STATE OF ILLINOIS)
)
COUNTY OF C O O K)
IN THE CIRCUIT COURT OF COOK COUNTY, ILLINOIS
COUNTY DEPARTMENT - LAW DIVISION

IN THE MATTER OF:	)
WATER QUALITY STANDARDS AND	)
EFFLUENT LIMITATIONS FOR THE	) R08-9
CHICAGO AREA WATERWAY SYSTEM AND	) (Rulemaking -
THE LOWER DES PLAINES RIVER:	) Water)
PROPOSED AMENDMENTS TO 35 Ill.	)
Adm. Code Parts 301, 302, 303	)
and 304.	)

TRANSCRIPT OF PROCEEDINGS had in the above-entitled cause before Hearing Officer Marie Tipsord, called by the Illinois Pollution Control Board, pursuant to notice, taken before Sharon Berkery, CSR, within and for the County of Cook and State of Illinois, at the James R. Thompson Center, 100 West Randolph Street, Room 9-040, Chicago, Illinois, on the 31st day of January, A.D., 2008, commencing at 9:00 a.m.

APPEARANCES:

ILLINOIS POLLUTION CONTROL BOARD:
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Ms. Alisa Liu, P.E., Environmental Scientist
Mr. Anand Rao, Senior Environmental Scientist
Mr. Tanner Girard, Acting Chairman
Mr. Nicholas Melas, Board Member
Mr. Thomas E. Johnson, Board Member;

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY:
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REPORTED BY: SHARON BERKERY, C.S.R.
CERTIFICATE NO. 84-4327.

HEARING OFFICER: Good morning. My name is Marie Tipsord, and I've been appointed by the Board to serve as Hearing Officer in this procedure entitled Water Quality Standards and Effluent Limitations For the Chicago Waterway System and Lower Des Plaines River, proposed amendments to 35 Ill. Admin Code 301, 302, 303 and 304. Docket No. 408-9.

To my immediate right is Dr. Tanner Girard, the acting chairman and lead board member assigned to this matter. Also present, to his immediate right, is Nicholas Melas and Thomas Johnson at the very end, two of our board members. To my immediate left is Anand Rao, and to his left is Alisa Liu from our technical staff.

I want to remind all the witnesses they are still sworn in, and we are continuing this morning with Midwest Generation, LLC's questions for Mr. Chris Yoder. And we'll discuss any -- we'll discuss how we proceed if Midwest Gen gets in today.

And again, I will remind everyone they're sworn in and let's begin.

CHRIS YODER,

called as a witness herein, having been previously duly sworn and having testified, was examined and testified further as follows:

EXAMINATION (Resumed)

BY MS. FRANZETTI:

Q. Good morning, Mr. Yoder.

A. Good morning.

Q. With respect to where we are beginning, it's in Section H of my questions. The topic is Extrapolation of Thermal End Points. And Attachment 3 to your prefiled testimony deals with that subject matter.

Just preliminarily, before I get to the prefiled Question No. 1, I believe you mentioned yesterday the topic of extrapolation in your testimony, but could you briefly describe when -- what is extrapolation and when do you use it as you are implementing your ranking approach?

A. Extrapolation is used to fill in what is missing, one of the missing endpoints of the four endpoints that we talked about yesterday, that's

produced by the model. And it's just the way the science is, not every study produces every endpoint.

Some produce only part of all the possible experimental endpoints. That's just sort of the lay of the land.

So to -- we initiated this procedure to make the model more equitable and to what we thought functioned better. And so, it's -- but it's based on, sort of, the average differences between different groups of fishes and families of fishes, the average differences between the optimum and the upper avoidance and some of the other experimental measured endpoints, like the temperatures and so on.

Q. So stated another way, for a given species on the RAS list that you're using to come up with your thermal criteria from each of the endpoints, your database may have a gap of no literature value for a given fish species that you're utilizing, so that you then have to create a value to put into your -- as one of your inputs; correct?

A. Yeah, that's correct.

An easy example is where the data

is primarily based on field observations. And as I indicated yesterday, you really can't produce lethal endpoints with field studies.

So for some of those species, they will not have an experimental laboratory direct lethal endpoint. So what we do is we extrapolate a lethal endpoint based on -- in this case, it would be the upper avoidances -- and the relationship within that family or that subfamily of fishes where data does exist.

Q. Can you maybe -- stay with that last example you just gave us. Can you describe -- now I'm on Question 1.

Can you describe and explain the procedure you follow to actually extrapolate a value for a given thermal endpoint when literature values are not available for a given species?

HEARING OFFICER: Excuse me, Mr. Yoder, before you do, I believe he started off referring to as Attachment 3 also Exhibit 16 to the record.

MS. FRANZETTI: Yes.

BY THE WITNESS:

A. I'm refreshing myself with Exhibit 16,

the section that describes that.

Okay. This procedure was established by the IOEPA methodology, and we simply followed through with it in the update.

Missing parameters are estimated by calculating relationships between six thermal parameters that were collected as part of the raw data compilation for each species. Estimates of missing thermal parameters included calculation of the differences between the optimum and the upper avoidance temperature, the optimum and the upper incipient lethal or chronic thermal maximum, the difference between the optimum and critical thermal maximum.

There was -- it's showing the upper avoidance temperature and the upper incipient lethal temperature, differences between the upper avoidance temperature and the critical thermal maximum and differences between the upper incipient lethal temperature and the critical thermal maximum. So what that did, that gave us dimension across the full range of response, from optimum all the way to lethality.

Q. Mr. Yoder, could you state the page

number that you're reading from --

A. Page 50.

Q. -- from Exhibit 16?

A. Page 50.

Q. Fifty.

Mr. Yoder, moving to my Question 2, although I'm going to change it a bit, because in Question 2 I'm asking you where in the 2005 Lower Des Plaines report can the extrapolation formula be found.

Based on -- can it be found there?

A. I'm not sure.

Q. Oh, okay.

A. I'm looking.

Q. What I was going to suggest is it, instead, in Exhibit 16 somewhere?

A. Well, yeah. Exhibit 16 is the -- I wouldn't say it's a Genesis document, because the Ohio EPA documents are the Genesis documents for the procedure, but it's repeated in Exhibit 16 on Page 50.

Q. And I do see where you were reading from on Page 50 with the preface, "Estimates of missing thermal parameters included calculation of

the differences between" -- and then that was the sixth thermal endpoint and/or laboratory methods that you've already read.

What I don't see, or didn't see, in looking through this, is whether -- where, if at all, any formulas are given for how one does this estimating by calculating the differences between those factors that are listed in 1-6 on Page 50.

A. Well, there -- I'm not sure there's a formula here.

Q. Okay.

A. There is a set of, basically, determinations of differences between different measured endpoints to establish the estimated or the average differences, which is -- and these are listed in Appendix Table Z(2) in Exhibit 16.

So if you can -- and, unfortunately, the appendix tables do not have page numbers. But it's almost to the --

Q. Almost to the back. Almost to the last page.

A. And it's Appendix Table Z(2) conversion factors also with the standard air calculated, as well, that are used to estimate

temperature criteria that are in Appendix Z(3), which is nothing more than a listing of the model input variables that we use for the Ohio River and also use for this project.

Q. Can you look at Appendix Z(2)?

A. Yes.

Q. All right. Can you take the first entry there for the fish family? And I'm going to mispronounce that name. Can you pronounce it?

A. Yes. Lepisosteidae --

Q. Okay.

A. -- which it's a common --

HEARING OFFICER: Can you spell it for the court reporter?

MS. FRANZETTI: I've got it. L-E-P-I-S-O-S-T-E-I-D-A-E.

BY THE WITNESS:

A. These are the fishes known as Gars, G-A-R.

BY MS. FRANZETTI:

Q. And under the first column, UAT, which is Upper Avoidance Temperature Optimum, there's a value, "1.5 (plus or minus 0.3)." That's the conversion factor for that fish species?

A. Yes. Well, for that family.
Q. Family, excuse me.
A. It's done by family.
And, in some cases, subfamilies, or more than one family, live together.
Q. And what is that -- when do I use that?
A. If -- for instance, if you're missing -- if you're missing a value; okay?
Q. For a fish in this family?
A. Yes.
It's probably not the best example --
Q. Why not?
A. -- to look at. Because it only has one relationship between the upper avoidance and the optimum.
If you look at -- let's --
Q. Well, stay with it for a moment, because that's part of my question.
So for that family of fish, there's only a conversion factor available, if you're trying to take an upper avoidance temperature value and turn it into an optimum value?

A. Yes.
Q. Okay. What if I want to do one of the things that's in the next five columns, I don't -- I don't have a conversion factor; correct?
A. Not for that family.
Q. So then, what do I do?
A. You use the average.
Q. Average what?
A. At the bottom. It's just the average of all fish species.
Q. Oh, okay.
A. It's a stepwise process. You try to get as close as you can, but we're limited --
Q. By the available literature?
A. -- by the available literature. And that's not uncommon --
Q. Okay.
A. -- in water quality criteria development.
Q. I understand. Really, I'm just trying to understand how you do what you do.
So if I go to Appendix Table Z(2), if there is not a conversion factor for getting the missing endpoint I'm trying to get, I go down to the

bottom to the average of all these fish families and/or, as you said, the species in some cases, and I use that average value to get my -- to calculate my missing endpoint; correct?

A. Yes.

Q. Okay.

HEARING OFFICER: Excuse me, Ms. Franzetti, also you've been referring to the 2005 LDP report, which was Attachment 2 to the testimony --

MS. FRANZETTI: Yes.

HEARING OFFICER: -- Exhibit 15.

MS. FRANZETTI: I'm sorry, I've had --

HEARING OFFICER: We've all been living with it so much that it went by me at first, too. But thank you. Sorry to interrupt.

MS. FRANZETTI: That's the problem with prefiled questions before exhibits are numbered. I'll try and catch that as I'm going through.

BY MS. FRANZETTI:

Q. Mr. Yoder, has anyone else followed this extrapolation approach in deriving thermal

criteria?

A. I'm not aware of anything else.

Q. Moving on to Question 3 -- 3(a), I'm going to rephrase it a bit.

Mr. Yoder, the conversion factors you've just shown us in the appendix, did you or your people at MBI develop those conversion factors?

A. I developed those -- those are actually holdovers from the 1978 Ohio EPA methodology.

Q. So these --

A. So we simply used those, we did not calculate new relationships.

Q. I think you're anticipating 3(b) of my questions, which is fine.

So these were conversion factors established back in 1978 when the original database was created; correct?

A. That's correct.

Q. And they have not been changed in any way, based on the added 200 new studies that you referred to in Page 6 of your prefiled testimony; correct?

A. That's correct.

Q. Do you think it would improve your conversion factors if you did update them based on those 200 new studies?

A. Well, I mean, in all likelihood, some may change because there were additions of brand new species. So we might fill in some of the gaps that exist.

I really -- unless I really took a look at it, I'd be guessing.

Q. Moving on to Question 4.

If literature data on only one of your thermal endpoints for a given species was available in your database, were all three of the remaining endpoints used in your fish temperature model developed by extrapolation from the single available endpoint?

A. If only one value, experimental value for an endpoint, was available? I believe we did that for the ORSANCO study.

Q. So you would extrapolate to get your other --

A. I believe so.

Q. -- thermal endpoints?

A. Frankly, I'm not sure.

Q. Well, let me ask it a different way: Part of what I'm trying to understand is, do you have any baseline or threshold requirement, minimum requirement, for having at least two out of the four thermal endpoints from the literature values before you fill in by extrapolation, or can you have, as this question asks, as little as just one literature value for a single thermal endpoint and extrapolate the other three from that?

A. No. What I'm doing -- I'm looking at Appendix Table Z(3) in Exhibit 16 and...

Q. Why don't you actually tell us what Appendix Table Z(3)'s purpose is?

A. This is actually the -- these are the thermal tolerance values. Again, the four baseline input values to the model.

And for each species, it lists the optimum, the mean weekly average temperature for growth, the upper avoidance temperature and the upper lethal temperature. It also lists some associated spawning periods and temperatures that fish have been observed to spawn at -- that's kind of ancillary to our subject right here.

In that table there are -- besides

some of the values adjacent to them to the right of the value, there may be an X listed.

Q. Yes, I see that.

A. That indicates, then, that that value is an extrapolated value.

Q. And in the footnote on the last page of Appendix Table Z(3), X is best estimate based on available data, see conversion factors used in table Z(2). Okay. So that's where we see what values were extrapolated.

Now, and I'm sorry, I'll try to speed this up.

This Appendix Z(3), does it cover all of the fish species and more that you used in your RAS lists for the three designated uses you calculated thermal criteria for?

A. Yes.

Q. So this will tell me -- if I take your RAS list from Exhibit 15, I go through Appendix Z(3), I will see by looking at a given species on the RAS list in Appendix Table Z(3), if there's an X next to the particular endpoint, it tells me it was based on an extrapolated value?

A. Yes.

Q. Do you know offhand, based on your Table 3 in Exhibit 15, which -- can you tell from looking at that table which of those are based on extrapolated values?

HEARING OFFICER: On Page 14, just to...

BY THE WITNESS:

A. No. Those really -- you wouldn't be able to tell that, because these are the outputs of the model. The extrapolated values are the input variables of the model.

You're looking at the output here.

BY MS. FRANZETTI:

Q. Oh.

A. So if I could be so bold as to be helpful here.

Q. I would love you to be helpful.

A. When we talked Appendix 3 yesterday --

Q. Excuse me?

A. When we talked about Appendix 3 yesterday.

Q. Yes.

A. Appendix Table 3 --

Q. (f) was it?

A. I believe.

HEARING OFFICER: Yeah, 3(f) in Exhibit 15.

THE WITNESS: Do you know the page number, by any chance?

HEARING OFFICER: Actually, yeah, it would be 64.

THE WITNESS: Sixty-four, okay.

HEARING OFFICER: There's 1(f) and then it's just right after that.

THE WITNESS: Yeah. Appendix Table 1(f). They go 1, 2, 3 for the different tables.

BY THE WITNESS:

A. So if you're -- are you looking at that --

BY MS. FRANZETTI:

Q. I am.

A. The optimum growth avoidance and upper incipient lethal temperature listed for each of those species are the same as listed in Appendix Table Z(3) in Exhibit 16, except these do not indicate which are the extrapolated values. You would have to give -- you have to use Exhibit 16 to

use this method, basically, is what I'm getting at.

Q. Okay. You did not footnote Appendix Table 1(f) with the Xs to denote what was an extrapolated value; correct?

A. Yeah. These tables, actually, are part of the model output, so...

Q. Okay.

MS. WILLIAMS: Can I ask a redirect at this point?

HEARING OFFICER: Yes.

BY MS. WILLIAMS:

Q. Mr. Yoder, Ms. Franzetti asked you if there were any extrapolated values that were based on just one thermal endpoint. And looking at this Appendix Table Z(3) --

HEARING OFFICER: From Exhibit 16?

MS. WILLIAMS: Right, from Exhibit 16.

BY MS. WILLIAMS:

Q. I'm looking at it, I guess, to see if there's any with three Xs.

Is that the proper way you would go about defining an answer to that question?

A. Yes. That's what I was looking at, too.

And I don't see any, so I -- and I also can read on Page 50 where it says that at least three of the six parameters used in the extrapolation process had to be available for a species before the procedure was used.

HEARING OFFICER: Page 50 of Exhibit 16?

THE WITNESS: Yes.

HEARING OFFICER: I know that's a real pain, but when people read the transcript, they're not going to know which one we're looking at.

MS. WILLIAMS: Especially because we're looking at 15 and 16 together.

HEARING OFFICER: Together, right.

BY MS. FRANZETTI:

Q. Well, actually, Mr. Yoder, I just realized, one of your four thermal endpoints is a calculated value, in and of itself; isn't it?

A. Yes.

Q. Which?

A. The mean weekly average temperature for growth.

Q. Right.

So that one, is calculated from the get-go for every species; correct?

A. Right.

Q. So we only have, actually, three that can originate from an actual literature value; correct?

A. Yes, you're correct.

Q. So if there are two Xs on there for a given species, then we did only start with one literature value for that species?

A. Yes. But there are more -- this is where it gets a little confusing.

Q. A little? Sorry, couldn't resist.

A. Well, there's more experimental endpoints than just the optimum upper avoidance in upper lethal. We talked yesterday that there's actually three different upper lethal experimental endpoints. There's, obviously, the upper avoidance temperature within the optimum, there's an optimum on the final preferendum, which we lump together.

So there can be more than one experimental endpoint available, and yet only have one real value in this table. So that's a possibility too.

Q. Okay.

I think we -- I'm moving on to Question 5, and I think we've answered it but I just want to be sure.

The question was, Is there any way a reviewer of your report to the Illinois EPA can determine from the information it contains which values in your report are actual literature data and which are estimated based on your extrapolation procedure? And the answer to that is what we just went through?

You start back at the appendix we were discussing to Exhibit 16, and you move your way forward into Exhibit 15 to determine whether any of those extrapolated values wound up in your thermal criteria in Table 3 of your report; is that correct?

A. Yes.

Q. Moving on to No. 6.

Do you know whether in any of the sets of RAS lists you used in doing your three sets of thermal criteria for the three designated uses that you gave to Illinois EPA, whether the endpoint values for the top three most sensitive species, respectively, in each of those three lists were

based on extrapolated values?

A. This is going to take some looking at.

MS. WILLIAMS: Yeah, because -- let me get this straight. We're talking about all -- there's four general uses RAS lists?

BY MS. FRANZETTI:

Q. Let me clarify what I'm talking about.

If you look at Table 3 on Page 14 of Exhibit 15 and we have your thermal criteria for modified use RAS 1, your thermal criteria for modified use RAS 2 and then your secondary contact indigenous aquatic life thermal criteria. And staying with the 100 percent column, for example, under the modified use RAS 1 optimum, there is a criteria of 71.2 degrees Farenheit.

How do I determine whether that is an extrapolated value or an actual literature value?

And if you -- I understand it sounds like you don't -- you can't just look at Table 3 and tell me, "All right, it's this one, it's this one, it's this one." So given that you can't do that, tell me how I go -- how I would do it if I'm willing to take each one of these values and try and figure out if they're extrapolated or not.

A. You would have to go back to -- okay, for example: The -- in Table 3, the first option, modified use RAS 1, you would have to go to -- well, let's stick with modified use RAS 2, since we know where that Appendix Table is on Page 64 of Exhibit 15. You would have to go to, actually, Page 67 and find the -- okay.

For example, let's look at the short-term survival number, because that's really where the most sensitive species --

Q. And that's the 88.7 degrees Farenheit number?

A. Yes.

Q. Okay.

A. So you'd go to Page 67 on Exhibit 15, you would go under the column View ILT Exceeded. The first species is white sucker.

Okay. So I know it's a white sucker. I would go to Appendix Table Z(3) on Exhibit 15 -- or 16.

Q. I'm sorry, give that me again.

Once I know it's white sucker from Appendix Table 3(f) of Exhibit 15 I go where next?

A. Into Appendix Table Z(3) of Exhibit 16

and I find white sucker, common white sucker. And I look across at the upper lethal values, and it's a literature value, it's not extrapolated.

Q. Okay.

A. So that's how you would determine for any of these results, whether it was --

Q. Can I just ask you to stay with Appendix Table 3(f) for one more moment?

Assuming I was trying to verify whether the optimum value was literature based or extrapolated, when I go to -- when I go to Appendix Table 3(f), I'm looking down instead the Optimum Exceeded column?

A. Right.

Q. And I think what I'm not understanding is where -- how do I spot which species here I'm supposed to look at under Optimum Exceeded? I'm not following how I determine which of those species listed under Optimum Exceeded is the basis for the optimum value in Table 3.

A. That's on Page 66. So if you're interested in the optimum exceeded, if you look under the Optimum Exceeded column --

Q. Right.

A. -- and it's the first species, northern pike.

Q. Oh, it's -- I'm sorry, that's what I was missing. It's always the first species you get to, that's the most sensitive species; correct?

A. Right. That encompasses 100 percent of the RAS, that's what that column is. If you want to know 50 percent, you count down half.

Q. Okay. Thank you.

But moving on to Question 6, and I think your answer is no, but let me just make sure.

So in any of the sets of RAS used in your report to Illinois EPA, Exhibit 15, are the endpoint values for the top three most sensitive species extrapolated? You can't tell us that just sitting there, you'd have to go through this exercise you've just described for us; correct?

A. Yeah, for each option you'd have to go through and determine that.

Q. Now, Question 7.

When your fish temperature model database was expanded, the additional couple hundred studies that were added, did you check to see how the new literature data that were added to the

database compared to the old extrapolated endpoints, those new data replaced -- and I recognize that assumes something, let me back up.

"Do you know whether, at all, any of those 200 new studies there was an actual literature value for a given species that before in your database you only had an extrapolated value? Do you know if that occurred?

A. Yes.

Q. Did you or anyone else at MBI do a comparison between when an actual literature value arrived how did it compare to the previously extrapolated value?

A. No, I did not -- we didn't do like a species-by-species breakdown of the changes. We just -- but we did accept the literature value over the extrapolated value.

Q. So you haven't done any exercise to try and see how good are your extrapolation procedures?

A. Well, there is something in Exhibit 15 that gets at that.

Q. What is that?

A. It gets to the ends result of it. It

is Table 2.

Q. That's the fish temperature model outputs for four RAS variations of the Illinois general aquatic life use designation?

A. That's correct.

Q. How does that get at that?

A. Okay. The first one -- the first option set of options there is general use original RAS from the 2004 draft of this report. And that is based entirely on the Ohio EPA 1978 methodology and literature database.

And so, the -- if you look at the 100 percent short-term and long-term survival and you compare that to the other RAS options, the other three options below that are based on the updated literature database, the last one is exactly the same.

Q. You lost me on the last one. The last one is the same?

A. The bottom one, the general use RAS 3 that reduced some from the equation.

Q. I'm sorry, I'm not following the last one is the exactly the same. If I look at the general use original RAS values under 100 percent,

and I look at the general use RAS 3 at the bottom, was that where I was supposed to look?

A. If you look at the -- the short and long-term survival values are the same.

Q. Okay.

A. Some of the other values are different. But those are the two that, I would say, are of interest. Because that's what the recommendations for --

Q. Right. But I don't know whether the original survival long-term and short-term was based on an extrapolated value or not.

I may be comparing literature to literature here; correct?

A. It's possible.

Q. Yeah. Because you can't tell me whether or not any of these values in the 2004 draft are extrapolated or not; correct?

A. Yeah, I would have to have the original Ohio EPA raw database in front of me to make that determination.

Q. Right.

A. And I don't have that in front of me.

Q. So we don't know whether we're

comparing literature to literature or extrapolated to literature or extrapolated to extrapolated as we sit here today; correct?

A. Yeah, I can't tell you that right now, with certainty.

Q. Excuse me just a moment.

Okay. Moving on to Section I, Representative Aquatic Species. Question No. 1, in Footnote 2 to Table 1 of Exhibit 15, you state that the species noted were, quote, "Collected in the UAA study segment between 1994 to 2002."

To what data does your statement refer?

A. Well, as I recall, I was provided a table of species that came from the approximate section of the lower Des Plaines River that I understood was subject of the UAA study, and in sitting in on the biological subcommittee meetings, that was my understanding. So -- but that's the data I was provided.

Q. Mr. Yoder, so are you saying that this reference to -- let me -- let me for the record read the entire sentence. "While these species were not included" -- excuse me, let me back up another

sentence.

"We also tested the influence of species additions of adding yellow perch, sauger and walleye, while these species were not included by the review of historical distribution data, and occurred in very low numbers in the 1994 to 2002 databases" -- and it doesn't sound like a list. It sounds like some sort of, quite frankly, it sounds like stream survey data taken during the period of 1994 to 2002, which showed that those three species, yellow perch, sauger and walleye occurred in very low numbers.

So do you recall seeing any stream survey databases for the lower Des Plaines River?

A. Yeah, that's -- I was provided a summary of sampling data that took place between 1994 and 2002.

Q. Who did that sampling?

A. I believe I -- oh, I would assume it was sponsored by Midwest Generation.

Q. Okay. And who gave you those databases?

A. EPA.

MS. WILLIAMS: Can you clarify --

BY THE WITNESS:

A. It was a table of data.

MS. WILLIAMS: Chris, can you clarify when you say "EPA," which one?

BY THE WITNESS:

A. Region 5.

BY MS. FRANZETTI:

Q. And is that table of data anywhere included in the appendices to Exhibit 15?

A. No. Not the exact reproduction of that.

But anything under the Membership Rationale column that has a 1994 to 2002, appeared in that table that I provided.

Q. In the Membership Rationale column, which is table...

A. Table 1 of Exhibit 15.

Q. So you did rely, to some extent, on at least -- strike that.

At least for purposes of identifying the RAS list that you worked from to derive your thermal criteria, you relied to some extent on stream survey data that you were provided by U.S.EPA, in which you believe was sponsored by

Midwest Generation; correct?

A. Yes.

Q. Okay.

HEARING OFFICER: Excuse me. Mr. Yoder, is there any way that we could get a copy of that?

THE WITNESS: I am -- I may have --

MR. SULSKI: I'm trying to figure out if it's in the Lower Des Plaines UAA Study Attachment A.

THE WITNESS: Yeah, we can try and find it.

HEARING OFFICER: Thank you.

MR. SULSKI: And it may already be an exhibit because we have data on fisheries from both EA and MBI.

MS. WILLIAMS: But if it's not in the record, we'll try and find it. And try and provide it.

HEARING OFFICER: Thank you.

MS. WILLIAMS: Can I ask a redirect at this time?

BY MS. WILLIAMS:

Q. I guess this is sort of a general

question that I thought of yesterday that didn't necessarily fit in a particular place.

But when you develop these RAS lists in your report, was it your intention that the Illinois EPA or whoever their decision maker regulator was, would use those as they were given, or did you expect that they would be modified in some way?

A. Well, the option is always there for a user to modify it. But the intent, especially with the general use, is to pick a list that represents what eventual compliance with general would incorporate. And that's the essence of restoration.

We have to have a target to shoot for. And that's the essence of RAS use and virtually any water quality criteria developed.

MS. FRANZETTI: Can I have the answer read back?

(WHEREUPON, the record was read by the reporter.)

BY MS. FRANZETTI:

Q. Moving on to Question 2 on Pages 8 and 9 of your prefiled testimony.

You describe how you selected the

species you considered representative of each of the three use categories you considered. But it appears for your general use RAS list, you included all species on which temperature data were available.

And if that's correct, please explain how your approach to the general use RAS list is consistent with your stated or prefiled testimony?

A. Is it possible for you to point to a specific place in my testimony?

Q. Okay. Give me a second.

I think you're going to have to read, Mr. Yoder, basically, the whole first paragraph of Page 8, the Representative Aquatic Species list.

And if I misunderstood your testimony, in terms of my statement that how you selected the species you considered representative, please feel free to correct my misunderstanding. And maybe that's -- I don't have a problem with starting with that question in terms of how did you select the species for your general use RAS list?

A. You want me to read my testimony?

Q. No, because what I'm trying to

understand is what criteria you use for -- who got on the list for general use?

A. Membership of the list for general use is based on the realistic expectation of species that would occur in a particular river segment under conditions. And I'm interpreting general use to meet the minimum Clean Water Act goals, which, in this case, you have to use some assumptions because it's so general.

But it means compliance with what we all understand is baseline water quality requirements. Then the species I put on the general use RAS list are representative of what should be in the Des Plaines River when it fully attains the general use.

Q. Okay. In the step from what you were -- what you -- when you start looking and deciding which species may be representative of general use, to the actual placement of them on the list, what my question is asking you: It seems you get influence to some degree by whether or not temperature data exists on a given species in your database.

Do you do another -- that's my

point. Do you do another cut, so to speak? Some of you guys, although I think you're representative of general use, you're not making the list because I don't have much thermal data on you.

A. That Table 1 only includes species that have thermal data. If I were to generate a list of species that were possible in the Des Plaines River, it would be larger than this list.

Q. Okay.

A. Species that did not have thermal data were not listed on Table 1.

Q. Right.

A. I think that's where --

Q. Right.

A. -- we're having the difficulty.

Q. I understand.

A. If you look in Appendix Table Z(3) of Exhibit 16, there's more than 49 species in that table. I believe there's almost 90-some.

Q. Right.

A. So we're not selecting every species that has thermal data, we're selecting species that are representative of a particular river segment

that also have thermal data.

Q. Right. So -- but there's two criteria for getting on the list.

Do I even think you're representative, and if so, is there any thermal data on that species? And if the answer is yes to both questions, you may make it onto Table 1; correct?

A. Yes.

Q. Okay.

MS. DIERS: Can we have just a moment, please?

(WHEREUPON, discussion was had off the record.)

MS. FRANZETTI: May I proceed?

MS. DIERS: Thank you.

MS. FRANZETTI: You're welcome.

BY MS. FRANZETTI:

Q. Question 2(b).

Can you tell me what species dropped off the RAS list because there was not thermal literature data available on those species?

MS. FRANZETTI: Counsel, I really don't appreciate conversation in the middle --

MS. WILLIAMS: I think he's explained this already, and I was just --

MS. FRANZETTI: I'm looking for examples.

MS. WILLIAMS: I think he explained they had started with species that there was data on, is all. I think you're asking him --

MS. FRANZETTI: No, he didn't start with species which there was data on. He said he starts first with what does he think are representative species. Then his second step is do I have thermal data for all those species, and the ones he doesn't drop off the list.

BY MS. FRANZETTI:

Q. Who dropped off the list?

A. I know there were species that are there that we don't have verbal data for. I would have to have that original table to tell you that though.

Q. And where's -- is the original table in either Exhibit 15, 16...

A. No, it's not. It's the one we were

trying to determine if it was part of the record already.

Q. Oh, the 2000 -- I'm sorry, the 1994 to 2002 data?

A. Yes.

Q. All right. So what you're telling me is once I see that 1994 to 2002 information, I can look and any fish that was on there as present in a given section of the waterway, whether it be Chicago Sanitary Ship Canal, Upper Dresden Pool, all of those fishes would have started on your list, your RAS list, for given designated uses. And the ones I no longer see in Table 1 I just compare the two and that's what dropped off, due to the lack of literature value data?

A. Right. And I --

Q. Okay.

A. And I can't off the top of my head --

Q. No, that's fine.

A. -- I would be guessing.

MS. FRANZETTI: That's fine.

MR. ETTINGER: Can I ask a couple of follow-ups here?

HEARING OFFICER: Identify yourself

for the record, please.

MR. ETTINGER: I'm sorry, I'm Albert Ettinger and I represent the Sierra Club Prairie Rivers Network and some other people.

BY MR. ETTINGER:

Q. That '94 to 2000 data, that was all in the Lower Des Plaines and the Sanitary and Ship Canal and the Chicago River; is that correct?

A. Yeah, I think it was just the Lower Des Plaines.

Q. Just the Lower Des Plaines.

On Page 8 of your report you say, "The general use supports a diverse warm water fish assemblage but is expected to occur in the least disturbed free-flowing habitats of the Lower Des Plaines and similarly sized rivers in the region." Sorry, this is Page 8 of what has been marked as Exhibit 15.

What similarly-sized rivers in the region did you look at?

A. Well, that's -- I mean, the Kankakee River is a tributary to just downstream of that segment, so I obviously looked at that. And that's -- the other membership rationale is

historical presence, and I used the 1979 version of the Fishes of Illinois to help with that. And so...

HEARING OFFICER: Excuse me, is that the publication?

THE WITNESS: Yes, it is.

HEARING OFFICER: By -- who published the 1979...

THE WITNESS: If I can read the citation. Smith is the author.

HEARING OFFICER: I apologize for interrupting.

MR. ETTINGER: That's okay.

HEARING OFFICER: I just wanted to get the reference in. That's fine. That's sufficient.

BY THE WITNESS:

A. It's the State Fish Book of Illinois, basically.

BY MR. ETTINGER:

Q. And so, how did you use the State Fish Book?

A. Well, I mean, it's a practice just to look at regional species that might be regionally relevant, especially in a degraded waterway.

Because, obviously, some of the more sensitive species are likely not to be present or even historically present. So you have to have an expectation that if things get restored to what the clean water echo is, that the species are going to return.

And if you're going to basing criteria to meet that use, they have to be compatible. That's the concept.

BY MS. FRANZETTI:

Q. Moving on to Question 3.

On Page 9 of your prefiled testimony, it is stated that, quote, "Only the general and modified RAS list relied on sample data from the Lower Des Plaines. The secondary contact RAS is a general collection of, typically, tolerant species that are usually found in the highly degraded and modified waters."

I think based on what you've just testified to, you've explained that your reference to sample data is to that 1994 to 2002 stream survey summary table you were given by U.S.EPA; correct?

A. Yes. That and the Fishes of Illinois.

Q. Oh, I understand. But Fishes of

Illinois, that's not what you meant by sample data; is it?

A. That's sample data.

Q. Oh, that is? Okay. All right.

And -- well, then why for your secondary contact RAS list wouldn't you have also said you relied on sample data, it includes the Fishes of Illinois book?

A. Because the concept of the second -- in my view and what I was led to believe, it's, basically, a nuisance use. It's the most minimal protection afforded by state water quality standards, and it's -- by the time you get to that use, you're left with the only most highly tolerant fish species.

So you really don't need a lot of sample data to know that. You need some experience in having been in those water bodies to know what species are left over.

But the concept is, it's just a very minimalist protection category for the protection of, I think, what we referred to as nuisance conditions. And you can usually find those things in the -- what's called the free fronts in

water quality standards, free from acute lethality, et cetera.

Q. All right. Moving on to Question 4. Again, referring to Page 9 of your prefiled testimony you state, quote, "The secondary contact RAS is a general collection of typically tolerant species that are usually found in highly degraded and modified waters."

Can you explain what you meant by your phrase "highly degraded"?

A. The worst of the worst. The examples we have are the both physically and chemically polluted waters.

Q. So when you say "physically," you mean things like absence of any adequate habitat?

A. Yeah, gross habitat modifications from a -- from the benchmark of a natural river use system.

Q. Okay. Moving on to Question 5.

Referring to the last sentence at the bottom of Page 9 of your prefiled testimony. It stated that, quote, "The tables I provided on pages 13 and 14 of my report illustrate temperatures that should not be exceeded in order to protect a given

percentage of the species in each RAS grouping for the four primary thermal endpoints."

Now, I'm going to ask you to explain how you're using some of the terms in that statement. First, what is the -- what is your intended meaning of the term "protect"?

And if it's easier for you to say protect a given percentage to combine that, that's fine.

A. Okay. So let's, once again, look at on Page 13 and just, for ease of reference, let's look at the first category, the general use original RAS.

And again, for --

Q. Could I actually stop you?

A. Yes.

Q. And maybe for clarification, is it really, though, Table 3 that are the recommended thermal criteria for the three uses you were looking at or the -- well, I'm sorry, for the modified use with the two variations and secondary contact that you were recommending to IEPA here?

MS. WILLIAMS: I don't understand the question, do you?

BY MS. FRANZETTI:

Q. I'm trying to make sure I understand the difference between Tables 2 and 3. Table 2 is general use; correct? Just general use with your various variations.

And Table 3 is modified use and secondary contact.

A. That's correct.

Q. All right. And the reason I'd like to use Table 3, is the modified use I think we went over yesterday was -- well, at least there was some basis to say that's what was applicable to the Upper Dresden Pool. So that's why I'm asking would you mind using, by way of example, the information for either the modified use variations included in Table 3?

A. Okay. Well, we'll look at the one we talked about yesterday, which is the second modified use option. Modified use RAS 2.

So again, looking at the short-term survival row, what that implies is consistent with my statement, is that temperature of 88.7 degrees should not be exceeded to assure protection of all of the RAS for that option. And,

of course, the extension is that it will protect the use.

MR. ETTINGER: May I follow up on that?

MS. WILLIAMS: I would like to follow up first, if that's okay.

MR. ETTINGER: Okay.

BY MS. WILLIAMS:

Q. I think there might have been some confusion created by that question, at least in my mind. Is there anywhere in your report here, Exhibit 15, where you recommend to the regulator whether the general use or the modified use or the secondary contact, for that matter, are applicable to the designated uses for the lower -- for the Upper Dresden Island Pool.

A. I don't believe so, so no.

HEARING OFFICER: Ms. Dexter? Identify yourself, please.

MS. DEXTER: I'm Jessica Dexter, ELPC.

BY MS. DEXTER:

Q. So are you saying that when you say protected species, you're just protecting for lethality, specifically short-term lethality, is

that what "protect" means?

A. Yes, protecting for that particular endpoint, yes.

MR. ETTINGER: May I ask a further question along that line?

BY MR. ETTINGER:

Q. In terms of protect, would those temperatures protect fish larvae?

A. These are -- some of the data is based on larval tests. But again, it's a mix of all life stages.

Q. Are larvae, generally, more sensitive to temperature than adult fish?

A. I'm not real positive about that. I'd have to look -- I'd have to dig that out of the raw database.

MS. FRANZETTI: Mr. Ettinger, you missed the testimony yesterday that most of the literature values are based on juveniles, larvae, first born, first-year young.

BY MS. FRANZETTI:

Q. With respect to moving on to Question 6, near the bottom of Page 9 of your prefiled testimony, you refer to potential RAS

lists. Can you explain what you mean by "potential"?

A. Where in my testimony?

Q. Bottom of Page 9.

Did you find it, Mr. Yoder?

MR. SULSKI: Bottom of Page 9, top of the last paragraph.

BY THE WITNESS:

A. I see it. I apologize.

Potential RAS lists. So you're asking what's the meaning of potential?

BY MS. FRANZETTI:

Q. Yes, what's your intended meaning there?

A. The intended meaning is that that's what we would expect to potentially be representative of each one of those designated use tiers. So that the term "potential" --

Q. Is it -- let me ask a follow-up on that.

Is it intended to have a similar meaning to the meaning of attainability under the use attainability analysis?

A. Not necessarily.

Q. Okay.

A. I mean, I think it has some relevance to that, but it -- what we're trying to do is to say that -- we're trying to attenuate the derived criteria against the expectations that a particular designated use tier will be supported by those criteria. And the main ingredient, the main difference between the three designated use tiers is the RAS membership.

And again, those necessarily subsets of what really would exist out there.

Q. Okay. I'm going to move on to Topic J QA/QC Question 1.

For the proposed thermal water quality standards -- and this is back to your Tables 2 and 3 -- that are based on the literature data for the most sensitive species in your ranking approach, how was the validity of that literature data confirmed? And let me just read A and B so that you can answer it all at once.

What I'm looking for is did people review that technical literature that provided that value for a given endpoint to determine if they were acceptable, and if so, what criteria were used to

make sure that that literature value was reliable and credible?

HEARING OFFICER: Ms. Franzetti, excuse me. I was just reminded. We talked a lot about QA/QC yesterday.

MS. FRANZETTI: Okay.

HEARING OFFICER: Do you recall that? I mean, because I think some of this might have been covered yesterday. If not, I don't want to --

MS. FRANZETTI: No, no, I understand. I think, generally, in terms of what got into the database.

HEARING OFFICER: Okay.

MS. FRANZETTI: And so, I guess I would just ask -- maybe I can ask it a little differently to shortcut it.

BY MS. FRANZETTI:

Q. What I'm asking is, whether -- if -- when you get down to where your hundred percent column is based on what can be a single literature value or two literature values, does anyone take those out and look at them, scrutinize them, to make sure that they should be determinative of what the

recommended criteria is?

A. Yeah, I did that as part of the ORSANCO project. That's Exhibit 16.

HEARING OFFICER: ORSANCO, I think, by the way, would you spell it? I think it's the first time we've used it today.

THE WITNESS: O-R-S-A-N-C-O, all caps.

BY MS. FRANZETTI:

Q. So you went -- if I understand your answer correctly, for any literature value that is contained in Exhibit 16, you went and looked at the underlying study report, lab report, whatever one wants to call it, and made the determine it met your QA/QC requirements?

A. Yes, we --

Q. All right.

A. -- talked fairly extensively about this yesterday. I think I explained the procedure.

Q. Okay. Moving on to Question 2.

In the 1985 U.S.EPA guidelines, data compilers are advised to check their data sets to determine if the data are acceptable.

Well, let me skip this, because I think you've already answered what you did.

Moving on. Give me a moment, we may -- some of these may also -- the rest of these may also be --

HEARING OFFICER: You know what, I think this might be a good time to take a break.

MS. FRANZETTI: Sure.

HEARING OFFICER: I did want you to look on that 1994, 2002 data and get back to this after the break.

(WHEREUPON, a recess was had.)

HEARING OFFICER: Let's go back on the record.

MS. WILLIAMS: Our belief is that the information you relied on is contained in Appendix A. But we're not convinced it's in the same format. So he -- because we don't have his list to compare to. He thinks he has his list in his hotel room, and we will try to provide it this afternoon, first thing tomorrow, so that we can all compare and make sure.

HEARING OFFICER: Attachment A?

MS. WILLIAMS: Did I say Appendix A?

I'm sorry. Attachment A should have the substance of information but maybe not in the same format.

HEARING OFFICER: Okay.

Ms. Franzetti?

MS. FRANZETTI: Yes.

BY MS. FRANZETTI:

Q. Mr. Yoder, I'm going to try and condense Questions 2-7 into a single question.

What I'm trying to understand and learn from you is, with respect to QA/QC procedures that were applied to your database, are you familiar with what the 1985 U.S.EPA guidelines prescribe in terms of the type of QA/QC procedures that should be applied to a database, such as yours, before determining that the information is reliable and can be used as a basis for establishing criteria or standards? Are you generally familiar with what U.S.EPA prescribes?

A. Only generally. I think I went over that yesterday about my familiarity with the 1985 guidelines.

Q. I wasn't sure if it applied as well to the QA/QC. So all right.

Based on your general familiarity, can you tell me whether or not when you say you reviewed those literature reports and studies, that are included in your database, to make sure they were reliable and credible, did your review equal or satisfy what the U.S.EPA QA/QC guidelines are?

A. Again, I described what process I use to assure that in my testimony yesterday, and I am also not familiar enough with that document to say with assurance that what I did was equivalent.

Q. Unless the Board or hearing officer disagrees, I think we've covered No. 8 yesterday.

Moving on --

MR. ETTINGER: May I ask one question?

HEARING OFFICER: Sure.

BY MR. ETTINGER:

Q. Your report, did you ever discuss it with officials at the U.S.EPA?

A. The --

MS. WILLIAMS: Which report?

BY THE WITNESS:

A. Exhibit 15?

BY MR. ETTINGER:

Q. Yes?

A. Well, it was a product of a grant that we were awarded by Region 5, so they -- it was who the report was done for. So, yes, it was discussed with them.

Q. And did they review it with you?

A. Yes, they reviewed it.

MR. ETTINGER: Thank you.

BY MS. FRANZETTI:

Q. Well, given that Mr. Ettinger has brought that up --

HEARING OFFICER: Let me have Ms. Franzetti, and then we'll come back to you, Mr. Howe.

BY MS. FRANZETTI:

Q. Mr. Yoder, do you recall meeting with the U.S.EPA in or about October 2006 to discuss temperature criteria in your report?

A. I'm not certain of -- I'd have to look at my calendar to see what meeting I was at, because --

Q. All right. Well, you know what, I thought that might help you in terms of -- because I don't know how many meetings you tend to have with U.S.EPA. But do you recall in or about 2006 having

a meeting with them regarding your recommended temperature criteria?

A. Yeah, I think it was --

MS. WILLIAMS: Again, are we talking about the Lower Des Plaines --

MS. FRANZETTI: Yeah.

MS. WILLIAMS: -- or the ORSANCO?

Okay, you're talking about --

MS. FRANZETTI: Lower Des Plaines.

BY THE WITNESS:

A. My recollection of that meeting was, yeah, it did focus on the -- somewhat on the Lower Des Plaines. But it was really about the methodology.

BY MS. FRANZETTI:

Q. All right. Well, why don't you tell us what was discussed in that meeting.

A. Best I can recall, and it seemed to me it was more towards the winter than the fall. And I really would have to look at my 2006 calendar to tell you when it took place.

Q. Oh, I really don't care about the date, but let's get to the substance of the discussion.

What was discussed?

A. Well, the technical elements of the procedure and some of the issues surrounding that and what we might do to continue to improve it.

Q. What were some of the issues surrounding that, as identified in that meeting?

A. Oh, that's -- I'm trying to recall. But I think there were some -- most of the discussions centered around some of the concerns that some EPA staff had about the -- are we sure we're covering other ecosystem-related things that happen that may not be covered by dwelling on, you know, lethal endpoints and that type of thing, that was one issue. I think another issue was there was concern that even though you're protecting for the short-term survival endpoint, at the time you get down there you can also exceed the other endpoints for a lot of species.

And there was some concern expressed about that as well. So -- but it was more in the climate of a -- what can we look at through further applied research to make the process, perhaps, work better.

Q. And has anything been done to make the

process better by you?

A. Oh, I have an ongoing project.

Q. But I take it that's not finished yet?

A. No.

Q. Okay. So, at this point, you don't have anything to present that improves upon your --

A. No.

Q. -- Exhibit 15?

A. No, not yet.

HEARING OFFICER: Mr. Howe?

MS. FRANZETTI: Now --

HEARING OFFICER: I'm sorry.

MS. FRANZETTI: Oh, I'm sorry.

HEARING OFFICER: Mr. Howe had a follow-up as well.

MR. HOWE: Mr. Yoder, could you tell me --

HEARING OFFICER: You need to -- excuse me, you need to stand up and identify yourself.

MR. HOWE: All right. Mr. Yoder, could you tell me --

HEARING OFFICER: You still need to tell me who you are.

MR. HOWE: Oh, you said, "Mr. Howe," I'm sorry.

HEARING OFFICER: Well, I know, but the court reporter doesn't know that.

BY MR. HOWE:

Q. Peter Howe, H-O-W-E.

And my question to Mr. Yoder is, does his Exhibit 15 follow guidelines set out in the U.S.EPA Gold Book and Blue Book?

A. Not entirely.

MR. HOWE: All right. Thank you.

HEARING OFFICER: Sorry, Ms. Franzetti.

MS. FRANZETTI: That's okay.

BY MR. FRANZETTI:

Q. Mr. Yoder, did you get any written comments regarding your Exhibit 15 from the U.S.EPA?

A. I'd have to look to make sure. I believe I did, but I'm not 100 percent sure.

Q. Would you be willing to produce those?

A. If I can find them.

Q. Thank you.

MR. ETTINGER: Follow up on Mr. Howe's question piqued my curiosity.

BY MR. ETTINGER:

Q. How does your methodology divert from the Blue Book and Gold Book?

A. Well, there really isn't much difference between the two. The -- I think about the only thing we have in common with the U.S.EPA methodology is the calculated mean weekly average temperature for growth and perhaps the use of an optimum.

But there's no use of, that I recall, that I'm familiar with, in that document, that talks about upper avoidance temperatures and the -- it does reference things like upper-incipient lethal temperature, but it uses it in a different manner.

HEARING OFFICER: And what are the Blue Book and the Gold Book?

BY THE WITNESS:

A. The Blue Book, as I understand it, is the 1973 National Academy of Sciences Document on Water Quality Criteria. And the Gold Book is 1985 or '7?

MR. HOWE: Six.

BY THE WITNESS:

A. 1986, split the difference, EPA's update to their water quality criteria document.

HEARING OFFICER: Thank you.

MS. WILLIAMS: It would be portions of that document, probably not the whole thing, but portions of the Gold Book are included in Attachment V, the statement of reason.

HEARING OFFICER: Thank you.

Mr. Howe?

BY MR. HOWE:

Q. Peter Howe. Does that Gold Book or Blue Book recommend that 50 percent of the species not be included in the growth that is present in the streams? If I -- if I refer you to Exhibit 15, when you looked at growth -- I realize that you're not -- you excluded 50 percent of the growth consideration in that growth considerate.

You say, basically, you looked 50 percent, you kept 50 percent in the growth and you deleted the other 50 percent.

A. I'm a little confused. To clarify, I'll read what the procedure says.

Q. Okay.

A. What we compute is a seasonal average, this is through the summer season, and a daily max. The averages should be consistent with, and I'm reading from Page 12 of Exhibit 15, "One, 100 percent long-term survival of all representative fish species. Two, growth of commercially or recreationally important fish species. Three, growth of at least 50 percent of the nongame fish species."

And I think that is the 50 percent that you're referring to.

Q. Yes, it is.

A. Note, the Gold Book makes no recommendations on how to make these decisions.

Q. So it's conceivable for 50 percent of the fish, with your maximum temperatures, that two-week averages, a number of fish would not exhibit any growth or almost three months?

A. Well, that's quite a leap. What this says is, that the mean week -- the calculated mean week average temperature for growth can't be exceeded for 50 percent of the nongame species. However, if we stick to the growth that's commercially or recreationally important for those

species, it may well encompass more than 50 percent of the nongame species. It just depends on where these things fall. But it doesn't -- if that's exceeded, it doesn't mean fish are going to stop growing.

Q. We --

A. It's also a period average --

Q. Okay.

A. -- for the entire summer.

Q. We have a situation in which the period average for the entire summer can exist. And if that is the case, would -- I would -- say, red horse, would they exhibit growth, no growth for that time period?

A. It would be dependent on the specific set of criteria and the RAS list. And I would have to look at that specifically.

MS. FRANZETTI: Madam Hearing Officer, I would object at this point. We're well beyond follow-up. We have limited time with Mr. Yoder.

HEARING OFFICER: I agree, Ms. Franzetti.

I'm sorry, if we have time later,

we can get back into this.

BY MS. FRANZETTI:

Q. Mr. Yoder, finishing up on QA/QC, and again, I just want to make sure I do understand, the record is clear, on what level of QA/QC was applied to your database. With respect to my Question 9, which refers to Page 3 of your Exhibit 15 report, and this is in the second paragraph, I think it's the third sentence, where it says, "The original literature source was examined for relevancy, originality and completeness, as much as was possible, prior to accepting the data in the master database."

What was the intended meaning there "as much as was possible"? Because that doesn't sound like all the literature reports were reviewed for relevancy, originality and completeness.

A. They were.

Q. They were. So why the caveat "as much as was possible"?

A. Well, I mean, what are the boundaries on those previous terms? I mean, short of calling and updating an individual study?

I mean, I didn't do that, obviously. So that -- it had to fall within the realm of reason with the resources that I was provided to do this work.

Q. All right. Now, stay right there in your report. Going on to the next sentence, "The acceptance of, quote 'extrapolated,' end quote, i.e., without a direct review of the original publication citations, was done for some of the more comprehensive thermal effects compendia, such as Brown 1974, Wismer and Christy 1987, Pokenson 1990 and Bitenger, et al, 2000."

I don't understand what you mean by "acceptance of extrapolated citations."

A. What that means is, what these compendia do, they -- well, they're a compendia of multiple literature studies. So they did an exercise much like what I did.

And it make sense that somebody else already did that heavy lifting. And again, with the resources that I have available to complete these projects, it was basically myself doing this work.

There was no army of lab

researchers, you know, to support this. So -- and I was advised by members of the ORSANCO ad hoc committee that the original work was done for to use these references.

These were reputable references, it's common knowledge among those in thermal biology that these are the leading compendia.

Q. Okay. And then it goes on --

A. What they do, they cite literature just the same way I did. So for some of the data that made it into Appendix Z of Exhibit 16, I did not go and retrieve the original study, I took what the -- for some, not all for some, I took their value as cited in their study, that's what that meant.

So I did not go retrieve the original publication, I simply took what these leading researchers in thermo biology had already derived. That's what --

Q. I understand.

A. And extrapolated is in quotes in the report. So that's what I meant by extrapolated.

Q. And then it says, a notation was made about the extrapolated citation of such references."

Can you tell us where the notation is made? I mean, how do we know when you're relying on one of these compendiums and not your own review of a given laboratory study report?

A. I have to look at Exhibit 16 for that. I'm not really sure I'm --

Q. Tell --

A. That may have been -- I may have noted that informally, I'm not sure. It's like you can go into a reference, I have to look at the references.

Q. Would you prefer to, or can you do that over the lunch hour? Unless you think you can quickly find it.

A. I'm not sure, I have to dig into this report a little bit and figure that out.

Q. All right.

A. I don't know.

Q. Moving on then to Question 10.

MS. WILLIAMS: At this point, I'd like to -- I mean, I'm not objection to the question, I'm just suggesting that, as I read Question 10, it's a question for Mr. Twait and not Mr. Yoder.

MS. FRANZETTI: Well, I was going to,

actually, before I read it say that this is an example of where having to question Mr. Yoder before having questioned Mr. Twait is a problem. And this question presumed that that questioning --

MS. WILLIAMS: We can ask the question of Mr. Twait today, that's fine. I just don't want to take away from your time with him.

MS. FRANZETTI: I appreciate that. I think all we need to do for Question 10 is, if Mr. Twait can confirm, whether or not our understanding that the proposed Upper Dresden Pool Aquatic Life Thermal Standards, that the thermal values on which the period average limits are based, were based on the white sucker species literature data from Mr. Yoder's work?

MR. TWAIT: Yes.

MS. FRANZETTI: Yes, okay.

BY MS. FRANZETTI:

Q. So with that established, that the period average proposed thermal standards for the Upper Dresden Pool aquatic life use designation are

based on literature data for the white sucker species, Mr. Yoder, I'm going to move to Question A.

Given that it is only one species that determines the numerical water quality standard value, would you agree isn't it very important to determine the validity of that literature data that was the basis for the particular endpoint used in the rankings used to derive the thermal water quality standard?

A. I would agree with that.

Q. Do you -- can you tell us what technical paper did the white sucker upper lethal value that's being used to determine the proposed thermal standard for the Upper Dresden Pool aquatic life use come from?

A. I believe, as I recall, that it came from -- I believe it came from two different studies, one by McCormick and others in 1977 and the other one by Burns and Jones in 1977.

Q. Mr. Yoder, can I go on, or are you still looking?

A. No, I'm just making sure because what I recall doing, I think I took the average of those two studies.

Q. Well, that was going to be my next question. Since you're saying it's based on two studies, do you know what you did? Did you average the values?

A. I believe I did.

Q. Mr. Yoder, can you -- well, let me just ask it: Can you produce copies of those two studies that are the basis of the proposed period average standard for Upper Dresden Pool aquatic life use?

A. Not this week. They're in Ohio.

Q. But you're willing to make a copy, send it to --

A. Yes.

Q. -- Illinois EPA, who can, perhaps, distribute it in this proceeding?

A. Yes.

Q. All right.

And in doing so, would you mind checking whether you averaged them or did something else with respect to whatever the literature values were?

A. No. I'm reasonably sure I did an averaging --

Q. Okay.
A. -- just looking at the raw data compilation.
Q. Mr. Yoder, can you tell us where you looked -- well, first -- strike that.
Did you look somewhere in Exhibit 15 to provide me with the names of those two studies that were the basis of the white sucker value?
A. I looked in 16.
Q. In 16. Okay.
Now, can you direct me to where in 16 you found that information?
A. It's Appendix Table Z(1) and I -- again, this does not have page numbers, so it's a little difficult, but...
Q. Okay. Well, do I start looking for white sucker, as I look in this?
A. Yeah, I think it might help -- look for under Family for catastemday (phonetic). And then, when you find that, you'll find white sucker on the next page.
MS. WILLIAMS: I believe it's like the 12th page of --

MS. FRANZETTI: I'm there.

MS. WILLIAMS: Twelfth page of when you started the -- family.

BY MS. FRANZETTI:

Q. And I see white sucker under Species, and here's -- let me cut to the chase. Here's my problem: I go over to the Upper Lethal column, and I just -- there's a whole bunch of numbers there, the 15 in parentheses, 30, and then 8.9 in parentheses, 29, 29, 28.6. I just -- I don't what -- what that grouping of numbers is.

A. That's part of the raw data compilation. That's what the authors of those studies reported as their upper lethal endpoint.

The numbers in parentheses are the test acclimation temperatures.

Q. Okay. So the McCormick 1977 study reported all of those numbers to the left under Upper Lethal?

A. Yes. All of the numbers under Upper Lethal.

Q. Okay. And when say you took the average, did you start off by taking the average of all those reported values?

A. No, I took the highest acclimation temperature.

Q. So that would be -- there's two 21.1s for acclimation temperature. I think that's the highest; correct, for acclimation temperature?

A. Right. There's actually three results reported there. And each one has a footnote.

Q. Yes.

A. And you have to go back to the key to Appendix Z(1) to find out what those footnotes mean.

Q. Okay. But I'm just -- I'm just -- you said you didn't average all of these.

You instead took the values for -- from the highest acclimation temperature. And I thought that's the number in parentheses?

A. Right.

Q. Okay.

A. But there's three values reported for one of those.

Q. Okay. All right. You're a step ahead of me.

I just first want to establish that 21.1 is the highest acclimation value there.

A. Correct.

Q. But there's actually two entries for 21.1 with at least three values after each one. So do we combine those and then average them?

A. That's -- that's an option. And again, I'm recalling what I did. Okay?

I cannot tell you from this exactly what I did. The only thing I can do with certainty is go to Appendix Table Z(3) and look under the Upper Lethal column and show that I used a temperature of 31.5 degrees centigrade.

Q. All right. I understand you.

You can tell me you used 31.5 as the upper lethal value for white sucker, but you really can't tell me exactly how you got that number?

A. Well, I -- in looking at -- I recall that I did some averaging.

Q. Okay. You can tell me that much about how you got that number?

A. Yes.

Q. Okay.

A. And I could for sure tell you it was a result of averaging some of these numbers.

Q. Okay. And that, I guess, would also

apply -- now that I understand the columns, you may have also thrown in those two values from the -- is that the --

A. Bruns and Jones.

Q. From the Bruns and Jones 1977 --

A. Actually, I'm thinking back and that makes a lot of sense, that I did use that -- the average of those two values.

Q. Oh, maybe you just used the average of those two values?

A. Yeah. And this was --

Q. Okay. All right.

HEARING OFFICER: Excuse me, Ms. Franzetti.

You may have answered this yesterday, but did you keep any notes or any way that you can track back or provide us with the information on how you manipulated this?

THE WITNESS: I think I can, and that's what I'm not sure of. This project ended sometime ago, and we've gone to other things since. But I do have the original notes and documentation in Columbus, at my

office.

HEARING OFFICER: If we could get that, that would be helpful.

MS. WILLIAMS: What do you mean "get that"? Like all his notes, or for this species?

Because she's asking just about one species of all of these lists of species. So I just want to be clear.

HEARING OFFICER: Well, right this second she's asking about one species of all the species. But we've been talking for two days now about how --

MS. WILLIAMS: Right.

HEARING OFFICER: -- the numbers were generated.

MS. WILLIAMS: So you're --

HEARING OFFICER: And if we could get some indication, I think that might be helpful.

MR. RAO: Ms. Williams, when you said all notes his notes, is it like thousands of pages or --

MS. WILLIAMS: I don't know. I don't

know. I just want to be clear.

MR. RAO: We're not asking for like boxes of stuff, but a few pages, something, it would be helpful, because there is so much discussion about it.

MS. WILLIAMS: Okay. I think I understand.

MS. FRANZETTI: If I may add to that: I mean, the last day and, I guess, almost a half, has been helpful in improving our understanding of what Mr. Yoder did and how he did it. It has filled in a lot of the gray area.

However, as we're focusing on right now, the fact is, that his -- one or more of his numbers is taken from his table, whether it's two or three, and put into the Illinois EPA's proposed thermal water quality standards. Nothing is done, nothing is changed about that number.

So it becomes critical for us to understand the basis for that number. And with that in mind, I would ask -- I think it's probably directed at Mr. Twait, but,

obviously, subject to his counsel's agreement -- we need the Illinois EPA to identify for us -- we shouldn't have to go through all this questioning to understand it.

Which of your proposed thermal standards numbers are based on the same number as contained in Mr. Yoder's thermal endpoint tables? And for those, I would submit that it is reasonable to ask the Agency with Mr. Yoder, at least for those, to bring forward and clearly identify what were the studies on which -- you know, what studies -- just as we just started to do here for white sucker, what studies are those based on, to the extent there had to be then averaging of those values. If somebody could just give us clear record of how we got to these proposed numbers.

MS. WILLIAMS: I think I understand now. And I agree absolutely that to the extent the RAS list we chose focus on a particular most sensitive species that we will provide whatever we can find to support

those studies for those species that are --

MS. FRANZETTI: That are driving the proposed thermal --

MS. WILLIAMS: I think that's fine. I'm just concerned, as Mr. Yoder testified yesterday, you can change your input into that database. And once you -- you know, then it may become a different species.

I didn't want to be -- this to every study relied on for every species that can potentially become --

HEARING OFFICER: No. I think what we're all asking for is that -- what we are asking for is that, if the RAS' that were chosen, if there were five studies and for some reason he discarded three of them and averaged two, that we know that.

MS. FRANZETTI: And if I could add, as well, it would also be helpful to know for those, quote, unquote, "most sensitive" species numbers that are driving the proposed thermal water quality standards, are those numbers based, in whole or in part, on extrapolated values.

And I recognize, Mr. Yoder, you showed me how to do it, and it -- but it just really becomes the difference between this is a lot of work. And given that it doesn't have to be done on every single one of these species, can we at least provide -- and I think it would help the Board, it would certainly help my client -- to know to what extent these proposed standards are based on extrapolated values rather than even a laboratory test result.

MS. WILLIAMS: And without trying to go into what Mr. Twait's testimony will be, my understanding then would be we would be looking at two species, white sucker and I think bluntnose minnow, and we will get, to the fullest extent we can, any information about how the numbers that those are based on are based. Or were derived, extrapolated, which studies -- I would expect the Board would even probably need to have those particular studies entered in all of that for those two species.

HEARING OFFICER: Yes.

BY MS. FRANZETTI:

Q. Moving on to Question 11.

Mr. Yoder, with respect to the number of individuals, this is organisms, that should be tested in order to produce a valid test result, do you agree that every species has a sensitivity range/distribution to stressors?

A. Yes, I agree.

Q. Okay. Moving then to (b).

If you agree, does this suggest that a valid endpoint cannot be derived using only one or two individuals?

A. I think that's reasonable to conclude to a certain extent. I think any time -- you know, with any kind of environment sampling -- again, it depends on what kind of test it is.

But the fewer observations you have, I guess, the more -- just based on pure statistics -- the more likely to incur some type of error. But I'm trying to put it in perspective.

I think it should also be weighed against not having any information at all.

Q. And taking the next step, Question C.

Would you also agree that an

endpoint should not be determined using only one or more tests involving one or two individual organisms?

A. I think I kind of have to disagree with that one. I mean, these studies get published in peer review journals.

And I get the strong impression that's the gold standard that we hold everything up to.

Q. I'm sorry, what's the gold standard would he hold everything up to? Whether it's published in a peer review journal?

A. Yes.

Q. All right. So --

A. That tells me that scientists, who are part of that community of work, whoever reviewed that paper, accepted that.

Q. All right.

A. They might have commented on it, but they accept it.

Q. I think I understand. You're saying, "I disagree with that if the test is published in a peer review journal," because then you feel it's been properly vetted to be acceptable among the

scientific community; correct?

A. I think that's what we all operate by in science.

Q. Do you know whether your MBI/CABB database from which you derive you inputs for your Lower Des Plaines work, do you know whether it contains any of this type of data?

A. Yeah, I think we talked about one of those studies yesterday.

Q. And I believe that was marked as Exhibit 18 as an example, that your database does contain such studies?

HEARING OFFICER: We don't have an Exhibit 18.

MS. DIERS: I think 17.

HEARING OFFICER: Seventeen.

MS. FRANZETTI: Seventeen. Sorry, I'm bad on exhibit numbers.

BY THE WITNESS:

A. That's correct.

BY MS. FRANZETTI:

Q. All right. Moving on to E on Page 7 of your prefiled testimony. You state that, "Much of the new data that we found were based on CTM

studies."

Is it correct that a CTM value, albeit not an accurate one, can be obtained based on testing only one fish?

A. I would assume that's possible.

Q. Are you assuming it or do you know?

A. I don't know for sure, but you can do a CTM test on one organism.

Q. Okay.

A. Yes, I know that for sure.

Q. All right. Do you know whether, moving on to the next one, but paraphrasing it, do you know to what extent your database contains those type of CTM studies done on only one fish?

A. Well, again, the study, the exhibit we talked about is one such example, although, I believe it was two fish.

Q. But you can't really tell me to what extent your database --

A. Not without going back and looking at each individual literature source. And again, the standard we use for acceptability was the publication.

Q. Moving on to Question 12 then.

Did you ever conduct sensitivity analysis to evaluate the level and significance of the many sources of uncertainty in your model?

A. I think the -- we did a degree of that in the -- in Exhibit 15, by looking at the changes in the RAS membership, at least, and how that affected the endpoints.

Q. And we went over that yesterday. You're talking about when you put stone cat or you take stone cat out; correct, when you say changes in the RAS?

A. Yes. And that, as we discussed earlier in the day, the general use original RAS also incorporate different thermal endpoint data because it's based on the 1978 version of the database.

Q. Any other sensitivity analyses that you believe were applied?

A. No.

Q. Moving on to K. Temperature criteria options. This begins at Page 10 of your prefiled testimony.

Question 1, how did you decide what period of time the period average temperature

criteria should cover?

A. If I could clarify, it seems to me you're talking about the mid-June to mid-September time period?

Q. No. Actually...

A. Or all of them?

Q. Well, all of them in the sense that -- let me back up and explain the basis for that question.

Sometimes the period average is -- covers as long as a month, other times it covers only a couple of weeks. And I couldn't really discern what decides whether the period average is going to cover a whole month or it's going to cover some period of time less than that?

A. I understand now. The periods are intended to reflect a couple of things: One, that the summer averaging period, which really goes over about a three-month time period, from mid-June to mid-September, is intended to reflect the period of time where you potentially have the highest thermal stress, because that's the time of highest ambient temperatures and generally lower river flows for more extended periods of time, both of which can

result in the highest temperatures seen on an annual cycle.

So that was one aspect of it. The other aspect was -- and the reason some of these only occupy an approximate two-week period, is because during the fall -- the fall to winter to spring cycle, the temperature curve is changing very rapidly.

Q. It changes rapidly from season to season, is that what you mean, when you say from summer to fall to winter?

A. Yeah. So that -- so you need to -- you need to chop the time period up into smaller increments so that you don't have like a maximum that is exceeded for -- you know, if we did it on a monthly basis, say, in October, did it for the whole month, well, you might exceed that in early October and be below it in late October.

So it was just -- and gets back to one of criterion, to try to maintain the normal seasonal temperature cycle for a temperate warm water river. So this is based on looking at temperature changes through time.

And again, we did that in

Exhibit 16. And you can -- if you want me to point out one of the graphs, it kind of illustrates the concept, I can.

Q. Sure that doesn't sound like it would take us a long time.

And, I'm sorry, did you say Exhibit 16?

A. Yes.

Q. Page 42, by any chance?

A. I'm not sure that's a good example.

Q. Okay.

A. I'm trying to find a good example here. Maybe Page 31 would be better to look at.

Q. Page 39?

A. Thirty-one.

Q. Thirty-one?

A. Yes, 31. Actually, let's try Page 32, that may even be better.

Q. At the top of the page it's ORSANCO Temperature Criteria Re-evaluation, January 22, 2006. And this is Figure 4?

A. That's correct.

Q. Just so everybody is with us.

Go ahead, Mr. Yoder.

A. Okay. Let's take the upper left-hand graph as an example. And what this graph illustrates is the --

Q. This is the -- I'm sorry, just to make sure everybody is with us. It's the Ohio River temperature data Markland Pool --

A. Yes.

Q. -- 1994 to 2003?

A. Yes, that's correct.

And over that time period -- what this is, it's a frequency plot of all the uncertain temperatures by month of the year for all 12 months of the year. So each one of those -- it's called a box and whisker plot.

And the -- to explain, the box itself has lines. It has a line through the middle, which is the median or the 50th percentile value.

The top of the box is the 75th percentile.

Q. And the box, being the shaded area, and that would be, what I would call, the whisker coming out of the top of the box?

A. Right. That's the whisker -- it's the box, it's the shaded area. The bottom of the box is

the 25th percentile.

The whiskers -- the bottom line and the horizontal dash, that's called the whisker -- it is the statistical minimum. The whisker on top of the box is the statistical maximum.

If you see dots also above the whisker, those are statistical outliers, so...

Q. Oh, we got a lot of dots in February; correct?

A. More information that you needed.

Q. So we have a lot of -- whatever reason, there are a lot of outliers in February, just to make sure everybody knows what you're talking about.

A. We don't -- to illustrate the point, we don't need to get into all of that.

Q. Right.

A. So you can see that in January and February -- let's just look at the median temperature for simplicity.

The temperatures are obviously the lowest in January, they're next lowest in February, they're next lowest -- you have to go all the way to

December. And then, as we proceed into the late winter, early spring months, the temperatures start to increase rather at a much faster rate.

And so, all the way up into June and July, they tend to flatten out in August, September. And then, beginning in September and October through November and into December, they have the reverse effect where they decline very rapidly.

So that's just simply our four-season climate at work. And so, the reason -- to convert this into the way criteria -- seasonal criteria are generally expressed as some kind of a period average and a maximum not to be exceeded, then you have to make sure that your maximum or your average is not being exceeded due to natural circumstances, as much as possible.

So that's why, because of the rapid increase in the spring and rapid decline in the fall, you need to divide those time periods into smaller increments. So that you have -- in other words, instead of having three steps to walk up, you have six steps. You're basically trying to --

Q. Right. And if I can --

A. -- smooth it out as much as you can and still have something that's translatable into a table in a set of water quality standards.

Q. Right.

A. Ideally, you would do this on some continuous basis, but I'm not sure we figured out how to write water quality standards like that yet.

Q. And if we can boil that down into my level as I look at this graph, if I see a tall box, like I do for June, indicating a significant swing from the beginning of the month to the end of the -- or during the month, of about ten degrees, it looks like, from 70 to 80 degrees, am I -- if I'm using the 25th up to the 75th percentile?

A. Which month are you looking at?

Q. I was looking at June. I thought I was looking at June?

A. Yes.

Q. Okay.

When you have the wider box, or taller, thicker box, if that's an indication, you need to think about making your -- dividing up your period average for that month into smaller segments than a period average, one value for the entire

month; is that correct? Is that the way to kind of visually get sense of what these charts are showing us?

A. Yes. I mean, in all likelihood, the actual raw numbers that make up the lower half of that box and whisker occurred in early June, and the numbers that went into make up the upper half of that box and whisker occurred in later June or during the onset of summer.

Q. Right. So here for -- did you -- I'm sorry, I don't -- I just, quite frankly, don't remember off the top of my head: Did you make recommendations to the Illinois EPA with respect to what should be the intervals for the thermal period average standards they were developing?

And I think, as you know, if you look at the proposed thermal standards, they are -- throughout the year, the interval varies. Sometimes it's a whole month, sometimes it's a two-week period.

Did you give them recommendations on how to do that? You know, whether January, the period average, should be for the whole month, or should January be divided into two intervals for

period average purposes with a different period average at the beginning of the month versus the last couple of weeks of the month?

A. I don't mean to be a stickler on semantics, but we -- these aren't recommendations, they're options.

Q. Okay. You want me to use the term "option"? Okay.

A. I would prefer that, thank you.

Q. I'm sorry, I'm not purposefully --

A. I understand.

Q. -- misusing the terminology.

Okay. Did you give them options?

A. Okay. Exhibit 15 has two tables, Tables 4 and 5, Table 4 on Page 16. And it's part of this methodology, it's to produce the table by the monthly or bimonthly increments and state what the average and maximum options would be and to also site what the source of those options are.

And so, yes, Table 4 shows that and also Table 5 also shows that. Table 5 is just a more, I guess, a larger smorgasbord of options.

Q. Okay. So in the sense that both of these tables utilize the same time periods for the

proposed individual period average values, you -- this was the option you gave them, that January the period average should be for the whole month.

The same for February, March, but beginning in April, the option is April should be divided into at least two different period average values; correct? Because I don't see a difference between what's on 4 and 5 in terms of how the period average intervals --

A. No, they are the same. You're correct, they are the same.

Q. So in that regard, that's all I'm saying, is that that's how you thought -- how you thought, for purposes of the Lower Des Plaines River, the period averages should be divided throughout the calendar year; correct?

A. Again, I'm sorry, I don't mean to be so picky. But what I was doing here was simply transferring the customary way of expressing the methodology output.

Q. Okay. Let me try and clarify what your -- I think what you're telling me is, whether or not this was the Lower Des Plaines or it was the Hudson River in New York, your intervals, as I'm

calling them, whether you have a full month for the period average or whether you divide it in two, would be the same?

A. Yeah, I think it was reasonable to conclude that we're dealing with a temperate Midwest river, and it would have the same general seasonal temperature cycle, yes.

Q. Okay. Now, just to finish up on that, I understand this is your work. If I want to determine whether that this is generally accepted among the scientific community, can you site me to anything where I can look up the concept of period averages and how they should be applied?

A. You know, I'm not sure. There's -- the first thing you make me think of is pointing to an analysis of all the state standards that appears in Exhibit 16.

And there are some that use similar period averages, not all. Most states are -- have very simple temperature criteria.

It's -- I doubt if it's something you're going to see in the peer-reviewed scientific literature, because it's really more of a management application. It's very applied, and it's just a --

this is an outgrowth of the Ohio methodology, but again, the -- all the users or people affected by that were very aware of this. And I think we all agree, that yes, there are these seasonal cycles and we need to divide the year up like this to avoid the obvious problems.

MS. WILLIAMS: I apologize if I missed it, but did you refer to a page in Exhibit 16 for that table you're taking about?

BY THE WITNESS:

A. Oh, for the State summaries? It starts on --

MS. WILLIAMS: Well --

MS. FRANZETTI: That's okay.

MS. WILLIAMS: This is a question I think I wanted to bring up later in redirect, that, typically, the Board will ask the Agency to give them as much information as we have about what's out there in the different states.

BY MS. WILLIAMS:

Q. So if you -- could you tell us whether there's information in your Exhibit 16 about what's out there for other states and their temperature

criteria?

A. Yes, beginning on Page 11 of Exhibit 16 and going through Page 23, of that exhibit, is a summary of, at that time, the current state status of state temperature criteria.

Q. Could you just summarize, generally, for the Board what they would find by setting out those tables? If it's possible to generalize about the State tables.

A. Well, what most state temperature standards, at least sort of a preponderance of the trend in assembling this table, what I was most impressed by is most states have -- they have a -- some still have the amount of increase above ambient, which I believe Illinois still has, and they also have a summer season average and maximum temperatures and some lack that altogether. But it really goes back to what the National Academy of Sciences recommend in 1972, and that's really what most -- most state water quality standards, their first set of water quality standards, will usually be based on that document.

Q. And have many states updated their standards since 1972?

A. No, they have not. Very few states have up, what I call, upgraded the -- upgraded their standards beyond the recommendations of that report.

MS. WILLIAMS: Thank you.

BY MS. FRANZETTI:

Q. Mr. Yoder, turning to Question 2.

With respect to the term "daily maximum," as you use it, is this intended to be a temperature level that is never exceeded at any time in the water body, or is it intended as a daily average value?

A. I think that's up to the people that convert these into standards.

Q. You don't have a -- do you have a firm opinion on that or no? It's -- it depends?

A. My opinion would be, if these get exceeded, is everything going to crash? No.

Q. Okay. Question 3.

On Page 10 of your prefiled testimony -- give me just a moment here.

MR. ETTINGER: Can I just follow-up on that one second?

BY MR. ETTINGER:

Q. You said if these daily maximum are

exceeded, everything is not going to crash. How far would you be willing to see him go over the daily maximum before you'd become concerned that things would crash?

A. Well, in -- again, Midwest temperatures, I think to kind of distill this down into an understateable concept, I think that -- and I don't want to call a battle ground, but I can't think of anything else to call it. I guess it's the range of temperature where things kind of get at the precipice of bad things starting to happen.

And I look at that as a range of somewhere between 86 degrees to 90 degrees Farenheit. And you get too much beyond that range and, yeah, things are going to start precipitously happening.

But it's also a function of how often it happens, the duration of the exceedance, were there any opportunities for temperatures lower than that range, like a cool-down period. I think some of the more recent studies on thermal tolerance suggest that, you know, fluctuating temperature regimes, like we really do have in nature, the exceedances have to be tempered by almost equivalent

magnitudes below those numbers.

So we can't just take a river up to the standard, keep it there forever. I mean, there's this (indicating).

So it's a matter of frequency and duration and there's no silver bullet for determining that, I don't think. So what do we have left to do is to set a maximum of the management goal in operating -- that's the reality.

Q. You said '86 is where things start bad happening. Were you just talking about the summer or...

A. Yes.

MR. DIMOND: That misstates his testimony.

MR. ETTINGER: I'm sorry. Whatever.

BY MR. ETTINGER:

Q. Why don't you state your testimony. Were you discussing the summer when you were talking about '86, or were you discussing the whole year?

A. Well, it -- this summer was a stressful summer period.

Q. Would you be comfortable with temperatures going up to 86 in March?

A. No, I think that brings in other concerns besides precipitating a lot of avoidance in high heat stress effects.

Q. If the temperature went up to 86 for a few days in March, what effects would that have?

MR. DIMOND: Objection. Lack of foundation and lack of expertise.

BY MR. ETTINGER:

Q. You may ignore his objection. Please answer the question.

HEARING OFFICER: Excuse me, Mr. Ettinger, you don't get to make that decision.

MR. ETTINGER: I'm sorry.

HEARING OFFICER: I mean, we've been asking him several questions, I would like some explanation of why you think he lacks the expertise.

MR. DIMOND: There's no evidence that he's done any studies to support an opinion on that. And, clearly, I don't think -- no indication that the Agency asked him to give expert testimony on that issue.

MS. WILLIAMS: On whether fish are

more stressed in summer or the winter or -- is that...

HEARING OFFICER: Mr. Dimond, you did ask a question earlier, I just want to be sure we have your name on the record.

I think I'm going to allow it, with that caveat.

MR. ETTINGER: Could you read the question back, please?

(WHEREUPON, the record was read by the reporter.)

BY THE WITNESS:

A. Well, it could have the same effect that it might have in the summer, maybe even worse. Especially if the ambient temperatures were consistent with what they usually are in March, that's quite a -- that's a much larger increase in temperature of what usually happens in the summer.

So fish being acclimated to lower temperatures would react, I think, more to 86 degrees in March than in the summer. There's also some issues with -- this is a time, if not of reproduction, then just before reproduction. And there are some studies out there that suggest that

fish need to have cold temperatures in the winter so that they can produce their -- have enough energy to produce off spring. It's a term called Gametogenesis. And so, there is some evidence, especially the purchase persons. I think one study cited they need extended periods of 50 degrees or less to complete this part of their life cycle.

MS. FRANZETTI: Can I return to my line of questioning now? Okay.

BY MS. FRANZETTI:

Q. No. 4.

With regard to the calculation of daily maximums and period averages for the nonsummer months, why is your recommended basis the use of background temperatures rather than using the same approach as was used for the summer months?

Maybe back up, make sure everybody's with us and...

A. I understand.

Q. Your nonsummer month options are based on background temperature, not -- and are not based on these thermal endpoint values that we have been discussing up to now; correct?

A. Largely correct, yes.

Q. Okay. So that's what -- that's what my question is based on. Why in the winter do you turn to a different approach on which to derive thermal water quality standards?

A. Well, I think there's a number of reasons for that. One is -- is just the, I think, reasonable assumption is we maintain normal seasonal cycles so that we will maintain the seasonal -- the nonsummer seasonal functions of the organisms.

There's really no reason to believe that -- well, let me back up.

The second issue is, there isn't a lot of data -- I don't think there's an equivalent amount of information about those -- the affects of temperature on those other activities as there is on the -- what I would call the -- more of the survival avoidance-related issues that we encounter in the summer and during the less stressful months. It doesn't mean that those things aren't important though.

The other thing is if somebody -- and we did list in Appendix Table Z(3) of Exhibit 16, some spawning periods and associated low and high temperatures with those. But that doesn't

mean that if those are exceeded, that somehow spawning is going to not happen.

It may just take place earlier or later in the season. And there's enough natural issues involved that do affect the success in any given year of spawning of a particular species.

So it's kind of hard to separate out what's, you know, artificial versus -- and so on. So I think taking that all together, we haven't been too -- I don't want to say we're not concerned, but we haven't been as preoccupied with the nonsummer months as we have been with the more stressful.

Now, I can see some who say, "Well, isn't that preoccupation with lethal endpoints, and I think there is some validity to that. I think our whole water quality criteria culture has preoccupation with toxicity. And maybe we need to pay attention to other things.

And I think some of the comments that I did get from Region 5 were, "Hey, we've got to be concerned about some of these nonsummer season effects," and it does cause me to go look at that a little more closely. But again, I think if we

adhere to what is truly an ambient seasonal cycle, that we will protect those things.

Q. Well, let me ask you this: With respect to your use of background temperatures to establish the nonsummer months standards, is that a conclusion you have come to in the more recent past? I mean, did you used to do it differently, in terms of establishing the nonsummer months standards?

A. No, it's the way that we did it with the 1978 version of the methodology.

Q. Okay. All right.

A. And so the rationale --

Q. I wasn't sure by that reference to talking to U.S.EPA, I went back, thought about it some more, I thought maybe --

A. Well --

Q. You changed your mind.

A. -- maybe the thought process about what we're doing has matured a little bit. Because I think in 1978 it was the absence of endpoints dealing with the nonsummer season more than it was -- I mean, I think there was always this notion that, yeah, we need to maintain normal seasonal cycles.

Q. Okay. So that's really what's driving it, is the desire to maintain normal seasonal cycles; correct? It may be a little over simplified, but --

A. But for ecological reasons. Not just because -- to maintain the physical --

Q. And is another way to say that because we think it's good for the fish to do that?

A. Yes.

Q. Okay. With respect to -- I'm sorry, one more thing there. And I think if I understood you, that's the part -- generally speaking, you don't have as much study data, people just haven't looked at this nonsummer period as much as they have focused on the summer periods?

A. Yeah. And I think I'd refine that a little bit more. I think it's because scientists tend to look lethal endpoints --

Q. Right.

A. -- more than crowning endpoints.

Q. I just didn't want to repeat everything as you said. Exactly. Because, as you said, you think the driving force has been lethality. And that tends to occur in the summer

not the winter, generally speaking. Okay.

Now, recognizing that's the basis of your option to use background temperatures rather than the same approach as was used -- or the same option you gave IEPA for deriving the summer temperatures. For the nonsummer months temperatures, what is the scientific basis for your suggestion that the geometric mean of the background temperatures should be used for the period average temperature criteria? Why the geometric mean?

A. Well, as I recall, that was an outcome of the ORSANCO committee deliberations on our study that we did for them. And there was a lot of discussion about how do you pick a period average.

Because you don't get the same average temperature every year. It goes -- it can up and down. But you have to capture that somehow in standards and not have them exceeded.

So how do you take an ambient temperature database and derive an average that kind of reflects the upper end of that range, and it was felt that geometric mean did that. So that's why it was selected.

Q. And, I'm sorry, one more point.

The reason one goes to using background temperatures is because they're thought to be the most -- that's what's representative of what the normal seasonal cycles would be?

A. Well, yeah. It is what the normal seasonal cycles are. So that's the rationale for that.

Q. Moving on to Question 6 for the nonsummer months temperatures, what is the scientific basis for your suggestion that the 98th percentile should be used for the daily maximum temperature criteria. So now I'm switching.

I'm not talking about period average. Now, this -- for which you were advocating geometric mean of the background temperatures, now switching gears to the daily maximum criteria, and there you don't recommend the geometric mean, obviously, your option is the 98 percentile should be used.

Explain to us why you think, you know, that's the right thing to use?

A. Well, again, that was an outcome of the ORSANCO committee deliberations. And the reason for choosing a percentile rather than saying, well,

let's just take the maximum value ever recorded, is a couple things.

One, you want it to be -- you want it to represent the max, but you don't necessarily want that ruled by potentially outlying values. Those outlying values could -- I mean, to say there isn't measurement error in these databases is being a little bit naive.

I mean, there is the potential for measurement error. So that's a way of blunting some of that and being mildly conservative about that data.

And we do try to examine the data for outliers. And you can pretty much spot an erronous value.

But we don't always have the opportunity to go back to the source of that data and track that down. It's very time consuming and beyond our resources.

Q. Right.

A. So using something like a 98th percentile is what we feel is a reasonable approach to capturing that -- I suppose the problem then that that might precipitate is, well, what about the

other two percent of the time that you've seen it, potentially? So -- but I think that's just the nature of parameters, like temperature.

Q. Moving on to Question 7.

Have your suggestions for setting nonsummer months thermal criteria been used by any other state, and if so, where?

A. The only ones I know of are Ohio and ORSANCO. There may be some others in this state compendium that I mentioned before.

Q. Moving on to Question 8.

Is the concept for setting nonsummer month thermal criteria is to maintain the normal seasonal cycles, which I think is what you've said, is the normal seasonal cycle what the water body ambient data has shown to be normal for that water body? And if not, then tell me how you're using the term "normal" in the phrase "normal seasonal cycle"?

A. Yeah, it reflects what we would -- another way to describe it is what's the least impactive background type setting. And in the absence of having that, if you're in a thermally altered water body, you can use sort of the best

that's there, try to find a site that's not directly impacted by our artificial influences, or you can turn the modeling, predictive modeling.

Q. What if you're in a effluent dominated water body? What effect does that have on this establishment of background temperatures, et cetera?

A. That's where part of the decision about what you define as background water quality has to -- take that into account, I would believe, and...

Q. So that is a relevant consideration --

A. It can be.

Q. -- in determining what constitutes background?

A. It can be.

Q. Okay. You would not think it is unreasonable to take into account the effluent dominated nature of a water body?

A. Again, it depends on what that effluent is. But I'm not sure I would want to include thermally altered -- heavily thermally altered data into that. But as much reflecting the background as possible.

Q. Okay. I think what you're saying is,

if my use of the term "effluent dominated" includes the effluence from an electrical generating station, that you won't consider?

A. I would not recommend using that.

Q. If it means the effluence from a municipal waste water treatment plant, that you'll allow; correct?

A. Perhaps. But that's a decision the management has to make in consideration --

Q. Well, I mean, I understand all this is up to them. I'm trying to understand what you would say is reasonable to be considered in terms of establishing what your background, what are the normal seasonal cycles.

And now I'm applying it to I want you to assume we're dealing with an effluent dominated water body. And now -- and whether, in that situation, you can look at what the effluent is that dominates that water body for determining what's normal.

And I think what you're telling me is that, yes, you can, but I think you are saying but some effluents it's okay to look at to determine what's normal and some it's not. And that's fine.

I'm just trying to understand how, you know, you apply these concepts to an effluent dominated water body.

A. Again, I think that's a decision the management agency has to make. I don't think I can make that in this case.

Q. All right. No. 9.

Can you explain how maintaining the normal seasonal cycles will protect essential functions, such as growth gametogenesis and spawning as stated on Page 1 of your prefiled testimony. And if you couldn't tell from that, including explaining to me what gametogenesis means?

A. I did just cover some of that in my --

Q. You did a little bit.

A. -- rationale, but I'll do it again.

Okay. The rationale, again, is, if we maintain normal seasonal cycles, we're maintaining the seasonal cycles within which these organisms have developed through time, basically. So if we do that, I think it's reasonable to conclude that we're going to ensure that these functions that take place during those time periods will also be maintained.

Q. Okay.

A. Without setting, you know, no exceedance numbers, you know, the same way we do in the summer season.

Q. And gametogenesis?

A. Gametogenesis is the process by which the organism prepares itself for production. So in female fish, that's the development of eggs.

It takes a lot of energy to do that. And if they're not devoting the energy to that and devoting it to something else, like -- and these are cold blooded organisms.

So if they have warm temperatures in the winter, they're going to be more active. And they're going to devote energy to being active and not to reproduction.

That's sort of the concept that's involved there. So, as odd as it may seem, fish need cooler water at times, too. I mean, they...

Q. I understand.

A. Okay.

Q. Okay. Question 10.

If a water body does not provide the necessary habitat or conditions for spawning,

should that affect how the summer and nonsummer month thermal month criteria are derived?

I'm asking you to assume that the water body in question doesn't have the necessary habitat or other conditions to allow for spawning. It just doesn't occur in that segment of the water body to which this question applies.

So then, my question is, can you take that into account, does that affect how the summer and nonsummer month thermal criteria should be derived? In other words, spawning doesn't occur, I don't have to protect for spawning.

A. It possibly could if it's so severe that you have so few fish spawning. Perhaps you could focus on those species and do something different.

But I think -- I have a hard time believing that there's too many waters out there where some spawning isn't taking place.

MS. WILLIAMS: Can I ask a follow-up that I think is related to what she's getting at?

BY MS. WILLIAMS:

Q. Can you tell us which life stages of

fish are generally most sensitive to temperature or thermal stressors?

A. Well, the common knowledge is that for -- you know, for the high stress periods, that adults are the most sensitive -- more sensitive than juveniles. And that's the -- of laboratory studies, that it produces tolerance endpoints that are higher than what adults can deal with.

That's a reversal of logic from a lot of other concern, but that's been a longstanding belief in the thermal community. But turn that around in the -- I'm not so sure that applies to the nonsummer season period, I'm not sure there's much data that I'm aware of out there that would support it one way or the other.

HEARING OFFICER: Mr. Ettinger, your follow-up?

MR. ETTINGER: Yes.

BY MR. ETTINGER:

Q. Regarding areas in which we're not concerned with fish reproduction in the nonsummer months, are you familiar with the phenomena that's been referred to as "cold shock"?

A. Yes.

Q. Would that be a concern with regard to temperatures in the nonsummer months?

A. Yes, it is.

Q. And does cold shock affect adult fish?

A. Yes.

MR. ETTINGER: Thank you.

HEARING OFFICER: We need you to explain what cold shock is, please, Mr. Yoder.

THE WITNESS: Cold shock is when a fish is -- actually, it's the reverse of the high end lethality. There's also a low -- there's also a lower incipient lethal temperature.

And fish have great difficulty acclimating to rapidly dropping temperatures, so the classic cases are where you have a water body that's warmed up during the cold months -- and does a couple things. One is, it raises the activity of the organisms.

It also attracts a lot of fish. They like to be warm.

And the danger is that, if that would suddenly cease -- say it's a discharge

and it would suddenly cease, and they were subjected to ambient temperatures that are 15, 20, 30 degrees lower, it's lethal.

HEARING OFFICER: Thank you.

BY MS. FRANZETTI:

Q. Moving on to No. 11.

Are there any biological data assessments or sympathies that suggest that maintaining the normal seasonal cycle requires achieving the background ambient temperatures uninfluenced by man? In other words, that that's what you've got to use as background, something that is not influenced by man?

A. In the strictest sense, no, there isn't.

Q. Moving on to Question 12.

On Page 12 of your prefiled testimony it stated that occasional thermal exceedances are inevitable and may not necessarily result if a biologically impaired use. A conclusion that I have reached is that temperature excursions should be evaluated with direct biological measures in a receiving water body that is representative or reference or least impacted conditions.

My first question is that it's based on the fact I'm not understanding the first sentence versus the fully quoted second sentence. Is something missing there or -- you know, that's what my question is. Is the second sentence intended to follow from the first, not understanding that part of your testimony, if you could clarify.

A. Yeah, I think the two are -- there's a train of logic there that --

Q. Could you try and clarify what you mean?

A. Well, yes. It -- temperature is one of those parameters that we manage for that, taken literally, an exceedance would imply an impairment. Certainly in the legal realm, it could be directly translated that way.

But in the real world, it probably isn't. But it depends on the magnitude and severity of the exceedances.

And that's where we would advocate looking at the affect of temperature also on -- in a field setting. And I talked about this yesterday, about what constitutes the proper design of a field derived understanding of thermal effects.

BY MS. WILLIAMS:

Q. Can you tell us -- you said it's one of the class or something. Are there other examples that are similar to temperature in what you're describing?

A. Yeah, there's other parameters where you can get excursions and not necessarily have harm. Dissolved oxygen is another one.

And I'm talking about, you know, you go out, you measure an exceedance and you compare it to the water quality standard. And if there's ample precedent that that has been used to design impairment status and precipitate at the MBO. So -- or, you know, how real is that?

BY MR. FRANZETTI:

Q. How real is that?

A. How real is it, is the question that some ask.

Q. How real is the affect of the excursion or how real is --

A. Yes.

Q. Okay.

A. Because that's an assumed effect, that's an indirect -- it's an indirect assessment.

The assumption you're making is that criterion is so sacrosanct, that it absolutely guarantees an impairment.

Q. And you're saying not necessarily so.

A. I'm an advocate of -- that with a bio assessment.

Q. Okay. Just again, and I'm just going to combine (a)-(d).

Has that been done? Can we look at studies that say what is that biological effect?

A. Yes. There's -- as I talked yesterday, we accepted what we considered to be adequately designed field studies into the thermal affects database.

Q. Well, that goes to your endpoints, other than lethality. Is that what you're referring now to, studies that --

A. Yes, they would not -- those studies you could not derive a lethal endpoint.

Q. I understand.

HEARING OFFICER: If you're -- wait, we have a follow-up.

Mr. Howe, you have a follow-up?

MR. HOWE: Peter Howe.

BY MR. HOWE:

Q. Yesterday you mentioned on the Muskegon River, that the temperatures got up to 92 to 93 degrees. And that the IBI was dropped and was probably due to the red horse species disappearing.

Couldn't you have predicted that, based upon the knowledge of the literature and the knowledge of that discharge temperature?

A. I think so. I mean, it goes back to what I'd said for, you know, the range where you start to see things happen between 86 and 90 degrees, generally being the place of concern. And yeah, you could expect that.

MR. HOWE: Thank you.

HEARING OFFICER: All right. Let's take an hour for lunch.

(WHEREUPON, a recess was had.)

HEARING OFFICER: I think we're ready to go back on the record. And I think we're on Page 18(l); is that correct?

MS. FRANZETTI: Yes. If I may though --

HEARING OFFICER: I'm sorry, Ms. Franzetti, before you do that: Mr. Dimond

spoke to me at the break and pointed out that the Attachment A is missing several pages. And I double checked to make sure it wasn't a scanning error on our part, our copy also does not have those pages.

Can we get those pages entered into the record.

MS. WILLIAMS: Yes. And I am -- to be sure I've got it correctly, we're talking about Pages 2-98 through 2-102 of Attachment A to the Agency statement of reasons; does that sound right, Mr. Dimond?

MR. DIMOND: Yes.

HEARING OFFICER: I'm going to mark those as Exhibit No. 18. If there's no objection?

Seeing none, they're Exhibit 18.

(WHEREUPON, said document, previously marked Exhibit No. 18, for identification, was offered and received in evidence.)

HEARING OFFICER: And like the other exhibits we had earlier this week that -- I don't even remember which ones they were that

I had scanned and linked, I'll have John scan and link these, as well. And if there are any other exhibits people want scanned and linked, let me know, because that's not standard operating procedure.

That's just something I've done, because there has been a couple things that we needed to get distributed the fastest and that was the fastest way to do it. We're happy to do it, just let us know what you'd like scanned and linked.

MS. FRANZETTI: Madam Hearing Officer, if I may digress from my prefiled questions for a moment. It occurred to me last night that in all of the questioning yesterday and now this morning, I kept referring to Table 3 on Page 14 of Mr. Yoder's report, which has been marked as Exhibit E.

In fact, one of the attachments to the Agency's statement of reasons, and specifically it's attachment No. HH, is a letter from Mr. Yoder to Toby Frevert of the Illinois EPA. The letter itself is undated, but on the second page enclosure to the

letter it's dated July 11th, 2007. And this is a revised version of Table 3.

So I think for the record, I would like to ask him to identify it, explain what changed from the values in Table 3 on Page 14 of his report. And then I would be offering it into evidence as an exhibit to be marked.

HEARING OFFICER: Okay.

MS. FRANZETTI: Okay? So if I could just do that right now.

BY MS. FRANZETTI:

Q. Mr. Yoder, I've placed in front of you Attachment HH to the Agency's statement of reasons. Could you take a look at that and then tell us what it is?

A. It's a correction to Table 3 of Exhibit 15.

Q. And this is a letter you wrote to Mr. Frevert of the Illinois EPA?

A. Yes.

Q. And even though it's unsigned, obviously, you did -- you did get it to the Illinois EPA, I take it, perhaps by e-mail?

A. Yes.

Q. All right. Turning to Table 3, then, am I correct that instead of referring to the thermal endpoint criteria of values in Table 3 of Exhibit 15 of your report, we should instead refer to this Table 3 that's attached to your letter to Mr. Frevert?

A. That's correct.

Q. And the values that had -- were corrected, are limited to some of the values that appear under the third proposed use category here, secondary contact indigenous aquatic life; is that correct?

A. That's correct.

MS. FRANZETTI: With that, I would offer Attachment HH as the next exhibit in this proceeding.

HEARING OFFICER: Ms. Franzetti, as I indicated earlier, I don't generally mark attachments to the statement of reasons as exhibits, simply because they are already in the record.

MS. FRANZETTI: That's right.

HEARING OFFICER: Is there a particular --

MS. FRANZETTI: Well, it's just we keep -- you know, we gave this an exhibit number, and this is a correction to a page of this. But it doesn't have to be. We've identified it now in the record.

HEARING OFFICER: I think that's sufficient.

MS. FRANZETTI: Okay.

HEARING OFFICER: Yeah. And just for the record, that was an attachment to his testimony not in the statement of reasons.

MS. FRANZETTI: Oh, sorry.

HEARING OFFICER: That's okay.

BY MS. FRANZETTI:

Q. Back to the prefiled questions, beginning with (l).

The topic is UAA Waterway Stressors and Constraints. Question 1.

How does the thermal endpoint ranking approach used here to identify thermal criteria options account for the presence or absence of adequate habitat?

A. Through the RAS membership.

Q. I'm sorry, through the...

A. The RAS, the Representative Aquatic Species Membership.

Q. Could you explain how the creation of the RAS list accounts for the presence or absence of adequate habitat?

A. Well, again, I'm assuming adequate habitat refers to a natural river range system, and we can factor in what we expect to see, say, in a modified habitat and provide different RAS lists to account for that.

Q. I still don't think I am quite following what you mean by that.

Do you mean that if you're dealing with a water body that doesn't have adequate habitat for a given species, you would not include that species on your RAS list?

A. That's correct.

Q. So do you first, in creating your RAS list, evaluate the available habitat in a given water body?

A. That's an option that you can employ.

Q. Okay. I understand theoretically it's possible. Did you do that here before you finalized your RAS list?

A. Yes. That was embedded in the three different designated use options that constitute the general use, the modified use and the secondary contact options. And that determines the -- the only thing that's between those --

Q. Okay.

A. -- are the representative species lists.

Q. If I understand you correctly then, the fact that you were basing the work you did on a particular use category, such as, modified use, that's where the degree of adequate habitat is taken into account by your use designation or classification, to which you are then creating your RAS list; correct?

A. Yes. That's correct.

Q. Moving on to Question 2. A similar question, but different factors, not habitat.

How does the thermal endpoint ranking approach used here to identify thermal criteria options account for the presence or absence of other stressors, i.e., ammonia, metals, nonpolar organics, emerging contaminants, endocrine disruptors, pathogens, et cetera, for fish in the

subject water body?

A. Well, in the three options that we considered, I guess some of that is indirectly implied. But it's -- what we did is to base it more on designated use goals.

And these kinds of concerns, they kind of fall in behind that. Because the other sort of part of the tiered use is that some -- could vary by those uses.

You could also, I suppose, say that I have a certain pollutant level which is going to exclude certain species and detail your RAS list that way, but we did not do that in this case. But you -- that is certainly possible to do.

Q. If I understand you correctly, that's one option? Were you also saying in the beginning of your answer that these kinds of factors, such as other stressors, can also be accounted for in the agency's decision process after receiving your criteria options?

A. They could do that, yes.

Q. Is that what you were referring to in the first part of your answer?

A. Yes.

Q. Okay. No. 3.

How are the fish populations in communities in the upper Dresden Pool and the Chicago Sanitary and Ship Canal likely affected by the several sources and causes of non to partial attainment identified by the IEPA in their most recent 305(b)report? If you know.

I realize that question assumes that you're familiar with the 305(b) report for the Upper Dresden Pool and the CSSC?

A. I haven't looked at that.

Q. All right. So you're not familiar with what that report identifies as causes of either non to partial attainment for those water bodies?

A. That's correct.

Q. Moving on to Question 4.

How are the fish populations and communities in the upper Dresden Pool and the CSSC likely affected by the elevated levels of mercury and PCBs?

A. That's something else I didn't look at.

Q. So you don't know -- your answer is you don't know?

A. No. Not without looking at more details.

Q. Moving on to Question 5.

Recent data suggests that fish populations have been adversely affected by chronic exposure to low levels of endocrine disruptors commonly found in waterways receiving municipal effluence, such as this one. How does such exposures to low levels of endocrine disruptors likely affect intolerant fish species that are included in the proposed use designation for the Upper Dresden Pool?

MS. WILLIAMS: At this point -- go ahead.

MR. ETTINGER: I just want to object. Are you going to put these reports in, or have they already been put in when I was gone, or --

MS. FRANZETTI: Well, we'll tie it up. We do --

MS. WILLIAMS: Well, I mean --

MS. FRANZETTI: We do intend to present evidence of the existence of endocrine disruptors in the discharges to

this water body.

MS. WILLIAMS: In the absence of that though, or without citing to one, the question then, I think, becomes are you putting evidence into the record that's not --

MS. FRANZETTI: I'll tell you what -- you know what, I can get around this and just say let's make it hypothetical.

BY MS. FRANZETTI:

Q. Can I ask you to assume that there are low levels of endocrine disruptors commonly found in waterways like this one? And based on that, how does such exposure to low levels of endocrine disruptors likely affect intolerant fish species?

A. Well, I can answer that a couple of ways I think. It would help for me to know what the recent data that suggests the population has been adversely affected. I am aware of some of them. Endocrine disruptor still means --

Q. All right. Well, I'm sorry.

If you're not -- are you not really -- do you not really have the experience or knowledge to answer a question like this about the

effects of low levels?

A. No, I do.

Q. Oh, you do. All right, I'm sorry. I misunderstood you.

A. But it would help me to know what recent data you were referring to. What specific studies?

Q. Well, what are you familiar with? It doesn't matter what I'm referring to, so much as what you know.

A. I'm familiar with some of the work that has been done at the EPA laboratory in Cincinnati.

Q. All right. And what is that --

A. General Zortec. And one I'm familiar with is a lake in Canada, where they dosed the lake with EDCs, and it crashed the natural fathead minnow population.

Q. So, based on that, what is your opinion about --

A. That's the only thing I've got to go on about recent data suggesting that. And I've heard other things, I have not seen other studies.

I have seen news releases and

things like from various researchers that say there are effects.

MS. WILLIAMS: Can I clarify for the record? When you refer to EPA, was that Ohio EPA or U.S. --

BY THE WITNESS:

A. I'm sorry, U.S.EPA.

BY MS. FRANZETTI:

Q. And would fathead minnows you mentioned in that one study fall within the category of tolerant fish species?

A. No. It's highly tolerant.

Q. That's highly tolerant. And even they crashed, is what you're saying?

A. Well, that's what that study reported.

Q. Okay.

A. But my other experience was effluent dominated water bodies. The one I'll refer to is the side of the river that's affected by 200 million gallons a day from sewage from the city of Columbus.

And I would -- being a large municipality, it would have some of these EDC compounds in the discharge. And we have seen in the past 20 years a resurgence of the populations of

highly intolerant fish species.

And that water body is 90 to 95 percent municipal effluent during the summer. And despite that, we've seen a recovery of highly intolerant fish species in that river.

Q. So how do you reconcile that with the candidate study you were mentioning?

A. I don't have an answer, but I -- you know, it's something real that's happening there that defies that study.

MR. ETTINGER: Can I just follow up on that very briefly?

BY MR. ETTINGER:

Q. Which are the highly intolerant fish species that you're seeing?

A. Well, I would say at least a dozen, if not 15 or 20. And we're just completing a project that documented this.

I did a presentation two years ago at the Ohio Natural History Conference, so...

Q. Tippecanoe darter is one. Most of the intolerant darters that are resident to that main stem have expanded their ranges in the past five to ten years.

In other words, they're reestablishing their former ranges that they were extricated from by the grows sewage pollution in the late 19th to early to mid-20th century. And then, when water quality based treatment was put into these plants, we just saw stages of recovery over the past -- I would say the past 20 years in that river.

So that's my observation.

BY MS. FRANZETTI:

Q. I'm going to just -- I'm just going to skip over the next question, it's going to get into the same discussion about whether I'm introducing evidence. So I'll skip it and move to 7.

At the bottom of Page 11 of your prefiled testimony it stated that, "Selecting a temperature representative of background temperatures in this system is complicated by the physically and thermally altered characteristics of the upper Illinois and the Chicago area waterway systems."

And I'm going to try and shortcut this because I know we touched upon this earlier today. By "thermally altered characteristics," are

you talking about the effluent discharges to this waterway?

A. That's part of it.

Q. All right. What else do you include in that?

A. Well, the physical -- the physical modifications will also have some impact on that as well.

Q. And what do you include in the physical modifications in the upper Illinois and CAWS?

A. Well, the impoundment and the channelization. Particularly in the -- what do we call it, the CAWS system or the CSSC?

Q. Well --

A. The whole collage of everything that's happening upstream, basically.

Q. That will work. And in terms of why that complicates the selecting a temperature representative of background temperatures. Can you explain why these -- at least taking the physical modifications first, if you can, segregate it from the thermal effluence, why does that complicate things for establishing a background temperature?

A. Well, I think there's two aspects. One is just the -- sort of the pure scientific facts of the situation.

It is an older water body so it induces that uncertainty of it. A conclusion that it's not a least impacted sort of reference quality water body, that's the first thing.

The second thing is it introduces a lot of variability and expectations among different stakeholders. And it's not just common that this particular water body, I think this is uncommon to any sort of urbanized modified river.

It's just that it just sort of stirs up a lot of different opinions about what's possible and what's attainable and that type of thing. So it's more difficult, it's not as straightforward as, say, in a reference quality water body, where you have a modern location and everybody agrees, yes, that's a least impacted reference.

Q. All right. Okay. Let's see, give me just a moment.

I think with respect to subpart (c) of this question, I think you've already

answered it. You did not take into account these types of complications in terms of your option contained in your report, Exhibit 15, for selecting a temperature representative of background temperatures; did you?

A. Well, we tried to, in Table 5.

Q. Okay. How did you try in Table 5 to take into account the thermally altered -- physically and thermally altered characteristics of the upper Illinois and the Chicago area waterway systems?

A. Well, to develop this table, especially for the nonsummer months, the summer months here are based on the data presented in Tables 2 and 3.

Q. Uh-huh.

A. But the nonsummer season is based on either the -- our analysis of the monitoring data at the Cal Sag Route 83 monitoring station or the Holly and Bradley modeling study, using that as ambient background.

Q. And the Holly and Bradley monitoring study, I see it referenced in Footnote 10, I believe, on Table 5 --

A. Yes.
Q. -- page 18 of your report?
Can you -- well, first let me break this down.
So, in part, your option for nonsummer month background temperatures was based on the ambient temperature data at the Cal Sag Route 83 monitoring station; correct?
A. Yes.
Q. Okay. Why did you conclude that that was an appropriate location for purposes of determining a representative background temperature?
A. Well, just from a sort of an impact setting, it was the least impacted of all the stations that we looked at. And you can see all the stations that we analyze in Appendix 2 starting on Page 74 of Exhibit 15.
Q. And, I take it, not just that it was the least impacted, but also in closest proximity and least impacted? I mean, you can look all through the state for, potentially, an impacted monitoring station --
A. Yes.
Q. -- isn't there a geographic component

to this, too?

A. Well, it was part of -- it was the connected part of the system, and it was upstream, and yes, it was -- I'm not sure if it was the closest site, but it was the closest site that didn't have a major thermal impact to it, at least that's what I was told. And there are -- I believe there were six sites that we did the same type of data analysis --

Q. Okay.

A. -- for in the CAWS system.

Q. And, as you said, we can find those in Appendix 2 to your report.

Now, you just made mention the fact that, in terms of the Cal Sag and Route 83 location being the least impacted or being without a thermal impact, that at least that's what you were told.

Did somebody help you -- you know, inform you of their opinion as to these varying monitoring stations that are listed in Appendix 2?

A. Yes.

Q. Who was that?

A. Ed Hammer helped me with that.

Q. And Mr. Hammer is with U.S.EPA Region 5, correct?

A. Yes.

Q. So you relied on Mr. Hammer's description of whether or not and to what degree each of the monitoring stations in Appendix 2 were or were not impacted by thermal impacts?

A. Yes. And what I mean by "thermal impacts" would be like a heated effluent. We know that there are waste water discharges that also have an effect that, that being sort of a given in this area, that was a reasonable --

Q. Right.

A. -- inclusion for this particular option.

Q. And, I take it, did you need to rely on Mr. Hammer because you did not have that personal knowledge yourself, personal familiarity with these monitoring stations?

A. Well, not necessarily.

Q. Well, then why are you relying on Mr. Hammer?

A. Well, he was -- he's our technical contact for producing this product.

He's the --

Q. Excuse me.

Does the fact that he's the technical contact mean that you have to defer to his opinion?

A. I don't have to defer to it, but I value his opinion.

Q. Okay, I understand that. But, for a moment, there I thought you said the reason, even though you say you had personal knowledge, was that you relied on what he said was because he was the technical contact?

A. Yeah. And what that means is, this is a grant product, that he is the technical overseer of that grant product.

So, of course, he's going to have input, and I'm going to listen to his input.

Q. All right.

A. I'm going to consider it.

Q. But you're telling me that if your personal knowledge differed from his, then you would follow your own personal knowledge?

A. Well, I think we would come to an agreement.

Q. All right. But in these instances, were you, basically, relying on the input he gave you as to these monitoring stations and their degree of impact -- the impacted nature?

A. Yes.

Q. Moving on to (m), Acclimation.

MR. ETTINGER: Can I just act a little bit about the background temperature again?

BY MR. ETTINGER:

Q. Was there any thought given to breaking down the system and using different background temperatures for different segments?

A. Well, I think we did look at all six sites and some were -- some had, what were obviously elevated temperatures. And, therefore, we knew those were in proximity to heated discharge.

And so, they were not -- they were not used. We were, basically, just using the least impacted of what was available.

BY MS. FRANZETTI:

Q. If you give me just a moment, Mr. Yoder, I'm -- I think 1(a) has been answered already. I want to see where we pick up again what has not been answered.

Moving on to 1(b).

On Page 7 of your prefiled testimony, you indicate that the upper lethal temperatures in your literature studies database are based on fish acclimation temperatures of between 25 to 30 degrees Celsius. Did you include this caveat because of the relationship between acclimation temperature and the resultant UILT?

A. Yes.

Q. Moving on to (c).

Did you similarly restrict, i.e., the studies based on fish acclimation temperatures of between 25 and 30 degrees Celsius the upper lethal endpoints in the data set you prepared for the ORSANCO project?

A. As much as I could. I believe I did -- well, first of all, in the compilation of raw data, we do have data that acclimation temperatures different than 25 or 30. But we attempted to, as much as possible, include -- use those as the input variables in the model. But there are some inputs due to just the policy of data for a species, the test may have been done at a lower acclimation temperature.

Q. Okay. Moving on to D.

Was the upper lethal temperature for white sucker based on acclimation temperatures of between 25 and 30 degrees Celsius?

A. I'll have to look that up.

Going back to my testimony, what I recall, what I think I did, and I have to go back and find out, if I could find my notes on what I actually did. But the data points that I think I used are acclimation temperatures of 26 degrees.

Q. And you are referring to which -- which appendix to Exhibit 15?

A. Appendix Table Z(1) in Exhibit 16.

Q. Sixteen, I'm sorry.

Mr. Yoder, are we looking back at the same page that we were looking at this morning?

A. Yes.

Q. Okay. With respect to the McCormick 1977 study and the Bruns and Jones study?

A. Actually, it's the Bruns and Jones study.

Q. Okay.

A. It talks about the acclimation of 26 degrees.

Q. All right. So you think that your upper lethal temperature for white sucker was based solely on the Bruns and Jones study now?

A. I think so.

Q. Oh. All right.

A. That's what I have to go back and see if I could find out.

Q. I'm just trying to clarify. That's different from what I thought you said this morning.

I thought you said it was a combination of both the McCormick study --

A. Well, I don't rule it out. But it's...

Q. All right.

A. I know that the input number is 31.5, which is the average of the two values in the Bruns and Jones study.

Q. Oh, okay.

A. So it makes sense from that aspect. Plus there's only one other study that had an acclimation temperature in the 25 to 30 range.

And that was only a 12-hour test, so...

Q. Okay. Well, so you're going to --

you've agreed, you're going to try and find your notes.

And in finding your notes, would you also agree that you would let us know, with a little greater degree of certainty, exactly what you did use?

A. Yes.

Q. Thank you.

Moving on to Question (e). And I'm going to jump to the second part of that.

If a laboratory study did not use an acclimation temperature of 25 to 30 degrees, did you exclude it as being something that you relied on for purposes of coming up with your temperature criteria options in Exhibit 15?

A. Yeah. If there wasn't -- if there was just a complete absence of that kind of data. But if it was available at these acclimation temperatures, then that's what I used.

Q. My question is different. I'm trying to determine whether that was a basis for excluding data from your ranking approach here in Exhibit 15. In other words, in order for you to use a value derived from one of the literature reports you were

using, you were inputting, did the value have to be based on a laboratory study that used an acclimation temperature of 25 to 30 degrees?

A. No. I believe in one of my previous answers I said that it was -- we did use data that was at acclimation temperatures outside of that range.

Q. Was that where you didn't have a literature value for a study that was done between 25 and 30 degrees?

A. That's correct.

Q. Okay. So it is less preferable data when it's a study based on acclimation values outside of that range. But it was -- it would still be inputted if it was the only thing you had?

A. That's what I did, yes.

Q. Okay. Moving on to (f).

Is it true that the upper lethal temperatures for a number of species, e.g., silver lamprey, stone cat and redear sunfish in your database were based on testing winter acclimated fish that had been acclimated at less than 5 degrees Celsius?

A. Okay. That is true for

silver lamprey, and it's true for stone cat. I don't see where that's true for redear sunfish, unless I'm missing something here.

And the data compilation, the lethal value I have is an acclimation temperature of 22.7 degrees.

Q. Are there any other species -- I mean, I accept what you're saying for redear sunfish, I don't know. But are there any other -- I mean, these were ones we thought fell outside of your range.

Are there any others that did among the inputs you used? Do you know?

A. Among the inputs I used for the study, I'd have to go back and go through them one by one to determine that.

Q. I won't ask you to do that right now.

Do you know, is it correct, that the upper lethal values in your database for the species, silver lamprey, stone cat redear sunfish, and even other species, were based on testing only one or two specimens?

A. The only one I'm certain of is stone cat.

Q. You don't know as to the other ones?
A. Not without going back and looking at the cited studies.
Q. Moving on to thermal avoidance, N, Question 1.
Is it correct that the thermal water quality standard values derived in your Exhibit 15 report were derived exclusively from laboratory data?
MS. WILLIAMS: We've answered this already, haven't we? I will object. It's been asked.
BY MS. FRANZETTI:
Q. Some of these need a little foundation in order to move forward.
Yes or no?
A. No. It includes some field data.
Q. Oh, that's right, that's your...
No. 2, do you agree that in lab testing the test organisms have nowhere to go to escape potentially harmful or lethal temperatures?
A. No, I don't agree.
Q. Why not?
A. Some tests are set up so fish do have

the ability to move, to seek other temperatures. Some are not.

Q. Right.

Would you say the majority are not?

A. I'm not certain of that.

Q. Well --

A. Almost, by definition, critical thermal maximum studies fall into that category. And I've already said that the majority of data out there seems to be from those kinds of studies.

So, yes, I would agree with that.

Q. And so, do you agree that that's really most of what's represented in the database that you use to come up with your thermal criteria option?

A. For the lethal endpoint, yes.

Q. Yes, that's what we're talking about.

MR. ETTINGER: That's my confusion. I thought we were talking avoidance temperatures now.

THE WITNESS: Yes.

MR. ETTINGER: Isn't this the area on thermal avoidance?

MS. FRANZETTI: Yeah. And the point being, that in most of these tests, the fish can't exhibit their natural behavior of avoidance.

BY MR. ETTINGER:

Q. Excuse me, then, that's why I'm confused. You wouldn't do a test for avoidance in which the fish couldn't avoid; would you?

A. That's correct.

Q. So if you were going to do a test for avoidance, it would be designed so that the fish could go somewhere.

A. Yes, that's inherently part of that design.

MR. ETTINGER: That's why I was confused.

MS. FRANZETTI: Well, moving onto the next question, maybe we can help your confusion.

MR. ETTINGER: Good.

BY MS. FRANZETTI:

Q. Do you agree that in a waterway fish can detect high temperatures and will avoid them, providing there's thermal refuge available?

A. Yes, provided they have somewhere to go.

Q. Moving on to Question 4.

Is it correct that the derivation process used here does not account for this thermal avoidance behavior in fish?

A. No.

Q. What is not true about that?

A. Well, the concept of the long-term survival is avoidance. The short-term survival is something they can withstand for short periods of time, but eventually will -- they will avoid that.

So that's why the average is based more on the concept of avoidance. That's what's inherent to this -- the concept of the long-term and short-term survival principles.

MR. ETTINGER: I'm sorry, Ms. Franzetti, you didn't solve my problem at all.

BY MR. ETTINGER:

Q. If you were going to design a test to measure avoidance, are such tests done?

A. Yes.

Q. I assume if you were going to -- I

don't want to assume.

Would you design such a test so that the fish could avoid temperatures and choose what temperature they wanted to be in?

A. Yeah, that -- for laboratory-based avoidance studies, that is generally what is done. It's a trough or a chamber that is set up that has a different temperature gradient and the fish are -- they seek where they want to be.

Q. So on these avoidance numbers that are in Table 3 of what I believe has been marked as Exhibit 19.

HEARING OFFICER: No HH.

MS. FRANZETTI: HH.

MR. ETTINGER: I'm sorry, HH. We didn't mark it.

BY MR. ETTINGER:

Q. HH. Are some of these avoidance temperatures derived from laboratory tests in which the fish were allowed to move?

A. Well, the -- yes, that data is part of the whole underpinnings, and it's one of the input variables in the model, that's the upper avoidance temperature part of it. So if you look at the

upper -- there is an upper avoidance row in these tables.

Q. Yes, how --

A. So if you look at that, you can see that's where the upper avoidance input was crossed.

Q. And was that number derived, at least in part, from laboratory studies in which fish could move?

A. Laboratory and field studies, it had to be an avoidance endpoint.

Q. And the fish could move in deriving those numbers?

A. Yes.

Q. Thank you.

BY MS. DEXTER:

Q. Would you accept a study that was designed to calculate that endpoint from a study that was designed to not let the fish move?

A. I mean, that's inherently not an avoidance setting.

MS. DEXTER: Right. Thanks.

MR. ETTINGER: Now we understand.

BY MS. FRANZETTI:

Q. And is thermal avoidance by a fish a

generally accepted phenomenon, Mr. Yoder?

A. Yes. It's a defined term.

Q. Right.

And with respect to how your criteria are applied, if the avoidance endpoint taking, for example, on modified use RAS II, if the avoidance thermal endpoint for 100 percent protection is 83.7 degrees Farenheit -- that is kind of in the middle of all your numbers there -- that is not going to be used for purposes of determining the daily maximum thermal criteria; is it?

A. Well, it's not how we produced the options, but it's certainly available to the user.

Q. I understand that the user can do whatever they want, but I didn't think that that was the intent of your approach; correct?

A. No, but we -- we feel that the long-term survival is sufficient surrogate for that.

Q. Okay. Moving on to (o), Absence of Early Life Stages, and in particular the CAWS aquatic life view sea waters.

MS. WILLIAMS: I think we are going to have to either set this aside for Mr. Twait or rephrase it in a way that's within his --

MS. FRANZETTI: And I think, quite frankly, to a large extent, it's already been answered by Mr. Yoder. I'll move on.

BY MS. FRANZETTI:

Q. And I'll move on right to P, to talk a bit about your 2003, 2006 ORSANCO project report, which we've been referring to as, I believe, Exhibit 16.

In your final report, ORSANCO Exhibit 16 -- the seasonal average limit of 75.2 degrees Farenheit and the daily maximum limit of 78.8 degrees Farenheit that you presented in Table 12, were based on the upper lethal endpoint for log perch; correct?

A. Yes. If I can be permitted to explain?

Q. Sure.

A. Okay. We, substantively, changed that endpoint based on feedback that we received from the subcommittee.

Q. Okay. Subsequently changed those -- those are no longer the thermal endpoint values for log perch, that you -- that the --

A. Yeah, that's current --

Q. -- that the MBI/CABB --
A. We have a different endpoint now for log perch.
Q. And you said you changed that because of input from -- I'm sorry, where?
A. The ORSANCO committee that we were reporting to for that project.
Q. What was the nature -- explain what the input was that caused you to change those values?
A. The study it was based on was critiqued and suggested that it wasn't a valid study.
Q. The study that you had included in your data --
A. Not the study, but the lethal endpoint that we pulled out of a study in a peer review journal. We took it out of the study and put it in the database, and then that was subsequently criticized.
So we dropped that, being -- I don't want to say accommodating, but we dropped it and we changed it because it was questioned.
Q. I guess the part I'm missing is, I'm

tempted to say, so if I criticize some of your values, will you change them as well? What was the criticism, what was wrong? And you're stressing to me, "Well, it was a peer-reviewed study, so don't blame me."

So what was wrong?

A. I was not present at the meeting that that was discussed. It was relayed to me by the person I was working with at ORSANCO.

And the decision was made that, okay, we'll -- it's controversial, we'll change it for this particular application. But I have since gone back and reread the study.

Q. Which -- I'm sorry, which study? The one the criticisms were based on?

A. Yes.

Q. I'm sorry, the one you used?

A. Yes.

Q. Originally, to get these numbers, 75.2 and 72.8; correct?

A. Yes.

Q. All right. You went back and reread it?

A. Yes.

Q. And what did you conclude after rereading it?

A. It's there in their data, that they reported the highest survival they saw for log perch was 26 degrees Celsius, which is -- what's that translate to?

Q. Well, Mr. Yoder, let me --

A. It's approximately the -- I believe, the 78.8 degree value.

Q. Mr. Yoder, are you telling me that -- I'm not sure what you're trying to tell me, that you reread the study. Do you disagree with the ORSANCO committee input? Is that what you're saying, after rereading the study?

A. No, but that's who I was producing the product for.

Q. Okay. So you do agree your original numbers should be changed?

MS. WILLIAMS: I'm losing track of what's original and what's subsequent.

MS. FRANZETTI: The original are what are in my question, 75.2, 78.8.

MS. WILLIAMS: Is that your understanding of original?

THE WITNESS: Yes.

BY MS. FRANZETTI:

Q. Mr. Yoder, I'm trying to figure out, do you today agree that those values were unreliable and you agree that they should be and have, and, in fact, they have been revised?

A. I agree that they were revised. Whether -- I'm having trouble with the definition of what's an unreliable study. Because what one person's opinion of what is unreliable, someone else will say it's reliable.

The only test I have to go by in doing literature use of information is, is a published study and was it reasonably vetted through some kind of review process.

Q. Okay.

A. That's really all I have to go on.

Q. Okay. I understand.

But I'm not so much talking about the study, I guess, I'm trying to get away from that to just establish do you agree that these numbers for log perch should have been revised per -- as the ORSANCO committee concluded, or do you disagree with that committee's input?

A. I'm not sure if -- I'm not trying to be difficult, but if I use the test of taking what I find in the literature, and if it's a published study, that if that qualifies as being acceptable, then I would disagree with the ORSANCO committee.

Q. Mr. Yoder, did you write to ORSANCO and admit in writing to them that, "The log perch upper lethal value was in error on my part and has been revised"?

MS. WILLIAMS: Can I object?

BY THE WITNESS:

A. No, I did not write --

BY MS. FRANZETTI:

Q. You did not write?

A. No.

Q. Moving on to Question 2.

Isn't it true that these values, 75 to 79 degree Farenheit are well below the ambient temperatures that often prevail in the Ohio River during the summer?

A. Yes.

Q. And isn't it true that log perch are very common in the Ohio River during the summer?

MS. WILLIAMS: I'd like object to this

point -- to this line of questioning. I know that we're giving a lot of leeway here, but I don't believe log perch is the used Upper Dresden Island report at all. So I don't understand how -- whether good or bad or relevant or will help the Board at all in the decision it needs to make.

MS. FRANZETTI: Madam Hearing Officer, I think this goes directly to the degree of reliability of the conclusions that Mr. Yoder reached what he's referring to as "options" in his report. And it shows how, from the values that he derives using his ranking approach, have, in fact, when been scrutinized in other settings like this one looking at what should be appropriate thermal standards, there have been errors found.

And in fact, those -- when found, those values have been changed. And, in part, I'm trying to show that it's because they don't reflect reality.

And, in fact, in the real river system, you have these fish and you have them in good numbers at significantly higher

temperatures. I think that's a very relevant point for this board to consider.

HEARING OFFICER: I would agree. Would you like to respond?

MS. WILLIAMS: Well, I would just like to respond that I think we well established yesterday that if any user of his model wants to change any endpoint or species that's in there, that that can be done. So I'm not sure there's anything to --

MS. FRANZETTI: Ms. Williams, are you telling us that in the proposed thermal standards before this board, I won't find a single number that comes straight from his Table 3?

MS. WILLIAMS: No, I'm saying that --

MS. FRANZETTI: Exactly --

MS. WILLIAMS: -- log perch is not in Table 3.

MS. FRANZETTI: I know log perch isn't.

MS. WILLIAMS: If there's some other information you want to change, we can change -- I mean, you can do that.

HEARING OFFICER: I'm sorry, Ms. Williams, I have to disagree.

MS. WILLIAMS: Okay.

HEARING OFFICER: I think that these questions are specifically about the ORSANCO project. And, at least my understanding is, that's the underlying database that was used to create Exhibit 15.

And I think that, certainly, everyone has -- should have the opportunity to ask him about the data that he used to get to 15 or data that was placed into that. So I'm going to overrule your objection and instruct the witness to answer the question.

MS. WILLIAMS: Can you repeat it for him?

HEARING OFFICER: Yeah, would you read it back?

(WHEREUPON, the record was read by the reporter.)

BY THE WITNESS:

A. To my knowledge, that's correct.

BY MS. FRANZETTI:

Q. Do you recall what was your

recommended value, the 75 to 78 degrees, based on an endpoint for log perch that, rather than being based on a lethal toxicity test, was based instead on one of the reproductive endpoints?

A. At this point, I don't agree with that.

Q. All right. What was it based on?

A. I went back and I reread the study. And based on what I read, that is a lethal endpoint.

Q. Moving on to -- excuse me for a moment.

Do you recall in rereading the study, was there -- were there any references to the endpoint, whether it be lethal or whether it be reproductive, was suspect because of poor temperature control as acknowledged by the author of that study?

A. I do recall seeing some of that, but that the author qualified that. He didn't think that was the problem in the endpoint.

Q. So the author admitted to poor temperature control during the study but didn't think it affected the endpoint?

A. No, he had -- as I recall reading the

study, he had some problems with the apparatus. But I also, from reading the study, that that information was not included in the study.

Q. The fact that he had problems with the apparatus wasn't included?

A. Well, he didn't have continuous problems, but there were some experiments he ran where it did malfunction and he did not use that information, was my understanding from reading that study.

Q. Okay. Moving on to No. 4.

Have log perch in the Ohio River been collected at temperatures above what your report suggests are the short-term and long-term lethal temperatures for log perch?

A. I haven't been presented any data that proves that.

MR. ETTINGER: May I just follow-up that briefly?

BY MR. ETTINGER:

Q. When you're talking about daily maximum, is that the average over a day, the maximum daily average?

A. I think we had this question before.

MS. FRANZETTI: I thought we covered it this morning.

BY MR. ETTINGER:

Q. Well, I guess my problem is specifically with regard to Ms. Franzetti's questions here and this study, that we've talking about. Was that to calculate what log perch could stand as an average over a 24-hour period?

A. I'd have to look at the study, how they reported that.

Q. Okay.

A. I'm not sure.

Q. If it was an average, that might go over that temperature for some part of the day?

A. It's possible, if that's what happened.

BY MS. FRANZETTI:

Q. Mr. Yoder, I want to jump to 5, I think you've answered the first part of that question.

There was a revised recommendation made to ORSANCO; wasn't there?

A. (No audible response.)

Q. I'll go ahead and read the -- I'm

sorry, I though you had -- maybe not. I'll read the question.

Is it correct that, based on the difference between the recommended log perch based fish temperature model criteria and the actual ambient fish survey data for the subject waterway, you made a revised recommendation to ORSANCO for the thermal summer criteria?

A. Not -- no, not in response to anything like that. I was never provided actual ambient fish survey data for that waterway, but may arrive at a different recommendation.

Q. All right. You didn't see any actual stream ambient data?

A. Not with the co-occurrence of fish with temperature. We did have a session in choosing the various RAS lists, and I should state that this isn't the only option that we provided for ORSANCO.

Q. Can we maybe cut to the chase? What did ORSANCO, ultimately, do? What did it, ultimately, rely on, if you know?

A. When we produced the report, there were two RAS options, one was a very inclusive -- any species that ever was observed. And this was --

these lists were chosen by the subcommittee, they were not chosen by me alone.

And out of respect to the subcommittee, I used the list that resulted in these unrealistic temperature criteria. And I owe that to the fact that that RAS list just -- it just got cluttered with too many small stream species that are transient to the Ohio River.

You might find them there occasionally, but they're not really residents. And we developed another list called a main stem restricted RAS that -- I think arrived at a much more realistic temperatures -- that were more inline with the ambient conditions in the river.

And that is what I -- it's my understanding that that is what ORSANCO eventually relied on.

Q. Moving on to --

MS. WILLIAMS: Can we just clarify whether log perch was included on this second RAS list you're referring to, or do you know?

THE WITNESS: It's in Exhibit 16.

BY THE WITNESS:

A. And we did the same thing -- we did

the same thing with the options where we removed selected species, just like we did with the general use options for the Des Plaines, just to show them what's the effect. And this is part of the -- I call it risk management use of this tool.

BY MS. FRANZETTI:

Q. Mr. Yoder, I'm going to jump to Question 7.

In the report you prepared for ORSANCO Exhibit 16, you stated at Page 2 that most studies that you relied upon were accepted at face value.

That's your term. What did you mean by that?

A. That I did not endeavor to reanalyze anyone's data or conclusions that they reached in their own publications.

Q. I think we've covered 8.

Just -- 9 is -- just to make sure we're understanding your Table 9 in Exhibit 16, can you explain what the numbers in the columns headed Original Sources and New Literature refer to? And, I'm sorry, I don't have a page number there to --

MR. SULSKI: Fifty-one.

MS. FRANZETTI: Fifty-one?
MR. SULSKI: Oh, that's the figure, I'm sorry.
THE WITNESS: Page 45.
BY MS. FRANZETTI:
Q. Page?
A. Forty-five.
Q. Thank you. Do you see that after the species table the next -- excuse me, the species column, the next column is entitled original sources?
A. Yes.
Q. And some have numbers and some don't. Can you explain what that means?
A. The original sources are the species that have data for the 1978 database done for Ohio EPA.
Q. And then, going over two columns, there's a column called New Literature.
A. Okay. Could I suggest something here? I think you need to understand what Appendix Table Z (1) is before we get to --
Q. Okay. You're the boss. Explain that column.

What does that column mean?

A. Appendix Table Z (1) is the compilation of all the studies that are available for those species. In other words, a count of how many studies did we find for each one of those species.

Q. Oh. I think maybe you're right, maybe I should have asked you this question three hours ago.

If that says -- if next to the particular species, silver lamprey, the number is one, does that mean there's only one silver lamprey study?

A. Yes. And it was found after the 1978 -- it wasn't available.

Q. Right. That's why there's nothing under Original Sources. It wasn't until sometime after 1978 that the study on silver lamprey became available?

A. It doesn't mean it wasn't necessarily done --

Q. All right.

A. -- but it didn't include the literature --

Q. You didn't find it, you didn't know about it. It didn't get into the database?

A. So Appendix Table Z (1) will always include the number of studies through the original sources. The new literature or the additional studies that we found for a particular species in this effort.

Q. Okay. So don't this table -- and isn't this where answered -- or strike that.

In a prior question I asked you for the species that you used for purposes of developing your thermal criteria options that you gave to the IEPA in Exhibit 15. Now, which of those species did you only have one study for?

This table answers that question; correct?

A. It should, yes.

Q. If I look for each of those species, I can determine, in your entire database, how many studies are there?

A. Yes.

Q. Thank you.

Now, and New Literature, I don't think -- I think we didn't get to that. Is that the

additional 200, 400 whatever it was --

A. Yes.

Q. -- added to the original database?

A. Yes.

HEARING OFFICER: It's 200, I believe.

MS. FRANZETTI: Two hundred, thank you.

BY MS. FRANZETTI:

Q. I think you've answered 10, or enough -- you've answered it enough, that we don't need to go over it. I think the same is true of 11.

I'm going to jump to the Ohio Muskegon River in Q.

According to Section 3745-1-07 of the Ohio Regulation, the thermal water quality standards period average for the period 15 June through 15 September is 85 degrees Farenheit with an allowable daily maximum of 89 degrees. Were these thermal water quality standards based on the same modeling approach you used on the ORSANCO project and have proposed here for the lower Des Plaines River?

A. Yes. The same methodology.

Q. Do you agree that the Muskegon River

limits of 85 degree period average and 89 degree maximum are essentially identical to the values you have proposed here for the Upper Dresden Pool at the Illinois EPA?

MS. WILLIAMS: He can't answer this. I don't think this is a question for Chris; do you?

BY THE WITNESS:

A. I'm not comfortable answering it. No, I don't know enough about the proposal.

BY MS. FRANZETTI:

Q. Oh, what the Illinois EPA has proposed here?

MS. WILLIAMS: If you just want to ask him -- that's fine.

BY MS. FRANZETTI:

Q. Well, can you answer -- if you look at your Table 3, can you, at least in terms of relating it to the uses that you looked at -- well, you may have to look at general use, I'm not sure. Can you relate it to the options you gave to Illinois EPA?

HEARING OFFICER: Table 3 in attachment HH; correct? That's the one you're looking at?

MS. FRANZETTI: Yes.

BY MS. FRANZETTI:

Q. Aren't those numbers similar to your modified use?

A. Yeah, they happen to be within a tenth or two.

Q. And I thought we had established earlier that -- well, let me ask it in the hypothetical.

I'm going to change that again. Let's just go to 2(a).

Can you describe the characteristics of the Muskegon River in comparison with the Upper Dresden Pool, starting with -- is the Muskegon River, for which we have thermal standards of 85 degree period average, 89 degree max; is it impounded?

A. Yes.

Q. All right. And describe the impoundment characteristics of the Muskegon versus the Upper Dresden Pool.

A. Well, it has a series of navigational dams and locks.

Q. All right.

A. It's -- however, not subject to -- it's restricted to pleasure boats. There's no barge traffic.

Q. Oh, there's no barge traffic on the Muskegon?

A. Right. But the --

Q. Is it a channelized -- excuse me --

MR. ETTINGER: Could you let him answer his question?

BY MS. FRANZETTI:

Q. Go ahead, Mr. Yoder, with your answer.

A. The Muskegon is impounded, I believe, for a slower, approximately, close to 90 miles of Banesville, Ohio, I think there are 11 dams. And they all have locks they're hand-operated locks. There's no maintenance, except in the vicinity of the locks.

Q. So --

A. It does impound and inundate the natural rivering characteristics for all, except the immediate tail waters below each damn. So, in that regard, yes, it's similar.

Q. Okay. But there's no barge traffic and there is no maintenance dredging done on the

Muskegon?

A. Not out in the main channel, no.

Q. Is it channelized in the way the Upper Dresden Pool is?

A. Well, I'm not -- my definition of channelization -- and we went over this the other day -- is where the river is physically dipped out from bank to bank.

Q. Oh, that's right. You only include bank to bank in channelization.

A. Right.

Q. Isn't it true that the upper Muskegon River is not impounded?

A. It's free flowing, yes.

Q. Yes.

And with respect to availability of habitat, do you know enough to compare the Muskegon River to the Upper Dresden Pool?

A. In the fact that both are impounded and the impoundments go from one damn to the tail water of the next upstream damn, that's the similarity extent that I'm aware of.

Q. And the unimpounded portion, same thing, you think they're the same thing?

A. Of the Muskegon.
Q. Versus the Upper Dresden?
A. No, I would say not.
MS. FRANZETTI: I think we're done.
MS. WILLIAMS: Can I ask some follow-up on this particular point?
HEARING OFFICER: Sure.
BY MS. WILLIAMS:
Q. Are you familiar enough with these ambient standards in Muskegon River to tell me whether they allow -- the standard itself allows for excursions?
A. The standard does not, no.
Q. Do you know if the standard was based on a background value for the nonsummer months in the Muskegon River? An ambient value, I'm sorry.
A. Well, we would have looked at representative ambient data, but I'm almost certain in that case it's based on the short and long-term survival values that came out of the 1978 version of the fish temperature model.
MS. FRANZETTI: Madam Hearing Officer, while counsel is conferring, I don't have any more questions on exhibits, his report, his

prefiled testimony. I do have questions on Attachment S, the MBI/CABB report that, I think it was on Monday, we established Mr. Yoder is also knowledgeable on and we should be directing questions to him.

But I thought it might make sense to give people a chance to do follow-up on Exhibits 15 and 16 topics, and I'll come back on Attachment S tomorrow.

HEARING OFFICER: Okay. I would note, we're going to take a short break. But Flint Hills will be next in the lineup of receiving. But I didn't really see any directly for Mr. Yoder.

MR. HILLS: No, Your Honor -- Flint Hills. None of our prefiled questions are directed toward Mr. Yoder. Obviously, we reserve our right to have follow-up questions.

HEARING OFFICER: Well, then that takes us to Citgo, and I don't see Mr. Fort.

MR. ETTINGER: He's abandoned the fort.

HEARING OFFICER. Which then -- the

list then would go to Corn Products, but again, I didn't see any directly for Mr. Yoder.

MR. HILLS: Same situation.

HEARING OFFICER: Corn products?

CICI, any specific.

Also the District, I really didn't see that you had any for Mr. Yoder.

UNIDENTIFIED SPEAKER: I think we had one, although we may have had follow-up questions.

HEARING OFFICER: All right. Then we will let you ask your one after break.

And then we will go to you, Mr. Dimond.

And, please, take the opportunity to look at your questions. I think he's addressed a lot, I believe, of Citgo, and then I think he's addressed at least some of yours, too, Mr. Dimond.

(WHEREUPON, a recess was had.)

HEARING OFFICER: All right. We are back on the record. And I would note that some off-the-record discussions have

occurred, and the District's question has been answered, that they had directed to Mr. Yoder.

So we're going to start with, I believe, Stephen and the Citgo.

MS. WILLIAMS: Madam Hearing Officer, would you like to have the list that you requested before lunch?

HEARING OFFICER: Oh, I'm sorry. Yes, you did say that. And this is a list that was in response to some questions by Ms. Franzetti.

It is the relative abundance of all fish tax collected electro fishing from Lower Dresden Pool between the I-55 bridge and Dresden Lock and Dam for the period of 1994 to 2002. If there is no objection, we will admit this as Exhibit 19.

Seeing none, it's Exhibit 19.

(WHEREUPON, said document, was marked for identification as Exhibit 19, was offered and received in evidence.)

HEARING OFFICER: Mr. Yoder, who

collected this data, do you know?

MR. DIMOND: I was going to ask some foundational questions.

HEARING OFFICER: Okay.

MR. MELAS: Good.

HEARING OFFICER: Let's go ahead with Mr. Dimond.

BY MR. DIMOND:

Q. Good afternoon, Mr. Yoder, my name is Tom Dimond, I'm here representing Stepan and Company. Regarding the document, the three-page document just marked as Exhibit 19, this is the document that you received from Mr. Hammer at U.S.EPA?

A. Yes.

Q. Do you know what the source of the information on fish species that's recorded in the document is?

A. I believe it is dated, it was collected for Midwest Generation during that period.

Q. What's the basis of that belief?

A. Well, I recall that from participating in the biological committee for the UAA process.

Q. Was this particular compilation

prepared by U.S.EPA or do you know?

A. I don't know. It could have well been prepared by Ham & Associates.

Q. Right. Regarding your Exhibit 15, in Appendix B starting at Page 73.

HEARING OFFICER: Excuse me, Mr. Dimond, if this is one of your prefiled questions, it would help the court reporter to know which one it is. And if not, fine.

MR. DIMOND: I've got a few follow-up questions, I'll let her know when I start in on my prefiled.

HEARING OFFICER: All right. Thank you.

BY MR. DIMOND:

Q. Mr. Yoder, this is the appendix that has the tables with the monthly and bimonthly ambient temperature statistics; is that correct?

A. Yes.

Q. Looking on these pages, I looked hard but could not find anywhere where it told me, for example, for Pages 74 and 75, where this data was taken from in terms of the sampling location.

A. The sampling location is at the top of

the -- Page 74. It's a shaded area. It's called Location, Cicero Avenue.

Q. Okay. Now I see where it is.

A. There are seven locations. I think I said six, I miscounted.

Q. Okay. I couldn't -- I barely could read it through the shading. Okay.

Then in your Exhibit 16, in table Z(1), the page that begins Appendix Table Z(1), key to footnotes, has a sentence at the top that says, "Criteria may vary from the original author's interpretation and are denoted by an asterisk."

What does that statement mean?

A. There were a few, and very few, where the data presented in the report, the author may not have identified one of the endpoints, but it was evident from their data that that endpoint existed. And that's a -- that's an option that I left open in putting this table together.

Q. I'm sorry, you said they identified an endpoint?

A. They may not have identified a certain endpoint in their study, but there was enough data in there to arrive at, perhaps, a conclusion of

that -- one of the endpoints. So we left that option open.

And I -- any information then in the table that's denoted by an asterisk would indicate that. Actually, there's an endpoint -- or excuse me, a footnote, M, also covers that.

Q. Okay. I'm going to start in with my prefiled Question No. 1, which I will modify slightly.

Mr. Yoder, our Prefiled Question No. 1 was to ask you to provide the MBI database and the fish temperature model. But, as I think I've come to understand during the course of the last two days, all the information in the database is essentially in the appendices to the ORSANCO report, Exhibit 14; correct?

A. That's correct.

Q. Is there anywhere in the appendices to Exhibit 16 where you indicate how many organisms were tested in a particular study?

A. No. Unless it's captured by one of these footnotes, and I need to look at those, but I don't recall getting that detailed communications in this. You'd have to go to the original study to

find that out.

Q. Okay. I'm going to pass on my second question.

HEARING OFFICER: Excuse me, Mr. Dimond, may I note, just for the record, you're going to say pass because it's already been answered?

MR. DIMOND: Yes.

BY MR. DIMOND:

Q. On my third prefiled question, I think that the first question there has already been answered, so I will pass on that -- or not pass on it, but I think it's already been answered.

The second question, though, said, "Did you examine whether the 200 news study that you added as part of the ORSANCO work themselves included any adjustment factors to account for differences from natural conditions"?

A. I'm not sure that would be possible, because the CTM endpoint itself, that's the inherent characteristic of that method, so there would not have been any way for them to incorporate an adjustment factor like that.

Q. Okay.

Similarly, I think all the subparts of No. 4 have been answered. I do have one minor question on that.

In terms of the two-degree safety factor that you applied to several of the CTM studies, did you reflect that in the information that is in Table Z(1), or do you add that on at some other point in the process?

A. No, that's done at -- the CTM values are reported in Table Z(1) as they come out of the studies. And then, if you use that as a model input variable, then that adjustment is made at that point.

Q. So if -- so, like, if we look at Appendix Table Z(3), you haven't applied the adjustment factor at this point either?

A. What table did you refer to? I'm sorry, what number?

Q. In Table Z(3). Is the adjustment factor reflected in the numbers in Table Z(3)?

A. I've got my pages scrambled here.

The upper lethal column, that's where the safety factor would have been applied.

Q. So Table Z(3) does have the two-degree

safety factor in it whenever you've applied it?

A. Yes.

Q. Question No. 5 was, do you know approximately what percentage of the original 370 literature sources relied on the CTM method?

A. No, not off the top of my head. I don't know an exact number.

Q. And I think the other questions that are part of No. 5 have been answered, No. 6 have been answered, 7 has been answered, 8 has been answered. In my Question No. 9 I've asked, were there any species that were considered but not included as modified use RASs, and that would be in your Exhibit 15?

A. If I understand what you're getting at, I think all the species in the -- yeah, all of the species in Table 1 of Exhibit 15 --

Q. Yes.

A. -- pages 9 and 10, that was sort of the universe of considerations. So when you'd see species under the modified use column that do not have an X, those were excluded from the modified use.

Q. Question No. 10, what other species

have been identified in the UDI Pool, the Upper Dresden Island Pool, of the Lower Des Plaines River which were not included in the modified use RASs?

A. I didn't determine that.

Q. Okay. And so, you wouldn't be able to answer Question No. 11 about what the inclusion of those species would affect the result of the study?

A. Yes.

Q. I think No. 12 in my list has been answered.

In No. 13, you state in Exhibit 16 that the list of representative fish in the ORSANCO study was determined by a subgroup of the ad hoc committee, which included members of the regulated community and other stakeholders.

The first question in my question was how were the representative fish species identified for the Lower Des Plaines River study, we've answered that. The second question was, was there a chance for input on the selected species by members of the regulated community or other stakeholders?

A. No.

MS. WILLIAMS: Can I follow up here

for a second?

BY MR. WILLIAMS:

Q. Mr. Yoder, would it have been your intention that the decisionmaker or even actually maybe the biological subcommittee would have chosen, amongst your options, to determine the proper RAS list for a given segment of the water body? Do you understand my question?

A. I think so, yes.

That -- I mean, that opportunity was certainly there. That could have -- that could have been done.

BY MR. DIMOND:

Q. Wouldn't it normally be preferable to have that input before you run the model?

A. It's not required to have that input to run the model.

Q. I understand it's not required, but wouldn't it be preferable?

A. It depends on the purpose and use. I would agree with you and in certain situations, yes.

Q. I think my Item 14 has been answered.

MR. DIMOND: So that's all I have.

HEARING OFFICER: Thank you,

Mr. Dimond. We'll go to Citgo's prefiled questions.

MR. FORT: Yes. Thank you, Madam Hearing Officer.

BY MR. FORT:

Q. Mr. Yoder, my name is Jeff Fort. I'm here on behalf of the Citgo Refinery, which is located in Lemont, Illinois. It discharges into the Chicago Sanitary and Ship Canal.

Have you ever been at the refinery?

A. No.

Q. From my brief description, do you have a mental image of about where it is?

A. I'm not sure.

Q. Okay. Do you know whether it's upstream or downstream of the electric barrier to keep the invasive species from migrating into Lake Michigan?

A. No.

Q. You have heard of this invasive barrier previously?

A. The electric barrier?

Q. Yes.

A. Yes.
Q. What's your understanding of it?
MS. WILLIAMS: Can you tell me what number in the prefiled questions this is? I'm sorry if I missed it.
MR. FORT: It's not in the prefiled questions.
MS. WILLIAMS: It's follow-up, okay.
MR. FORT: It's more follow up.
MS. WILLIAMS: That's fine.
MR. FORT: General knowledge.
MS. WILLIAMS: Okay. Thank you.
BY MR. FORT:
Q. Do you have any understanding of what this electric invasive species barrier is or what it's supposed to do?
A. Just in a very general sense.
Q. You don't have an opinion of effectiveness or what the issues here might have to do with that particular device?
A. I don't have any basis to judge its effectiveness.
Q. Okay.
MR. FORT: Going to the prefiled

questions, Counsel, I think Nos. 18 and 19 have been answered.

BY MR. FORT:

Q. Twenty. Mr. Yoder, do you consider yourself an expert on compliance measures to meet water quality standards, such as those identified in your report?

A. Well, I have multiple years of work experience in that area.

Q. And what is your understanding of compliance measures that might be necessary to meet temperature standards, such as you're outlining in your reports and testimony?

A. Do you mean like in terms of the NPD excrements?

Q. I'm not thinking about the legal device to enforce them, I'm thinking about the practical ways to meet these kind of standards.

A. My experience is mostly with electric generating stations and how you would set up a means to determine compliance with thermal standards.

Q. And what are the kinds of measures that electric generating station might take to meet the temperature standards that you've outlined here?

A. I see. In terms of like pollution controls?

Q. Yes.

A. Yes, I understand now.

Q. Okay.

A. There's -- it depends on the type of discharge. If it's once thermal cooling, there's the option to go to closed cycle. Or there's the option to do what we call a thermal looping.

Q. Okay.

A. There's, I believe, some intermediate options, like helper cooling towers, that type of device.

Q. Have you ever been involved -- sorry, go ahead.

A. I'm just saying that type of device.

Q. Have you ever been involved in designing or specifying the characteristics of such devises?

A. I have been involved in developing thermal load management plans.

Q. And what's a thermal load management plan, in your understanding?

A. Well, it specifies the limits under

which a power plant would operate, so that it doesn't exceed the ambient temperature standards.

Q. Is this more of a measurement in management decision tool, or is this the hardware that helps that happen?

A. This is a management measurement meant tool, the operational implementation is by adjusting the operation of the facility.

Q. In your experience of whether it was Indiana or Ohio EPA or anyplace else, have you had experience with any other kinds of facilities needing to do some sort of a thermal management plan or cooling towers or anything else like that in order to meet the standards, thermal standards, such as what you're proposing here?

A. You'll have to pardon me, I have to recall 30 years of memory. I believe I do recall an oil refinery that we dealt with that had a thermal discharge issue.

MS. WILLIAMS: How about municipal facilities, Mr. Yoder?

BY THE WITNESS:

A. No municipal waste water treatment plants, if you're referring to that.

BY MR. FORT:

Q. Okay.

A. I've heard of that in other states, but I've never dealt with it.

Q. So you recall something vaguely about a refinery; correct?

A. Oh, yes. I know which refinery it was.

Q. What?

A. The BP refinery in Toledo, Ohio.

Q. Okay. And what do you recall about those issues?

A. It was a thermal discharge to a highly modified, highly polluted water body that had a lot of the same questions about use attainability.

Q. Do you know if that refinery was treating their waste water for nitrogen?

A. No.

Q. Okay. Are you familiar with the means of treating waste water for nitrogen?

A. No.

Q. You're not aware that you need to heat the water in order to provide nitrification stability for --

MS. WILLIAMS: Objection.

BY MR. FORT:

Q. -- make the -- treat the ammonia, particularly during the winter?

MS. WILLIAMS: I just want to say, Mr. Yoder is not an engineer. We put his resume, laid out yesterday, what he's here to testify for. I mean, I don't have a problem. If he wants to answer, he can answer. But it just seems like we're going down a road where we haven't tried to use him for this purpose. Nobody has -- I'm just not sure the relevance, I guess, of asking this witness this line of questioning.

HEARING OFFICER: He can answer if he can.

MS. WILLIAMS: Okay.

BY THE WITNESS:

A. I do understand it's difficult to treat ammonia during winter.

BY MR. FORT:

Q. And in order to do that, you have to heat the water in order to maintain the bugs so they can nitrify; correct?

A. Yes.

Q. Going on on the prefiled questions, I think No. 21 and 22 of mine have been taken care of.

No. 23, let me refine that a little bit.

Did you collect any field data from the Chicago Sanitary and Ship Canal that was used in your report and testimony in this matter?

A. No. The data we collected in 2005 was not used.

Q. Okay. That was the -- and that was a test of the methodology used to do fish shocking, if I remember your testimony?

A. Yes. It was a comparability study.

Q. It was really a measurement of how you collect samples, as opposed to what the samples were themselves?

A. Oh, no, it's done by actually collecting a sample and then comparing the results from two different samplers. So it's the same data.

Q. Do we know what's the availability of that data? I thought you had asked for a copy of that?

MS. WILLIAMS: I think we had said we

would look for it, but we didn't have it.

MR. FORT: Okay.

MS. WILLIAMS: As far as we knew and U.S.EPA could get it for us.

MR. FORT: Thank you.

BY MR. FORT:

Q. I think No. 24 has been taken care of.

No. 25, let me modify this a little bit.

With respect to the procedure that you are using in your report, Exhibit 15, has that been subject to a peer review or a publication in a peer review journal?

A. Yes. It's patterned ORSANCO Document Exhibit 16, references a study by Bush, et al., as the basis of the methodology.

Q. Oh, I see. So you're saying your methodology is patterned upon something that somebody else has published and that has been peer reviewed; is that correct?

A. Yes. This is a paper by Bush and others, 1974, published in Environmental Science and Technology.

Q. Okay. Since having developed that

methodology in the '70s, are you aware of any other studies since there to demonstrate the accuracy of that approach?

A. No.

Q. Are you currently collecting data to demonstrate the accuracy of that approach?

A. Well, I'm -- we're continuing to work on the approach and improving the accuracy is an outcome that we hope is achieved.

Q. Okay. Thank you.

No. 27.

With respect to your literature references, is that -- are all of those in -- was it Exhibit 16 or 17 -- 16. Everything is in Exhibit 16?

A. They're cited in 16.

Q. Got it. Thank you.

And with respect to that literature, is there a methodology for weighting one as being more authoritative than the other?

MS. WILLIAMS: I think we went over this in a lot of detail, both yesterday and probably today, too. How he prioritizes the different studies, how he chooses the

averages, I mean all of that.

MR. FORT: If the hearing officer thinks it's asked and answered, I'm perfectly fine to move on, but...

HEARING OFFICER: Well, we discussed how Mr. Yoder did it, was that your question, how Mr. Yoder did --

MR. FORT: Yes, it was his --

HEARING OFFICER: Okay. Then, yes, we have.

MR. FORT: Okay.

HEARING OFFICER: I was thinking of it as a more broad question.

Thank you, Ms. Williams.

BY MR. FORT:

Q. Well, is there a broader way of looking at that data and potential conflicting data than the one you particularly used, Mr. Yoder?

A. Well, I won't rule out that somebody else would come up with a different way of doing it.

Q. There really isn't a set protocol or guidelines on how to choose amongst data that aren't identical?

A. I can't point to anything --

Q. Okay.
A. -- that sets a methodology.
Q. Okay. Moving on to No. 30, I think 28 and 29 have been dealt with.
Your methodology that you've used is not something that U.S.EPA has officially embraced in a national publication or national criteria?
A. No.
Q. I think 31, I'm going to remove. He's not a standards expert.
I think 32 we talked about.
I guess 33 really gets me more back into your report, Mr. Yoder. And I want to understand Table 1.
A. In 15?
Q. In Exhibit 15, yes, sir.
A. Table 1, okay.
MS. WILLIAMS: I'm sorry, Jeff, I think I missed where we're at now.
MR. FORT: Sorry?
MS. WILLIAMS: Is 33 where we're at now?
HEARING OFFICER: Yes.

MR. FORT: Well, it's 33, but I think, in order to do 33, I've got to ask some more precise questions than what I had in the prefiled.

BY MR. FORT:

Q. Do you have Table 1 there?

A. Yes.

Q. And maybe you should have Exhibit 19 at the ready as well.

A. Table 19.

Q. So if you'll bear with me, let me make sure I'm understanding Table 1 correctly.

Under the category or secondary contact you have eight individual species identified; correct?

A. Yes.

Q. And it looks to me like the eight species that you have under Secondary Contact appear to be also in Exhibit 19. Is that how it should have gone?

Exhibit 19 was the basis then to come up with the listing of what was available in different categories?

A. There -- according to -- under the

membership rationale column.

Q. Yes.

A. Anything with the 1994-2002 would come from Exhibit 19. Any species that's marked something else only would not have come from this table --

Q. Okay.

A. -- necessarily. And I think there are a couple of species that we included from a historical basis, rather than being on this table.

Q. Well, the one that caught my attention -- one of them that caught my attention from Exhibit 19 was the fathead minnow, which, in the Lower Dresden Pool, there's a grand total of one. And it doesn't show up at all in the -- in your Table 1 of Exhibit 15, as being found in the 1994-2002 report.

A. Right. But -- so its membership rationale is historical.

Q. Okay. Do you have an explanation of why fathead minnows would have been historical but not present from 1994-2002 in the Lower Dresden?

A. Not a specific explanation, no.

Q. Okay. Do you know if the fathead

minnow has ever been found in the Chicago Sanitary and Ship Canal?

A. I don't know that for sure.

Can I clarify one point though?

Q. Absolutely.

A. Part of the membership rationale for an RAS is -- you can include a species that isn't found in a particular area, but it has ecological relevance to other species that are not represented with thermal data.

Q. So you mean the fathead minnow has relevance to things for which there is no data on thermal effects?

A. It can be ecologically represented in something like a secondary contact use, at least in the way we were thinking about.

Q. Okay.

A. And you do get to kind of a critical mass of data that you need to make this work. Eight species is fairly minimal.

Q. What species would the fathead minnow be the proxy for?

A. It's more of the tolerance of what you would expect a secondary contact habitat to --

Q. Okay.

A. -- to support. So it is a species that, throughout the Midwest, you might find in other waters that are typical. But it's really -- it's the tolerance, the highly tolerant aspects of that assemblage.

Q. So you're expecting it to be there, even though it may not be something that gets found?

A. Right.

Q. Okay. And the black bullhead has a grand total of three in the -- on Exhibit 19. And I guess on your Table 1 it also shows up as only being historical.

So that would be another one that you assume to be there but wasn't found?

A. It wasn't found in this sampling, but the historical means it was in the Fishes of Illinois. And it was in close enough proximity to this area that we included it.

Q. So the time period of '94 to 2002 is not a big enough time period in order to assess the native fishes?

A. No. And I think we recommend when these lists are built that historical information be

accessed. Because oftentimes contemporary data can be very unrepresentative of the potential of that water body, if it is restorable.

Q. Now golden shiner appears to have enough hits or findings at 21, even though it's a half of -- less than .05 percent to still make into Table 1 in terms of your species that you're looking at; correct?

A. Yes.

Q. Do you know if either of these last two species we talked about, the black bullhead or the golden shiner are actually found in the Chicago Sanitary and Ship Canal?

A. I'd have to look at the data to determine that.

Q. Okay. Do you know from the list of the eight species, the eight RAS for secondary contact -- and the significance of that is that you use those sensitivities to build your temperature recommendations; correct?

A. Yes.

Q. Okay. Let me move on then to your Table 3 of Exhibit 15.

MS. DIERS: Which is -- now we're

referring to HH. Because Table 3 was corrected earlier, and I don't know if Mr. Fort, if you were here when --

HEARING OFFICER: I was actually going to ask Mr. Fort if he was going to look at Table 3 in Exhibit 15 or HH.

MR. FORT: We have a correction to Table 3, Exhibit 15?

MS. WILLIAMS: It was filed with the proposal, the corrections to Table 3, and referred to in the testimony and all of that.

BY MR. FORT:

Q. Are there any changes in Table HH to the secondary contact list?

A. Yes, that's what changed.

HEARING OFFICER: Do you need a copy of that?

MR. FORT: Please.

HEARING OFFICER: Here's my copy.

MR. TWAIT: That change was represented in our proposal though.

HEARING OFFICER: Yes. This was attached to HH, to the proposal itself.

MR. FORT: I see the numbers have

changed, the questions don't.
BY MR. FORT:
Q. So I understand this, the secondary contact values here for temperature, are those that are based upon these eight species that you have listed with the X in Table 1 of Exhibit 15; correct?
A. Correct.
Q. Do you know of those eight which is the most sensitive to elevated temperatures?
A. Okay. You would find that on Page 72 in Appendix Table 3(G), and it's the first species that has its upper incipient lethal temperature exceeded. And that would be bluntnose minnow.
Q. Okay.
HEARING OFFICER: I'm sorry, I lost part of that.
BY THE WITNESS:
A. Bluntnose minnow.
BY MR. FORT:
Q. And what's -- the second most sensitive then is...
A. Golden shiner.
Q. The golden shiner. Okay. Thank you.
Now, these temperatures that you

have in Table HH all have -- and let's just stay with 100 percent function. Those assume that the, at this temperature, all the species will continue to live with a two-degree Fahrenheit margin of safety?

MS. DIERS: Just to correct, for the record, we're at Attachment HH, Table 3. Sorry.

MR. FORT: Okay.

BY MR. FORT:

Q. Attachment HH, the modified Table 3. So when you come up to value -- and let's just say -- do the short-term survival of 90.3 degrees Farenheit, that represents 100 percent survival with a two-degree Farenheit margin of safety?

A. No.

Q. No?

A. There's no margin of safety for short-term, it's the long-term that has the two-degree centigrade margin of safety.

Q. Okay.

A. That's used as the average.

Q. Thank you.

So survival for long term includes

a two degree Centigrade margin of safety to calculate your 86.7 Farenheit; correct?

A. Yes.

Q. Okay.

MR. TWAIT: Just for a clarification, you said 86.7 degrees?

BY MR. FORT:

Q. So again with these -- in terms of the species upon which these are based, it is based upon the finding in the -- in a body of water other than the Chicago Sanitary and Ship Canal. Because you don't know if anything came out of the Chicago Sanitary and Ship Canal?

A. No, it's -- as I explained, I think yesterday, the concept behind the secondary use RAS was what we would expect to be representative of a fish assemblage that occurs in that type of water body that we described as being highly degraded and as also reflecting the minimum protection supported by.

Q. Are these species the most sensitive to elevated temperature also the basis for the period average calculations, or is it different?

A. The period average is the maximum

value less two degrees C. So yes, it's related to the determination of the short-term survival, so it's a product of that.

And I think I explained before that we're using it here as a surrogate for long-term habitation avoidance.

Q. And that is also -- but that's not true for the cold weather months; correct?

A. No, the nonsummer season is strictly based on maintaining the background seasonal temperature site.

Q. Do you know if the data included in -- which document was it -- Exhibit 16. Do you know if that data for the -- which species was it?

The bluntnose minnow, did you know what age of fish that represented?

MS. WILLIAMS: And I'll let him answer the question he wants to, but -- if he knows. But if he doesn't know, we've already indicated earlier that we'll be following up with the underlying studies for bluntnose minnow as well as white sucker and entering those into the record. Because those are the species that drive --

MR. FORT: Okay.

MS. WILLIAMS: I don't think you were here for that part, that's why I wanted to -- but if he knows the answer, I don't mind him answering.

BY THE WITNESS:

A. Well, in looking at the -- just take all the data that we have compiled for bluntnose, and there are -- there's multiple studies available, as there is for a lot of these tolerant species. All of the studies, except one, dealt with adults. And at least juvenile fish. In fact, the majority were adults. One study was on young.

Q. Did you weigh those differently, whether or not they were juvenile or adult?

A. I think based on the common knowledge that we have had for 30 to 40 years in thermal biology, that juveniles can produce higher thresholds than adults, I think I would have gravitated to adults first.

Q. Juveniles are less sensitive to temperature than adults?

A. Yes. I know that's the reverse of what it is for other substances.

Q. Okay.

Do you know if those fish were -- fish had been raised in a laboratory or had they been extracted from the field and then tested?

A. I would have to look at the study to see.

Q. Would that make a difference?

A. Possibly.

Q. Possibly because the laboratory raised fishes might be more sensitive or not?

A. It could work the other way, too. But a couple of these studies were -- I know for sure, were wild fish. Some were field studies, field observations. So those were definitely wild fish.

Q. Was that anything that you would use for weighing your recommendations here?

A. Not for picking an upper lethal, you're kind of constrained to lab study almost by definition of the test for that. We might have had a preference for field data for something like avoidance temperature.

Q. Okay.

A. But again, it's based on the type of study that was done.

Q. Okay. Are you aware of the findings made by your colleague Mr. Rankin in terms of the habitat of the Chicago Sanitary and Ship Canal, as contrasted with the further down gradient waters?

A. Well, I'm familiar with his written report.

Q. Okay. Are you familiar with the extreme fluctuations in the Chicago Sanitary and Ship Canal in terms of water height varying of four to six feet in the matter of 24 hours or so?

A. Generally, yes.

Q. Do you think the temperature has a greater effect upon fish than those water level variations?

A. It depends on how serious the temperature effects are.

Q. Okay.

A. It could trump water level fluctuations but the reverse could be true as well.

Q. And what about the actual habitat conditions? Could that also trump temperature?

A. Well, I think -- yeah. In those extreme variations, the flow can certainly be overruling.

Q. What is your -- do you have a view on the effects of the lock and damn structures on the Chicago Sanitary and Ship Canal on fish survival and how they may -- how that might impact their success?

A. No.

Q. Do you have a particular understanding of how the sanitary and ship canal is constructed with locks along the various reaches?

A. Yes, I've been on the waterway at some of those points.

Q. Okay. Do you have a view of the effect of those devises on fish as compared to temperature? Is that another one of those things that could be more significant than temperature in some situations and temperatures more significant in others?

A. It could be.

Q. I think you indicated yesterday that you'd worked on the Cuyahoga River system in Cleveland?

A. Yes.

Q. How many locks and dams are there on the Cuyahoga?

A. There are none.

Q. That's what I thought. Okay.
It is channelized, but it does not have the restraining devices of lock and dams for navigation?
A. That's right. It's open to Lake Erie.
MR. FORT: That's all I have.
HEARING OFFICER: Go ahead, Mr. Dimond.
MR. DIMOND: I do have one question.
BY MR. DIMOND:
Q. Mr. Yoder, you've got this two-degree safety factor that you applied to the results of the CTM models; correct?
A. Yes.
Q. And you also applied the two-degree safety factor between the short-term and the long-term survival in your fish temperature model will; right?
A. Yes.
Q. So in a particular instance, if in the 100 Percent column, where the driving entity is a single species, you could actually have a four-degree safety factor for the long-term survivability rate; right? If the short-term

survivability is based on a CTM?

A. Well, they're really two different concepts. They just happen to be the same degree Centigrade.

Q. But you could end up with a four-degree safety factor there; right?

A. I'm not going to characterize it that way. I don't think --

Q. Well, it would be four degrees Centigrade over the published literature of the CTM result; right?

A. Yes. But the two-degree adjustment of the critical thermal maximum is to make it more like the preferred endpoints. Or just independent of the other --

MS. WILLIAMS: I mean --

MR. DIMOND: Thank you. That answers my question.

MR. FORT: I've got one more here.

BY MR. FORT:

Q. Mr. Yoder, I started asking you questions about these eight species that you use for secondary contact. You're not aware if in fact any of these were found in the Chicago Sanitary and Ship

Canal?

A. I'd have to look at the data, I mean, I'd be very surprised.

Q. You'd expect a couple would be?

A. Oh, yes.

Q. But whether all eight are isn't clear?

A. No.

Q. Thank you.

HEARING OFFICER: Mr. Ettinger?

MR. ETTINGER: I have some follow-ups on the two-degree questions. I don't think these were asked, at least my associates here don't think so.

BY MR. ETTINGER:

Q. Where did you come up with the two-degree safety factor between the short-term and the long-term?

A. Well, it's inherently rule of thumb, but it approximates -- I guess it approximates a reasonable separation between a maximum and a longer term average. And it also is sufficient separation from a short term -- a criteria that's designed to protect for short-term effects versus one that's designed to protect for long-term effects.

And so, that's -- I mean, I think that's the rationale. And I think the concept imbedded in the long-term survival is that it would minimally protect against long-term avoidance.

Q. Is there anything in the literature that we can look at to find at that two percent number, or how did we --

A. Two degrees C?

Q. I'm sorry, two degree number.

A. What I recall, some of the early compendium that were written in what I call the zenith of the thermal research of the 1970s, that seemed to be one of the rules of thumb that was referred to. And it may be in the Brun publication, which was really the, at the time, one of the most comprehensive compendium in 1974.

MR. ETTINGER: Okay. Well, can you we go off the record here for a second?

THE HEARING OFFICER: Sure.

(WHEREUPON, discussion was had off the record.)

HEARING OFFICER: Back on the record.

Mr. Howe, you can ask a question.

MR. HOWE: Peter Howe.

BY MR. HOWE:

Q. Mr. Yoder, do you know if the 1978 water quality standards for temperature in Ohio were approved by U.S.EPA?

A. Yes, they were.

MR. HOWE: Okay. Thank you.

HEARING OFFICER: All right. Then let's switch to Exxon Mobil.

MS. WILLIAMS: Is the District --

HEARING OFFICER: It was already answered.

MS. WILLIAMS: Thank you. I missed that.

MS. DIERS: Can we have just a moment, please?

HEARING OFFICER: Sure.

(WHEREUPON, discussion was had off the record.)

MS. WILLIAMS: Are we talking about No. 12, Tom?

MR. SAFLEY: Since I have had the benefit of the last two days, I'll be able to ask them a little more eloquently than they were written here.

Yes, Question No. 12 on Page 9 and Question No. 15 on Page 10. But again, I'm going to try to rephrase them in a way that makes more sense in light of what we've been talking about in the last couple of days.

HEARING OFFICER: Go ahead.

BY MR. SAFLEY:

Q. My name is Tom Safely, and I'm up here right now on behalf of Exxon Mobil Oil Corporation. And as I just indicated off the record, there are a couple of our prefiled questions that I wanted to ask you.

I have had the benefit now of having been here for your testimony over the last couple of days, so I think I'll be able to ask them in a little more clear way than they were written before we had the benefit of your testimony.

My first question is going to spring from our prefiled Question No. 12, which is on Page 9 of our profiled questions. And before I ask it as it is written here, we talked -- or you talked in response to some of the questions just a little bit ago about just very generically some options for facilities to address thermal issues and

their discharges to comply with thermal standards. Do you remember that testimony?

A. Yes.

Q. Okay. With regard to your November 2005 report, which I think is Attachment B to your testimony --

MR. SAFELY: Is that Attachment A?

MS. WILLIAMS: They were numbered.

HEARING OFFICER: It's Exhibit 15.

MR. SAFLEY: Okay. Well, we know what we're talking about. I haven't kept track of the numbers or letters the right way.

BY MR. SAFLEY:

Q. Was any consideration of methods of treating a thermal discharge or reducing a thermal load to achieve compliance, was that within the scope of what you were tasked with doing when you prepared that November 2005 report?

A. No.

Q. And did you in fact consider any of those kinds of issues when you were preparing that report?

A. No.

Q. So then, to get back specifically to

the question that's here, would it be then correct to state that you did not, in considering that report, take into account the operational impact to a facility that would be required to adjust its discharge every two weeks for five months of the year in order to comply with the changing temperature limit?

A. No.

Q. No, that's not correct, or no --

A. Oh, yes that is correct.

Q. Okay.

A. No, I did not take that into account.

Q. Thank you.

Then moving on, my next few questions will stem from the prefiled Question No. 15 at the top of Page 10 of the prefiled questions. And again, we set this up in light of the testimony that's been given.

There has been some discussion today regarding the issue of excursions above a maximum temperature water quality standard which might be set. Do you recall that testimony?

A. The excursions that you're --

Q. I just want to make sure I understood

our earlier testimony -- or your earlier testimony.

One of the options -- or within the options that your report provides to Illinois EPA, are maximum temperatures; is that correct?

A. Yes.

Q. And there was some discussion earlier about, in general, what the affect might be of going above that temperature for some period of time. Do you recall that testimony?

A. Yes.

Q. And where I wanted to go with this is, did you or were you tasked with providing any options to Illinois EPA on any kind of limit on those excursions, either in extent of the excursion -- of an excursion above the maximum temperature or percentage of time that excursions might be allowed to occur?

A. I wasn't asked to do that, no.

Q. Okay. Did you in fact provide any options on that issue in your report?

A. No, I did not.

Q. Okay.

MR. SAFLEY: Those are -- that answers these questions to the extent that they're

directed to Mr. Yoder.

BY MS. WILLIAMS:

Q. I may have already asked this earlier, so I apologize if I'm re-asking it.

But, Mr. Yoder, do you have an opinion personally about whether excursions of the type just mentioned here by Mr. Safely are appropriate with in a water quality standard?

A. My opinion?

Q. Your opinion. What's your opinion?

A. No, I don't think they should be done in the standard. That's my opinion.

MR. SAFLEY: If I can follow up then on that question.

BY, MR. SAFLEY:

Q. Mr. Yoder, you've obviously expressed your opinion on that. We've also had some discussion about specific aspects of water quality standards that are up to a managing governmental body to consider taking into account the options that you have provided in your report.

Would that be something that Illinois EPA in this case would be able to consider and make a judgment call on whether it thought that

those excursions should be addressed in a water quality standard?

A. That's their call.

MR. SAFLEY: That was my only question. Thank you.

HEARING OFFICER: Ms. Franzetti?

MS. FRANZETTI: I'd actually like to start with of couple questions for Mr. Esaig, so we can put a little background to Attachment S.

HOWARD ESAIG,

called as a witness herein, having been previously duly sworn and having testified, was examined and testified further as follows:

EXAMINATION

BY MS. FRANZETTI:

Q. And, Mr. Esaig, you had previously testified the other day that on May 9th, 2007, in your e-mail box appeared Attachment S; is that correct?

A. If you're referring to the -- can you tell me what attachment is, please?

Q. Oh, Attachment S is the field data and QHEI.

MS. DIERS: Isn't Exhibit 5 that we've marked, or are we talking about --

HEARING OFFICER: She's asking, generally, about Attachment S, I believe.

MS. DIERS: So now we're in S. Okay, I'm sorry.

MS. FRANZETTI: Yeah, not the revised -- not the two revised sheets. I want to go back to the beginning.

MS. DIERS: Okay.

MS. FRANZETTI: How the heck did we get Attachment S?

MS. WILLIAMS: I would like --

MR. FRANZETTI: I think Mr. Esaig is where it starts; correct? It came in through an e-mail to you; right, Mr. Esaig?

MS. WILLIAMS: I would like to help the court reporter here, Susan. I don't think Howard has spoken here today or his name has been spelled on the record.

So for the record we're -- the Mr. Esaig we're referring to Howard Esaig, E-S-A-I-G.

BY MR. FRANZETTI:

Q. Mr. Esaig, do you now have in front of you Attachment S?

A. Yes, I do.

Q. Okay. And do you remember the other day telling us that you received that on May 9th, 2007 by e-mail; correct?

A. Yes.

Q. And that e-mail was from U.S.EPA I believe you said; is that right?

A. Ed Hammer.

Q. Ed Hammer, U.S.EPA.

Now, how did you come to receive it? Did it -- did you ask for it, or did it just pop up in your e-mail?

A. I don't remember exactly what the circumstances were. I remember -- I think I had contacted them about another matter, I believe, for some other information.

I don't remember exactly why I -- I think we probably had talked about these things and he offered to send it to me, I believe. But I don't recall specifically.

Q. Okay. I'm just trying to --

MS. WILLIAMS: Can you clarify when we

say "Ed." I think it's -- I just want to make sure when you say "Ed."

MS. FRANZETTI: It's Mr. Hammer.

MS. DIER: Thank you.

MS. FRANZETTI: Thank you.

BY MS. FRANZETTI:

Q. Mr. Esaig, did it come up in the -- as you're saying, you were talking to Mr. Hammer about you think a different project. And then, I take it, he mentioned that he had this information, which we're referring to as Attachment S, that had to do with the Lower Des Plaines River?

A. I think that may have been what occurred.

Q. Okay.

A. I'm not sure.

Q. I understand. As best you can recall, he already had the info, he brings it up to you and says, "You may find this to be of interest?"

A. Probably. I don't know if that was what he said or not.

Q. I understand. Not verbatim. But, generally, "Would you like to see this data"?

A. Sure.

Q. And you say, "Yeah, send it on"?
A. Yes.
Q. Okay. All right. So you get it.
And then, once you get it, what do you do with it?
A. After I looked it over, I went ahead and I believe I forwarded it on to Springfield.
Q. Meaning, Illinois EPA's office --
A. Yes.
Q. -- in Springfield, the water division?
A. Yes.
Q. Anyone in particular?
A. You know, I don't recall specifically.
Q. Okay. Would it likely have been the people in the water division that were working on the UAA?
A. Yes.
Q. Now, with respect to your involvement with Attachment S, is that where it ends?
A. (No audible response.)
Q. You forward it on, and do you do anything else with Attachment S?
A. I've looked it over.
Q. Okay. Let me be more clear and help

you. Did you talk to Mr. Yoder about it or anyone?
A. No, I did not talk to Mr. Yoder about it.
Q. Did you talk to anybody else at MBI/CABB?
A. No, I did not.
Q. Okay. So if I want to find anything more about Attachment S and how it got prepared and what it's all about, I shouldn't be talking to you; is that right?
A. That's correct.
Q. Thank you. Okay.
MS. DIERS: I think Mr. Dimond had a question.
MR. DIMOND: Yes.
BY MR. DIMOND:
Q. Mr. Esaig, when you sent the data to other people at Illinois EPA, did you forward it by e-mail?
A. Yes, I did. So there -- I could find out for you who I sent it to.
MR. DIMOND: Madam Hearing Officer, could we request that the e-mail from Mr. -- that a printed-out copy of the e-mail from

Mr. Hammer and Mr. Esaig's e-mail forwarding it to other people be made part of the record?

HEARING OFFICER: I think that's --

MS. WILLIAMS: It's fine with me. I just don't think there's any dispute that we got it via e-mail.

MR. ETTINGER: Is this a chain of custody matter? I mean --

MS. WILLIAMS: I mean, is there a question about any of that? Are you concerned about the --

MR. DIMOND: It's not a chain of custody matter, it's a matter of what information Mr. Hammer may have relayed --

MS. WILLIAMS: Okay.

MR. DIMOND: -- in his e-mail when he relayed the data.

MS. WILLIAMS: That's fine. I mean, not today, obviously.

HEARING OFFICER: But before the March hearing?

MS. WILLIAMS: Before the March hearing.

MS. FRANZETTI: If I may, I'm going to ask one of my prefiled questions on Attachment S in order to, again, try and put it a bit in context before I move to specific questions about some of the other information that was produced the other day and has been marked as Exhibits 5-8. So I'm going to ask the question, and I will leave it to the panel of witnesses as to who is the one with the responsive knowledge to the question.

BY MS. FRANZETTI:

Q. My question is, it appears that the Illinois EPA is relying on the fact that the QHEI scores for the Upper Dresden Pool range as high as 80, to conclude that the Upper Dresden Pool is capable of maintaining a biological condition that minimally meets the Clean Water Act aquatic life goals. Is that correct?

Is that something you're relying on for your finding that Upper Dresden Pool is capable of meeting the Clean Water Act aquatic life goal?

HEARING OFFICER: For the record, that's Page 24 of the prefiled

Question(b)(2)?

MS. DIERS: Did you say Page 24?

MS. FRANZETTI: You are good.

MS. DIERS: Page 24, what question? I'm sorry.

HEARING OFFICER: (B)(2).

BY THE WITNESS:

A. Yes, we considered the whole range of scores.

BY MS. FRANZETTI:

Q. Well, that's not exactly my -- I understand you considered the whole range. What I'm trying to understand is, is the fact that the QHEI scores you have, range as high as 80, one of the factors you relied on in concluding that Upper Dresden is capable of minimally meeting the Clean Water Act aquatic life goals?

A. We concluded that, based on QHEI, ranges from 45 and above were reasons to consider the habitat limit.

Q. Okay. And is the Illinois EPA relying on information contained in Attachment S to support its statement that the QHEI scores for the Upper Dresden Pool range as high as 80? Is that the

source of that statement that they range as high as 80?

I'm trying to put this in context for all of us --

A. It came from Attachment S, yes.

Q. -- Where does this come from. It comes from Attachment S.

MS. WILLIAMS: Is this coming from a statement, a quote?

MS. FRANZETTI: It's coming -- it's my prefiled question No. 3.

MS. WILLAMS: I'm sorry. Go ahead.

MS. FRANZETTI: It is in your statement of reasons, I know at least it's there, that the QHEIs range as high as 80 for Upper Dresden Pool. I don't -- this shouldn't be a shock, a surprise. And I'm just trying to find out if the place I find those QHEI scores that are as high as 80 is in Attachment S.

Yes, Rob.

MR. SULSKI: Yes. We looked at several sources of QHEI, so attachment S has a value like that.

There may be other sources, we have to look at all the different -- the data and the attachments.

MS. FRANZETTI: All right. Let me -- well, fine.

MR. SULSKI: You know, there may be some corresponding values there that, you know, corroborate with that or whatever.

MS. FRANZETTI: Right. You're telling me that Attachment S is at least one place that I will find the source of the underlying support for the statement that the QHEI scores range as high as 80 for Upper Dresden Pool.

MR. SULSKI: Correct.

MS. FRANZETTI: All right. I'm submitting to you, and I'll go one -- I will back this up with a question. But the whole point of this is, I don't think so. I think Attachment S is the only place where they range as high as 80, and that leads to my next question --

MS. WILLIAMS: Hang on.

You can answer that.

MR. SMOGOR: Okay.

I think that's correct.

MS. FRANZETTI: Thank you.

MR. SMOGOR: I'm sorry, my name is Roy Smogor, S-M-O-G-O-R.

BY MS. FRANZETTI:

Q. Now, if we want to find the source of -- or the support for that statement, the only place we will find it is in Attachment S information.

So let me ask my next question, which is prefiled Question 5.

Is that correct that neither the 2004 studies reported in the Rankin CABB report in Attachment R identified QHEI scores higher than 67 for the Upper Dresden Pool?

MR. SMOGOR: That's where I'm not following you.

MS. FRANZETTI: Okay.

MR. SMOGOR: Because, from my numbers, it looks like one of Rankin's scores from Attachment R is a 69.5.

MS. FRANZETTI: All right. I'll accept that.

MR. SMOGOR: Okay.

MS. FRANZETTI: That you think that's the highest score that Mr. Rankin came up with.

MR. SMOGOR: And, as far as I can tell, there's two scores from the Rankin report Attachment R from Upper Dresden Island Pool.

MS. FRANZETTI: There were two locations?

MR. SMOGOR: Two locations -- yes. Two locations, each given a QHEI score.

MS. FRANZETTI: Okay. So from Mr. -- the highest in Mr. Rankin's is two locations that scored 69.5.

MR. SMOGOR: No, I'm sorry. Mr. Rankin has two locations, each having a QHEI score. And the highest of those two scores was a 69.5.

MS. FRANZETTI: All right.

MR. SULSKI: I have some sixties.

MS. FRANZETTI: Do you have them somewhere other than Attachment R or S? Or S. What I'm trying to do --

MR. SULSKI: Yes. You're just -- yes.
MS. FRANZETTI: -- is explain to the Board that we have QHEI scores in Attachment R, they top out at what I'm accepting -- I'm accepting a 69.5. Then we also have Attachment S. And, in there, they hit a higher score of 80. There may be --
MR. ETTINGER: Excuse me. My mat may be off, but I think 83 is bigger than 80; isn't it?
HEARING OFFICER: I think you're looking at the Exhibit 5.
MS. FRANZETTI: I'm talking about the Upper Dresden Pool.
MR. ETTINGER: I'm looking at the Des Plaines, and I see an 83 here.
HEARING OFFICER: On Exhibit 5 there's an 83.
MS. FRANZETTI: We'll get to that. These prefiled questions are based on Attachment S and not any of the information that's been produced in exhibits 5-8, 5 and 6, basically, revising what was in Attachment S. And that's why my questions

are specific to Attachment S. Okay?

With respect to QHEI scores, we have Attachment R, we have Attachment S. We do also have the revisions to Attachment S.

Are there any other sources of QHEI scores that the Agency relied upon in coming to its determination that the Upper Dresden Pool could minimally attain the Clean Water Act aquatic life goal?

MR. SMOGOR: Yes.

MS. FRANZETTI: Okay. Where -- what is that?

MR. SULSKI: In Attachment A.

MS. FRANZETTI: There's QHEI data in Attachment A.

MR. SULSKI: Yes.

MS. FRANZETTI: All right. Do you know what entity collected that QHEI data?

MR. SULSKI: I'll look, but I believe --

MR. SMOGOR: Yes. EA.

MR. SULSKI: EA.

MR. FRANZETTI: And by "EA," we're referring to EA Engineering, which is the

consultant to Midwest Generation; correct?

MR. SMOGOR: Yes.

BY MS. FRANZETTI:

Q. And that's -- they do -- they collected that QHEI information as part of those annual stream surveys that Midwest Gen was required to do by the terms of it's adjusted standard?

A. Those were from --

Q. Sorry.

A. I believe they were collected in 1992 as a part of the studies for that adjustment standard.

Q. Thank you. Yes. So those came before the adjusted standard was received. They were relied upon to obtain the adjusted standard; is that what you mean, Mr. Esaig?

A. All I meant was they were collected in 1992 as part of that study.

Q. Okay. Now, going back to Attachment S -- and before I want -- I just want to get this in before we end today.

We had the other day when Exhibit 8 was produced, which is the QAPP for the Attachment S study.

HEARING OFFICER: Q-A-P.

MS. FRANZETTI: Q-A-P-P.

We had noted, while we were given Exhibit 7, which is a collection of QHEI field data sheets of the type that are -- a sample is shown in Figure 5 of Exhibit 8, we were not given a collection of the field data sheets that are depicted in Figure 4 and are used for the purpose of recording electro fishing collection data. And I think an effort was going to be made to ask Mr. Yoder to bring those with him.

And so, I now ask, is there any additional information, including but not limited to the completed Figure 4 field data sheets that you can -- the Agency can produce to us?

MS. WILLIAMS: Can you give us a minute to locate them? The answer is yes, but let us -- if you want them entered now.

MS. FRANZETTI: I would have loved to have gotten them yesterday, but...

MS. DIERS: We have them -- Susan, we have them, we just need to make copies of

them. Sorry.

I thought they had done that earlier for me. I apologize.

MS. FRANZETTI: Well, you know, the day is long, it's the end of day, but just for the record, we specifically asked for these, we asked you to ask him for them.

MS. DIERS: We got them this morning.

MS. FRANZETTI: I understand. But he's only here for --

MS. WILLIAMS: They were FedEx'd from Ohio.

MS. FRANZETTI: He was only here for one more day. If I hadn't asked the question -- I didn't think he brought them. I didn't think you had them. And I just wanted to make it clear on the record that's the case. So, I guess, if I hadn't asked the question I wouldn't even be told that they exist, you have them, but you just didn't get them copied.

MS. DIERS: Well, I've got a lot of other things to do. I got them this morning, the copies were made --

HEARING OFFICER: Ms. Diers, we are on the record.

MS. DIERS: I know we are on the record, but I'm being accused of something.

HEARING OFFICER: We need to all take a deep breath. We are going to have a copy, I'm sure, to Ms. Franzetti before the end of the day?

MS. DIERS: Yes.

HEARING OFFICER: At a minimum to Ms. Franzetti?

MS. DIERS: Yes.

HEARING OFFICER: Thank you.

MS. FRANZETTI: Let me turn to the QAPP, Exhibit 8.

BY MS. FRANZETTI:

Q. Mr. Yoder, I think these questions are probably directed at you.

Let me ask the overall question: Do you have a copy of the Exhibit 8 in front of you?

A. Yes.

Q. Okay. And do you recognize Exhibit 8 as the QAPP for this fish assemblage assessment of the Lower Des Plaines River?

A. Yes.

Q. In performing this study, it says on the first page submitted by Chris O. Yoder, principal investigator and project manager. I take it, you served in those roles for this project?

A. Yes.

Q. Now, with respect to performing this study, did you do everything -- did you or your staff do everything that this QAPP says would be done?

A. Well, that's certainly the intent.

Q. All right. Well, let me put it another way: Did you perform the study in accordance with this QAPP, Exhibit 8?

A. Yes, I believe it was conducted in accordance with the QAPP.

Q. Okay. You know, one other basic point: Our copy lists a number of names under approvals on the front page.

Is there -- and I'm not going to ask for it, I just want to establish, did the person listed here approve this QAPP?

A. Yes, they're signed -- there is a signed original at EPA Region 5.

Q. That is signed by all four of those individuals approving this QAPP?

A. Yes.

Q. Okay. Let me move on to a general question Mr. Yoder.

I believe you testified the other day that this proposal to do this study was made in response to a request for bids by U.S.EPA Region 5; correct?

A. Okay.

Q. It's been awhile, I may be remembering wrong.

A. The grant under which this was done was an award that was made to MBI after a request for proposals and competitive process. This is just one project done under that larger grant.

Q. Thank you. I do remember now that's how you previously testified.

And as it says on Page 3 under the Section A(3) distribution list, it was contemplated that this data would eventually be used by Region 5, Illinois EPA, Illinois DNR and others to address multiple issues in the Lower Des Plaines, including UAA. Do you see where I'm reading from?

A. Yes.
Q. So that was known at the front end of the study, at least by you; correct?
A. Yes.
Q. And at least by MBI/CABB?
A. Yes.
MS. FRANZETTI: Now, can I ask the Agency: Did the Agency know at the inception of this project that this data was being collected and would eventually be used by it in connection with the UAA for the Lower Des Plaines?
Yes, Rob.
MR. SULSKI: I can recall a conversation, perhaps, at the stakeholder meetings of the CAWS, UAA or somewhere in that time frame at the end of those, that MBI would be out collecting additional data on these systems. But that's the extent -- I had no -- I didn't have any documents.
MS. FRANZETTI: All right.
Well, Mr. Smogor, you're here and you're listed there as one of the interested contacts. What role did you play as an

interested contact in getting this project going?

MR. SMOGOR: I don't recall.

MS. FRANZETTI: Do you recall any role?

MR. SMOGOR: No, nothing specifically.

MS. FRANZETTI: Okay.

You don't recall discussing any of these purposes of this study with people from MBI/CABB?

MR. SMOGOR: No. Nothing specifically.

We meet every now and again Region 5 -- biological assessment technical people meet every now and again and discuss issues. And sometimes Mr. Yoder is there and sometimes Mr. Hammer is there.

And so, we may talk about ongoing projects, in general, but I don't remember any details.

MS. FRANZETTI: Okay. All right.

HEARING OFFICER: Excuse me, Ms. Franzetti, Mr. Dimond has a --

MR. DIMOND: Mr. Sulski, the

stakeholder meeting that you said that this may have been discussed at, was that CAWS stakeholder meeting?

MR. SULSKI: Yes. But I don't mean it was necessarily announced, that everybody knew. I can recall during that period of time that there was -- somebody was collecting go additional data on the waterways that could be useful to the project.

That's -- and who said it exactly, I can't tell you. But I can recall that that --

MR. DIMOND: But that was at a CAWS stakeholder meeting, not a Lower Des Plaines River stakeholder meeting.

MR. SULSKI: That's correct.

BY MS. FRANZETTI:

Q. And now, Mr. Yoder, back to you. And directing your attention still on Page 3 under A(4), Project Task Organization.

And in the second sentence it says, "Chris Yoder will serve as the principal investigator and project coordinator. In this

capacity, he will provide the primary oversight and management of all aspects of the project, including participating directly in the field sampling and ensuring that all methods and procedures are followed."

Did you do that?

A. I did not participate directly in this specific sampling, no.

Q. So that's one example of something that was not done in the way the QAPP says; correct?

A. That's correct.

Q. Now, it says, another couple of sentences on, "The CABB will assign a qualified crew leader who will be responsible for all data collection activities."

Who was assigned as that, quote, unquote, "qualified crew leader"?

A. I believe for that project it was an employee by the name of Alex Johnson.

Q. Do you know whether Mr. Johnson has previously collected this type of data in the areas covered by this work, i.e., Upper Dresden Pool? I think there were some sampling locations below the I-55 bridge, has he done it before in this area?

A. This is his first -- is was his first survey of this river.

Q. All right. Okay.

Turning to Page 4. There is a figure, Figure 1, Quality Assurance Project Plan Functional Table of Organization. And we go from the top box, CABB director Brian Armitage, directly down to you, Mr. Yoder, as the principal investigator and project manager.

And then, one of the lines down from you is to the agencies and stakeholders. And in that box is Illinois EPA, Illinois DNR and the UAA study group.

Was the UAA -- well, who -- who is the UAA study group that's referred to there?

A. Well, as I recall, that would have been the -- my understanding was, and I put this table together, because this is standard operating procedure for QAPP -- Project QAPP. And I really can't recall who the UAA study group was, that's something that I put in there.

Probably my frame of reference for that was something like the biological subcommittee that I participated on before. So that was really

the intent.

Q. So the intent was -- your intent when you prepared the QAPP was to give the biological subcommittee group of the UAA stakeholders group for the Lower Des Plaines some role in this project?

A. This table of organization doesn't imply a confirmation of a role. It's more -- it also indicates where the information can flow to and who might be interested in it.

Q. Okay.

A. It doesn't necessarily mean that they have to participate in the study.

Q. I understand. It can also just mean that this is one of the entities to whom the information collected in the study will flow to?

A. Yes.

Q. Did this information ever flow to the UAA biological subcommittee, to your knowledge?

A. I'm not aware of that. I -- in actual terms, that was up to Ed Hammer.

Q. So Mr. Hammer decided whether or not any of the stakeholders were going to receive the information collected as a result of this project?

A. Yes.

HEARING OFFICER: Ms. Franzetti --

MS. FRANZETTI: Time to stop? That's fine.

HEARING OFFICER: Almost a quarter to 5:00. So let's go ahead and wrap it up for today and we'll start again tomorrow morning at 9:00 with Ms. Franzetti. Thank you everyone.

(WHICH WERE ALL THE PROCEEDINGS HAD IN THE ABOVE-ENTITLED CAUSE THIS DATE.)

STATE OF ILLINOIS)
) SS:
COUNTY OF COOK)

I, SHARON BERKERY, a Certified Shorthand Reporter of the State of Illinois, do hereby certify that I reported in shorthand the proceedings had at the hearing aforesaid, and that the foregoing is a true, complete and correct transcript of the proceedings of said hearing as appears from my stenographic notes so taken and transcribed under my personal direction.

IN WITNESS WHEREOF, I do hereunto set my hand at Chicago, Illinois, this 11th day of February, 2008.

Certified Shorthand Reporter

C.S.R. Certificate No. 84-4327.