listed in the PCB and chlordane advisories that are in the exhibit from DNR."

MR. BONEBRAKE: The green booklet, Dr. Hornshaw?

MADAM HEARING OFFICER: Exhibit No. 11.

DR. HORNSHAW: Yes, Illinois fishing information. A: "If so, what is the basis of that? Fish Advisory Great Lakes Protocol. B: "What waterbodies are covered by that advisory." Again, the information that is in the DNR booklet. 24: "When was the general statewide mercury fish advisory issued in Illinois?" 2002. A: "Is it correct that the statewide mercury fish advisory does not mean that all sampled fish are above mercury fish advisory levels?" Yes. 25: "Dr. Hornshaw's testimony at page threes state that, `In

the past, the FCMP relied on a criteria for mercury and sport fish of 0.5 milligrams per kilogram developed by the Illinois Department of Public Health with samples exceeding the criterion given do not eat advice and samples below the criterion placed in the unlimited category.' A: When did specific fish advisories move from these two categories to the five categories set for in Table 4.3 in the Agency's TSD?" 2002. B: "Why were the two categories moved to the five categories?" So that the procedures that we adopt would be consistent with the Great Lakes Protocol, which requires five categories of consumption advisory. 26: "If mercury levels in fish tissue were reduced below the current Illinois mercury fish advisory levels for mercury, would all of the fish advisories in the state of Illinois be lifted?" Only those for mercury. A: "If not, why not?" B --

MR. BONEBRAKE CONTINUES:

Q. Your answer I believe Dr. Hornshaw assumed that the advisory for mercury would be lifted.

A. Yes, if all the fish levels drop below .06 milligrams per kilogram.

Q. Do you happen to know -- I will hold that question for later. Go ahead.

DR. HORNSHAW: "If not, why not?" And B: "Which waters would remain subject to fish advisories?" All those waters that are on advisory for PCB's and chlordane. 27: "Does the Agency agree that exposure to methylmercury through fish consumption can be reduced significantly by eating younger, smaller fish and by trimming fat from fish before cooking?" Yes for younger and smaller fish; no for trimming because mercury resides in muscle tissue, for the most part, and not fat, and fat is what is eliminated by cooking and trimming.

MR. BONEBRAKE CONTINUES:

Q. Just to follow-up, other than eating younger or smaller fish, are you aware of other ways, Dr. Hornshaw, in which those who catch fish can reduce the methylmercury consumption in fish containing methylmercury that they catch?

A. Yes, eating nonpredator fish.

Q. Which fish in Illinois are nonpredator fish, and here I limit my question to the fish that are commonly caught by fisherman?

A. Carp, catfish other than flathead catfish; most of the pan fish, other than the white bass family, suckers. I'm not sure many suckers are caught in

Illinois. I know some are.

MS. MOORE: There's a lot of suckers out there.

DR. HORNSHAW: I was not willing to go there, but thank you.

MR. BONEBRAKE CONTINUES:

Q. When we talk about younger, smaller fish, is there a rule of thumb with respect to young -- the age of the fish or the size of the fish that are safer to eat?

A. That's pretty species specific. Young bass would be in the range of, for instance, 12 to 15 inches, whereas young walleye would probably be in the range of 14 to 18 inches.

Q. Is that information contained in the fish advisory?

A. No. It's just general information.

Q. Do you know if the Illinois Environmental Protection Agency, the Department of Health, or other Illinois state agencies, provide information to Illinois residents about means to avoid consumption of fish with higher methylmercury levels?

A. Well, for instance, the Department of Public Health has a website listing the state fish

advisories, so that's one way that the information is given out, and of course, there's all the information in the DNR booklet. There's, also, at the beginning of the fishing season, late February, early March, Department of Public Health issues a statewide press release listing the updating of the annual updating of the advisories.

Q. So if a member of the public is interested in identifying fish that have the potential to create a consumption risk for them, there's public information upon which they can base those kinds of decisions, Dr. Hornshaw?

A. Yes.

MR. KIM: Before we go further, I have the copies of the draft Protocol for mercury-based fish consumption advisory that was referred to earlier.

MADAM HEARING OFFICER: We will mark this as Exhibit 33, if there's no objection. Seeing none, it's marked as Exhibit 33. And you know what? Why don't we take about five minutes, so you can look this over and see if you have any questions.

(Exhibit No. 33 was admitted.)

(A small break was taken.

MADAM HEARING OFFICER: Mr. Bonebrake.

MR. BONEBRAKE CONTINUES:

Q. Dr. Hornshaw, I had a very brief opportunity to take a look at Exhibit No. 33, and have not had a full chance to review it, but I did have a couple of questions for you regarding Exhibit 33. Does the addendum reflect current practice or is it your anticipation that this is going to be instituting some new practices in fish advisories for the FCMP?

A. As I stated before, the Fish Contaminant Program is going to be changing to an upper limit of one milligram per kilogram to be consistent with the FDA action level, so what is in the Technical Support Document now, as far as the different concentration ranges for the meal frequencies, that will all change. We will only have one meal per week, one meal per month and do-not-eat for mercury.

Q. And if you've got a copy of Exhibit 33 handy, page 13 of that exhibit, Dr. Hornshaw. There's a table in the middle of that page that reflects the new standards that you were just referencing.

A. That's correct, although we're probably not going to use the two meals per week category. That is an option that the states have, especially for states that are going to be incorporating FDA's advice to eat

two meals per week. All kinds of fish or for states that are going to be addressing commercial fish species with their sport fish advisories Illinois will not be, at least the last time I talked with Department of Public Health.

Q. And the numbers that are on the table in page 13 will they apply to all members of the population?

A. No. These value are for the sensitive part of the population, women of childbearing age, particularly. And I might add the value for no consumption is listed in this table at greater than 9.5. for Illinois, it will be greater than 1.0. like I said, we are going to be using the FDA action level as the upper limit.

Q. I guess what I'm not clear on is the current fish advisory for the nonsensitive population, is that going to change, as well?

A. That's one of the things we will have on the agenda for discussion when we have the annual update meeting.

Q. As I have an opportunity to read this Exhibit, Dr. Hornshaw, a little more carefully, after the proceeding today, is there any -- do you know of any

changes that are necessary to this document at this point in time?

A. To make it --

Q. Either changes that you, or others, have identified need to be made, or that you understand otherwise will be made to this document?

A. None that I'm aware of. It's my understanding that all of the Great Lakes states have pretty much agreed to what's in here, and it's just a matter of -- actually, it's a matter of Dr. Henry Anderson in Wisconsin wrapping up the U.S. EPA grant that was behind all of this, and he issues his final report to U.S. EPA. Then I think this will be finalized, as well.

Q. So it's your expectation that this draft will be final by the end of 2006?

A. Yes.

MR. HARLEY CONTINUES:

Q. Dr. Hornshaw, could you please repeat the age at which children are regarded to be a susceptible population, what age that was?

A. For the Illinois Advisory Program, it's children under 15.

Q. And could you remind us again at what age

children can fish without obtaining a fishing license?

A. I'm not entirely sure on that. I think it's either 16 or 17.

Q. So in other words, a member of a susceptible population would be able to fish in an unlimited fashion in Illinois without ever coming into contact with any state agency?

A. That's correct.

Q. Thank you.

CROSS EXAMINATION BY DR. GIRARD:

Q. I have a clarifying question. You said Illinois may decide to drop out some of these meal frequency categories and you talked about the two-meal-per-week category. Looking at page 13, of Exhibit 33, then, how would Illinois change the fish mercury concentration ranges then?

A. We'll still use what's in the technical Support Document up to .05 milligrams per kilogram will still be unlimited. .06 to .22 parts per million will be one meal per week and .23 to 1.0 will be one meal per month. Above 1.0 will be do not eat.

MR. BONEBRAKE CONTINUES:

Q. Just a related question, is it your understanding, Dr. Hornshaw, that after this addendum is

finalized, that the fish tissue mercury levels that will be used to identify impaired waters will remain at greater than .05 parts per million?

A. That's correct.

DR. HORNSHAW: I believe we are on question 28: "Is it correct that the Illinois Department of Public Health continues to recommend that Illinois residents eat fish?" Yes. 29: "With respect to nonanglers living in Illinois, what percentage of their fish intake is comprised of fish from waters outside of the state of Illinois, including the oceans?" There's no way to answer this question since fish consumption survey data are not available for Illinois anglers or nonanglers, and I will note that I believe this response also answers Prairie State's Question No. 2. 30: "Is it correct --

MADAM HEARING OFFICER: They do go on and ask -- Prairie State -- whether national surveys of fish consumption, are they relevant to Illinois anglers? Are there no national surveys at all?

DR. HORNSHAW: Yes. There's lots of that information in my testimony and in the Technical Support Document. There are national surveys of the general population, as well as surveys of people who

admit to eating fish, and people who are anglers that have been surveyed.

MADAM HEARING OFFICER: Thank you. I just wanted to make sure.

MR. BONEBRAKE: In fact, I think we have some questions later on about some of the materials sited by Mr. Hornshaw.

DR. HORNSHAW: 30: "Is it correct that U.S. EPA has developed a fish advisory criterion of 0.3 parts per million based on its current reference dose, an assumed body weight of 70 kilograms, and assumed fish consumption of about 17.5 grams per day?" Yes.

MR. BONEBRAKE CONTINUES:

Q. Do Illinois fish advisories assume a certain level of fish consumption per day?

A. Yes.

Q. What is that number?

A. It varies with the meal frequency that we assume. If you look at -- if you look in Draft Mercury Addendum that we just entered into the record.

MADAM HEARING OFFICER: Exhibit 33.

DR. HORNSHAW: If you look at the discussion under -- starting on page 11, under B,

"Calculation of maximum daily mercury ingestion when following the advisory," and this also answers a question asked of me of how these things were derived. There's an example calculation, and it lists the number of grams per day that goes into the calculation of each of the advisory level range for the assumed meal frequencies that we use in the Fish Contaminant Program.

MR. BONEBRAKE CONTINUES:

Q. So for instance, the assumed fish consumption level associated with the unrestricted consumption advisory is 140 grams of fish per day?

A. That's correct.

Q. And that number is I guess, at least, seven times higher than U.S. EPA's assumed fish consumption level. Is that right?

A. Yes.

Q. How is the 140 grams of fish per day derived?

A. Just as it's shown in here. 225 meals per year is equivalent to 18.75 grams per month, and that's equivalent to 140 grams of fish per day.

Q. And what was --

A. I'm sorry, 18.75 meals per month, I'm sorry.

Q. What was the eight-ounce fish meal size used in that calculation?

A. Right. 227 grams is eight ounces.

Q. Do you know, Dr. Hornshaw, why U.S. EPA's fish consumption per day number is so much lower?

A. No, I don't.

DR. HORNSHAW: 31: "Does the Agency contend that adoption of the Illinois Mercury Rule Proposal will result in fewer fish and sea fish advisory standards than if only CAMR is implemented in Illinois?" Yes. A: "How many fewer fish will exceed the fish advisory standard?" I don't believe there's any way of calculating that. B: "Please explain the basis for your answers." The Agency believes that the results from Florida and Massachusetts described in Marcia Willhite's testimony shows that reductions in mercury deposition result in reductions in fish tissue mercury. Since the Agency believes that this rule will result in greater reductions in mercury deposition than would be achieved by CAMR, we contend that adoption of this rule will result in fewer fish exceeding mercury levels of concern than if CAMR were implemented.

MR. BONEBRAKE CONTINUES:

Q. Dr. Hornshaw, in answering that question,

are you relying solely on Ms. Willhite's testimony?

A. Yes. I don't know anything about deposition.

Q. So you're offering no independent view with respect to the answer to that question?

A. That's correct.

DR. HORNSHAW: 32: "In his testimony, at page 4, Dr. Hornshaw refers to a study by NFCS noting that the study found that the rate of fish consumption in the general population of the NFCS study was `12 grams per day, 19 meals per year.' He refers to another of only female consumers using data from the NFCS study and a U.S. D A study. Of the reported average number of meals per week, how many of the meals were of motion fish, or shellfish, as compared to freshwater fish or shellfish?" I can't say. The data on studies are for all fish and shellfish combined.

MR. BONEBRAKE CONTINUES:

Q. The 12 grams per day number is less than a tenth of the 140 gram per day number that we just discussed with respect to the addendum, which is Exhibit 33, Dr. Hornshaw?

A. Yes.

Q. Does that indicate to you that the

unrestricted consumption fish advisory is very conservative with respect to the assumed level of fish consumption in the Illinois population?

A. Yes. It was actually intended to be -- in the Great Lakes Protocol, 140 grams per day was chosen to account for high-end fish consumption, either by subsistence fisherman, or by avid anglers.

Q. And my metric conversions are not great, so can you tell us, approximately, how many ounces correspond to 140 grams?

A. My metric is just as bad as yours.

MR. ZABEL: I make no claims to mine, Dr. Hornshaw, but I think it's less than half an ounce.

DR. HORNSHAW: 227 grams is eight ounces, so 140 is --

MADAM HEARING OFFICER: About five ounces.

MR. BONEBRAKE CONTINUES: Four to five ounces sound about right to you, Dr. Hornshaw?

DR. HORNSHAW: Yes. "At page five of his testimony, Dr. Hornshaw refers to fish consumption studies in California and Michigan of anglers. A, please explain why these studies are relevant to Illinois anglers." These studies are relevant to

Illinois anglers because they are studies of fish consumption by anglers, rather than by the general public. B: "Is there any reason to believe that Illinois anglers may have different consumption patterns?" There's no reason to believe that Illinois anglers may have different consumption patterns than anglers from California or Michigan.

MR. BONEBRAKE CONTINUES:

Q. Do you know, Dr. Hornshaw, that the California study that you cite involved primarily the consumption of ocean fish?

A. That's correct.

Q. Are you aware of any studies or analysis concerning whether individuals eat greater quantities of motion fish, as opposed to freshwater fish or whether there's an inverse relationship?

A. I'm not really conversant with that, no.

Q. Are you aware of any studies that address the question of how often anglers eat what they catch?

A. Well, that's, basically, the premise of the California and Michigan studies is to try and determine people who admit to fishing, how much they actually eat of their catch.

Q. Are you aware of a Wisconsin study that

addresses the levels of hair mercury levels between women who fish and those who do not?

A. No, I'm not.

Q. Do you know if U.S. EPA has determined average fish consumption rates in connection with its CAMR rule in reconsideration?

A. I don't know anything about the CAMR rule.

Q. Do you know what the CAMR rule is?

A. It's the rule that U.S. EPA has directed the states to implement, I believe. Like I said, I don't know much of anything about the CAMR rule.

Q. Have you read any of the supporting materials of U.S. EPA relating to the CAMR rule?

A. No, I have not.

Q. So you don't know if U.S. EPA has determined an average fish consumption rate of eight grams per day in connection with the CAMR rule?

A. I do not.

Q. Are you familiar with fish consumption studies in Maine or with respect to Lake Ontario?

A. No, I'm not.

DR. HORNSHAW: C: "Why hasn't Illinois collected the same type of information?" I have no way of answering that. I could guess that it

may be a funding problem.

MR. BONEBRAKE CONTINUES:

Q. Have you ever asked, Dr. Hornshaw, anyone within the Agency about conducting such a survey or otherwise collecting such information?

A. Typically, that would not be my Agency that would do that kind of stuff. That would be, either Department of Natural Resources, Illinois Natural History Survey, or possibly Illinois Department of Public Health. We don't do very many surveys of any kind.

Q. Do you know if the Illinois Environmental Protection Agency has discussed such a survey with any other state agency within the state of Illinois?

A. Not that I'm aware of.

DR. HORNSHAW: D: "Are there any subsistence fishermen in Illinois?" There is no reason to believe that Illinois would be different than any other jurisdiction in not having subsistence anglers. As I said, a statement shows 225 meals per year or 140 grams per day from literature reports of high-end fish consumption as the most appropriate value for the unlimited consumption advisory category in order to account for high end consumption by either subsistence

anglers or avid sports fisherman.

MR. BONEBRAKE CONTINUES:

Q. Dr. Hornshaw, are you aware of any information that, in fact, establishes the presence of subsistence fishermen in Illinois?

A. Without mentioning names, other than myself -- I'm kidding about that part. The Agency received an inquiry from an individual who holds a commercial fishing license and sets nets in the Kaskaskia River below Carlyle Lake and in Carlyle Lake, specifically, targets catfish, especially flathead catfish. This individual, when he became aware of our advisories for predator fish, had one of his 11-pound flathead catfish analyzed by a commercial laboratory and found .38 parts per million in that flathead catfish. This individual also told me, in several discussions, that he was very concerned by the levels of mercury because he and his friends eat ungodly amounts of catfish each year, so yes, I, personally, know one, plus, subsistence fisherman by talking to this person on the phone many times.

Q. And with that exception, are you aware of any other evidence of subsistence fishermen in Illinois?

A. Not directly, no.

MR. HARLEY CONTINUES:

Q. Are mercury fish advisories posted at fishable waterways of the state.

A. No, they are not.

Q. Are mercury fish advisories given to every licensed fisherman -- fisherperson -- in the state of Illinois?

A. Not really. The DNR information booklet is available where licenses are sold, and whether the vendor gives out the booklet or not, I can't answer. They are supposed to.

Q. Is complying with the fish consumption advisory a condition of maintaining a fishing license in the state of Illinois?

A. Absolutely not.

Q. Are mercury fish advisories given to consumers of fish that are caught in Illinois who may not have actually caught the fish? For example, members of families, people who are eating at restaurants.

A. Not directly. The Department of Public Health has set up some outreach programs. For instance, they try to make fish consumption information available at WIC clinics and pediatricians offices, for instance. I don't know how successful that is.

Q. Are mercury fish advisories directed to unlicensed anglers, like children, who are part of susceptible population by the State of Illinois?

A. No.

MR. ZABEL CONTINUES:

Q. Would your friend at Lake Carlyle be considered in the insensitive population?

A. Yes.

Q. Are you a fisherman, Doctor?

A. Yes.

Q. Have you ever caught a largemouth bass?

A. Several.

Q. Did you eat it?

A. Of course.

Q. Thank you.

A. Not anymore. I've discovered perch and crappy are much better.

Q. But if you were to catch a largemouth bass, would you --

A. I would probably throw it back.

Q. I like crappy myself.

A. I should probably throw walleye into that conversation, too, and trout.

Q. Is that because you prefer the others to

eat?

A. Absolutely.

MR. BONEBRAKE CONTINUES:

Q. When the studies address subsistence fisherman are the subsistence fishermen typically addressed native Americans?

A. Not in Illinois.

Q. There are no reservations -- Indian American reservations in the state of Illinois. Is that right?

A. That's correct. I think we are at No. 34. "At page five of his testimony, Dr. Hornshaw states that the review of fish consumption literature provides convincing evidence that sport anglers may consume amounts of sport-caught fish that could allow them and their families to exceed health-based limits for chemical contaminants in their catch. With respect to this statement, A, is this conclusion based on the presence of different kinds of contaminants in fish, including PCB's?" Yes. This is just a general statement. B: "Does the Agency agree that exceeding any such limit may, but will not necessarily, cause a health impact?" Yes. 35: "Is it correct that, at least, some other states have less rigorous fish

advisory action levels?

MR. BONEBRAKE CONTINUES:

Q. You are moving quickly, and I know we are getting to the pointed hour for you, but I did have a couple follow-ups with respect to 34. Do you know, Dr. Hornshaw, what portion, if any, of any exceedence of the methylmercury fish advisory standards in Illinois is attributable to mercury arising from the emissions of electric generating units?

A. I have no way of answering that.

Q. I had a related question for you, and if we can take a look at Exhibit 31 it was earlier entered into the record, and it is a copy of a federal registered document, one of the reconsideration documents, 40-CFR, first page 33388, and it was published June 9, 2006.

A. I have been given a copy.

Q. If you could turn with me to page 33392, please.

A. Okay.

Q. I would direct your attention to the far right column in the paragraph starting, "As these IDI tables show." Do you see that, Dr. Hornshaw?

A. Yes.

Q. You drop down about halfway in that paragraph, you will see the sentence starting with "Finally"?

MADAM HEARING OFFICER: 33392.

DR. HORNSHAW: Yes.

MR. BONEBRAKE CONTINUES:

Q. Far right hand column. That sentence reads, "Finally, only when eating solely freshwater fish from the 99th percentile for fish tissue utility attributable MEHG do the 99th percentile recreational fisher and native American subsistence fisher show IDI's above one." Do you see that?

A. Yes.

Q. And his "MEHG" is that methylmercury?

A. Yes.

Q. Do you know what an "IDI" is?

A. No. You will have to tell me what that acronym stands for.

Q. At the bottom of the middle column on that same page, there's a sentence that starts at the very bottom of that column, "An IDI of less than one is equal to a utility attributable exposure lower than the RfD." Do you see that?

A. Okay.

Q. And then a little above that reference, again, in the middle column, you will see the Index of Daily Intake, as referred to as the IDA. Again, the middle column about 10 lines up.

A. Okay.

Q. Referring back do the sentence that begins with "Finally," have you ever seen this document before, Dr. Hornshaw?

A. No, I have not.

Q. So do you know if it's true, then, that only those eating solely freshwater fresh from the 99th percentile for fish tissue utility attributable methylmercury at the 99th percentile of recreational fisherman in native Americans exceeds the U.S. EPA's reference dose?

A. I have no way of commenting. It looks okay, I guess. I don't know.

Q. You don't know, one way or another, if that's a correct statement?

A. I hate to take this out of context and just say yes.

Q. Do you know if Illinois -- if Illinois fisherman, other than the one individual that you have already mentioned to us, are in the 99th percentile for

fish consumption among United States fisherman?

A. This one individual may be in that top percentile. I couldn't speak for others.

MR. HARLEY CONTINUES:

Q. Are you familiar with children age 15 and younger who fish.

A. In general, yes.

Q. Have you, or any of the commissions or agencies on which you participated, ever estimated the total number of children within that susceptible range of age 15 or less who may be fishing in Illinois waterbodies?

A. I have no way of answering that.

DR. HORNSHAW: 35: "Is it correct that, at least, some other states have less rigorous fish advisory action levels than the 0.05 parts per million unlimited fish consumption level in Illinois, including machine Minnesota and Texas?" I can't answer for Texas. The mercury advisory issued by Minnesota are based on the same criteria used by the SEMP (phonetic) and are actually a bit more rigorous than Illinois advisories in some instances. I have an exhibit from the Michigan -- I'm sorry, Minnesota Department of Health website that gives information on their fish

advisories for mercury, and I believe you can make an exhibit out of this. And what I'm going to be passing out is current as of whenever the mercury addendum is formally adopted and just about everybody will be using the same criteria, but for now, this is what Minnesota is doing I believe.

MS. BASSI CONTINUES:

Q. I'm sorry. Did you say this is -- what you're handing out is what Minnesota is doing now or what it will do?

A. It's what's on its website now, but it's subject to change whenever the addendum that we just made an exhibit out of is finalized.

MADAM HEARING OFFICER: Exhibit 33, the draft to that addendum.

DR. HORNSHAW: The draft protocol, yes.

MADAM HEARING OFFICER: If there's no objection, we will mark this as Exhibit 34. Seeing none, it is exhibit 34.

(Exhibit 34 was admitted.)

MR. BONEBRAKE CONTINUES:

Q. Dr. Hornshaw, are you familiar with either the fish advisories of either Florida or Mississippi?

A. No. I'm only familiar with the Great Lakes states because that's the states I deal with in the Great Lakes Fish Advisory Task Force. I'm a little familiar with Iowa and Missouri because we share a border, even less with Kentucky. Do you want me to go ahead with the statement to answer this one, then?

Q. Sure.

A. There are three minor differences between Minnesota and Illinois levels of concern. Minnesota rounds their values to one significant figure, whereas the Fish Contaminant Monitoring Program uses two significant figures. Minnesota recommends no consumption of women of childbearing age and children under 15 for fish above the action level of 1.0 milligrams per kilogram. And I said previously that we are going to be doing that, as well. Minnesota recommends no consumption by women beyond childbearing age and men over 15 above 2.8 milligrams per kilogram, whereas the Fish Contaminant Monitoring Program makes this recommendation above 5.62 milligrams per kilogram.

MR. BONEBRAKE CONTINUES:

Q. So Minnesota, essentially, for sensitive populations has adopted already the revised standard that is in the addendum that we discussed earlier.

A. Other than the rounding that I mentioned. The addendum has two significant figures, and currently, Minnesota uses one.

Q. And did Minnesota adopt that as a revised standard in the last couple of years? Do you know, Dr. Hornshaw?

A. What's currently on here now?

Q. Correct.

A. I believe so, yes.

DR. HORNSHAW: "Is it correct that the average fish tissue mercury level in Illinois is lower than the average fish tissue mercury level in, at least, 75 percent of the other states?" I have no way of answering this question. I might guess that we have less mercury than the northern tier states, again, talking with my colleagues within the Great Lakes Fish Advisory Task Force, but that's about the best I can do.

MR. BONEBRAKE CONTINUES:

Q. When you say "the northern tier of states," what states are you referring to?

A. Minnesota, Wisconsin and Michigan, within the Great Lakes states.

Q. And your understanding is that average fish tissue levels in Illinois would be below the

average fish tissue levels in those three states?

A. Based on discussions I have had with them and based on the fact that we have our advice for predators and they have their advice for predators and other fish, as well, which indicates to me that there's mercury in their fish than there is in ours.

Q. Do you know if U.S. EPA has done a comparative study of fish tissue mercury levels among the various states?

A. I'm not aware of that, no.

Q. So you have never seen such a study, Dr. Hornshaw?

A. No, I haven't.

MR. ZABEL CONTINUES: I believe you have indicated you are a fisherman. Is that correct.

A. I try.

Q. I believe you indicated you are going fishing next week. Is that correct?

A. Let's put it this way, I spend too much money chasing fish.

Q. Are you going next week?

A. Leaving tomorrow morning, yes.

Q. Where are you going?

A. Kinewa (phonetic) Peninsula in Michigan's

upper peninsula. I'm not going to be more specific, in case somebody wants to chase me down.

Q. I've never know a fisherman who didn't protect his favorite fishing holes, but why are you going to Michigan?

A. Intensive fish sampling effort.

Q. With a line, I assume?

A. Yes.

Q. Was there any particular reason you chose Michigan?

A. Because they have trout that we don't have here in Illinois, and walleyes are easier to catch than we have in Illinois.

Q. Did you consider the regulation for mercury emissions when you decided to go to Michigan?

A. I hope not.

Q. No further questions.

MADAM HEARING OFFICER: Anything further for Dr. Hornshaw? Thank you very much. I also want to thank all of you. Mr. Bonebrake, Ms. Bassi, Mr. Zabel, Mr. Forcade, etc. I appreciate your courtesy shown to Dr. Hornshaw and to Dr. Keeler and to the other witnesses this week, and I hope we can continue next week in the same vein, and I look forward to seeing you

all Monday at nine a.m.

(At which point, the hearing was adjourned.)

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 IPCB, Springfield, Illinois, all parties to the rulemaking proceeding touching upon the matter in controversy aforesaid and such rulemaking 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 30th day of June, 2006.

_____

HOLLY A. SCHMID
Notary Public -- CSR
084-98-254587