ILLINOIS POLLUTION CONTROL BOARD
AUGUST 12, 2004

IN THE MATTER OF:
PROPOSED AMENDMENTS TO
DISSOLVED OXYGEN STANDARD 35 ILL.
ADM. CODE 302.206 R04-25
(Rulemaking - Water)

The following proceedings were held before the Illinois Pollution Control Board, August 12, 2004, at the Stratton Office Building, Springfield, Illinois, before Ann Marie Hollo, CSR, RMR.

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E X H I B I T S

| NUMBER | MARKED FOR IDENTIFICATION | ADMITTED |
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| Exhibit 9 | 9 | 9 |
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HEARING OFFICER MCGILL: I want to go on the record. Good afternoon, and welcome to this Illinois Pollution Control Board hearing. My name is Richard McGill. I'm the hearing officer for this rule-making proceeding entitled, Proposed Amendments to Dissolved Oxygen Standard 35 Illinois Administrative Code 302.206. The Board docket number for this rule making is RO4-25. The Board received this rule-making proposal on April 19, 2004 from the Illinois Association of Wastewater Agencies, or IAWA, on May 6th. The Board accepted the proposal for hearing to amend the Board's general use of water quality standards for dissolved oxygen.

The Board held the first hearing in this rule making on June 29 in Chicago. Today is the second hearing. No other hearings are presently scheduled.

Also on behalf of the Board to my left is Board Member Andrea Moore, the lead board member for this rule making. To her left, Board Member Tanner Girard, and to his left Board Member Thomas Johnson. To my right, two

members of our technical unit, Anand Rao, and Alisa Liu.

Would any of the board members present like to make any remarks at this time?

BOARD MEMBER MOORE: I would. Thank you. As Mr. McGill said, my name is Andrea Moore, and I'm the lead board member on this rule making.

And I, again, would like to welcome all of you, and thank you very much for your participation and for attending today. We appreciate all the hard work that has been done, and clearly everyone went to a lot of effort in establishing this proposal and the testimony questioning at the hearing, all the filings. There's been a lot of effort put forward.

I'd like to take this opportunity to emphasize the importance of the subject we're dealing with. And I'll quote Toby Frevert who is from the IEPA at the last hearing. He generally said that this is one of the most important -- one of the most important rule makings in 30 years as it regards to water

quality. So it is incumbent upon all of us to establish a good and solid record from the Board to make a decision.

So with that in mind, I am hoping that everyone will and all participants to be cooperative and proceed in a civil manner and assist us in developing a record that's complete.

And just to be clear for today, we are not ruling today on the motion pending that is to suspend the consideration of this rule making. The entire Board, through a board order, will rule on that motion. The purpose of today's hearing is not to make legal arguments on that motion or otherwise, but rather to gather information relating to the dissolved oxygen proposal. Thank you.

HEARING OFFICER MCGILL: Are there any other board members present that would like to make a comment?

With that, as I mentioned before we went on the record, if you would like to testify today, and if not already, inform me. There is a sign-in sheet for testifying located up here

in front of the room.

Today's proceeding is governed by the Board's procedural rules. All information that is relevant and not repetitious or privileged will be admitted into the record.

We will begin IAWA's testimony followed by any questions the Board or members of the audience may have for the IAWA's witnesses. Please note that any questions posed by board members or staff are designed to help develop the complete record for the Board's decision and do not reflect any bias.

After the questions, we anticipate receiving testimony from Dr. David Thomas, Chief of the Illinois Natural History Survey. And after that, we hope to receive an update from a representative of the Illinois Environmental Protection Agency on state holder discussions regarding implementation rules. After that, time permitting, anyone else may testify regarding the proposal.

Like all witnesses, those who wish to testify will be sworn in and may be asked questions about their testimony. And also if

we have time, we will take up the Department of Commerce and Economic Opportunity's decisions to not conduct an economic impact study on this proposal.

We'll conclude today's hearing with a few procedure items.

For the court reporter, who is transcribing today's proceeding, I'd ask that you please speak up and don't talk over one another, so that we produce a clear transcript.

With that, are there any questions about the procedures we will follow today? Seeing none, I'd ask that the court reporter to swear the IAWA's witnesses and attorney collectively at this point.

(Whereupon the witnesses were sworn.)

HEARING OFFICER MCGILL: Thank you. And now, the IAWA's attorney, Roy Harsch, will begin the rule-making presentation today.

MR. HARSCH: Thank you very much. We have pre-filed testimony from Dr. Garvey. And attached to Dr. Garvey's pre-filed testimony is a report, dated July 2004, entitled, "Long-term Dynamics of Oxygen and Temperature in Illinois

Streams." I would move that a copy of the pre-filed testimony, along with his report, be entered as an exhibit, marked as an exhibit.

HEARING OFFICER MCGILL: If I could have that. Thank you.

Is there any objection to entering this document as a hearing exhibit? Seeing none, this will be Hearing Exhibit Number 9.

(Whereby, the Hearing Officer marked Exhibit Number 9.)

MR. HARSCH: An additional exhibit that I would like marked is a copy of Dr. Garvey's and Dr. Whiles' report, dated April 2004. That is in the record. As Dr. Garvey will testify, he has received comments back from Mr. Chapman who is the author of the National Criteria Document. And those comments are either in blue or gray. I've got some multiple copies of that. I have got that marked as an exhibit.

HEARING OFFICER MCGILL: We'll mark this as Exhibit 10.

(Whereby, the Hearing Officer marked Exhibit Number 10.)

HEARING OFFICER MCGILL: Are you moving to

have that entered at this time?

MR. HARSCH: That would be fine.

HEARING OFFICER MCGILL: Any objections to entering this document as a hearing exhibit?

MS. WILLIAMS: I'd just like to clarify what is it, and do we have copies?

MR. HARSCH: You have copies. It's the comments back from Mr. Chapman.

MS. WILLIAMS: Yes, I'm Deborah Williams from the Illinois EPA. Sorry.

MR. HARSCH: They were sent in email form to Toby.

HEARING OFFICER MCGILL: Could we go off the record for a moment?

(Whereupon there was a short discussion off the record.)

MR. HARSCH: And I also have seven extra copies of Dr. Garvey's written testimony if anybody didn't get it and would like one.

HEARING OFFICER MCGILL: Let's go back on the record. Where we left off, the Agency Attorney Deborah Williams had a question about the document that's been moved to be entered as a hearing exhibit. I believe it's the

Garvey/Whiles report reflecting comments in the margin by Chapman, the author of the 1986 NCD. Is that a fair characterization, Mr. Harsch?

MR. HARSCH: Yes, it is.

HEARING OFFICER MCGILL: I'll just repeat. Is there any objection to entering that document as a hearing exhibit? Seeing none, I'll enter that as Hearing Exhibit 10.

(Whereupon Exhibit Number 10 was entered into evidence.)

MR. HARSCH: At this point in time, I'd like to call Dr. Garvey.

HEARING OFFICER MCGILL: Okay.

MR. HARSCH: Dr. Garvey, you've previously been sworn. Would you please present your pre-filed written testimony.

DR. GARVEY: Okay. Thank you for the opportunity to testify before the Illinois Pollution Control Board during this second hearing in Springfield, Illinois.

As I noted in the first hearing before the Board, I am an assistant professor in the Fisheries and Illinois Aquaculture Center and the Department of Zoology at Southern Illinois

University at Carbondale. My research interests revolve around fish and aquatic ecology in lakes and streams.

The Illinois Association of Wastewater Agencies asked Dr. Matt Whiles and me to assess the current Illinois state dissolved oxygen standard, which requires that at no time shall concentrations below 5 milligrams per liter and for at least 16 hours each day they must remain above 6 milligrams per liter.

In our report, we concluded that the standard is unrealistic for most streams in the state, because oxygen concentrations fluctuate both seasonally and daily, often declining below the state's standards. These conclusions were based largely on published studies summarizing research conducted outside of Illinois in addition to unpublished data in tributaries of the Ohio River, which were discussed at the first hearing.

Proposed recommendations. To make the state general use standard more realistic, Dr. Whiles and I recommended that during March through -- March 1 through June 30th, when

early life stages of sensitive species are present, a minimum identical to the current Illinois standard of 5 milligrams per liter in a seven-day mean of 6 milligrams per liter should be adopted. During warmer productive months and the remainder of the year, when species with sensitive early life stages have largely completed reproduction, we recommend a minimum of 3.5 milligrams per liter and a seven-day mean minimum of 4 milligrams per liter. It is important to emphasize that we included running means to avoid chronically low dissolved oxygen concentrations. For the proposed standard to be supported, minima must not be violated, ensuring that concentrations never approach critically lethal limits.

Analysis of Illinois stream data. In response to questions about fluctuations of oxygen in Illinois surface waters, I analyzed the applicability of both the current state standard and the proposed standard to eight Illinois streams, in which dissolved oxygen and temperature were intensively monitored. My analysis is attached as Exhibit 1.

I was made aware of this data during a meeting with the USEPA on June 18, 2004. It is my understanding that the United States Geological Survey, further known as USGS, and Illinois Environmental Protection Agency, further known as IEPA, began collecting this data to address concerns about the applicability of the current state standard of streams in the state. I requested these data from Paul Terrio, a hydrologist, with the USGS shortly following the first hearing.

I also reviewed oxygen and temperature data in other reports for streams in Illinois. I have summarized my analysis of these data in a recent report submitted to the Illinois Association of Wastewater Agencies, and submitted as Exhibit 1.

Paul Terrio of USGS, Robert Mosher of IEPA, and Matt Whiles of Southern Illinois University, have provided comments on this report that I have incorporated into the final draft.

These long-term data are unprecedented. I am aware of no other similarly comprehensive

data set for streams of the Midwestern United States. We now have access to robust data that will allow us to ground truth the proposed dissolved oxygen standards.

The eight intensively studied stream reaches were North Fork Vermilion River by Bismarck, Middle Fork Vermilion River near Oakwood, Vermilion River near Danville, Lusk Creek near Eddyville, Mazon River near Coal City, Rayse Creek near Waltonville, Salt Creek near Western Strings, and Illinois River near Valley City.

During late summer 2001 through fall 2003, semi-continuous dissolved oxygen and temperature data were collected by IEPA and USGS. The stream segments varied widely in physical characteristics, surrounding land use and latitude. Five of the eight streams segments are currently considered impaired and included on the most recent 303-d list compiled by IEPA. The nature of impairment varies from nutrient enrichment in Rayse Creek to mercury and PCB contamination in the Illinois River.

Dissolved oxygen patterns in Illinois

streams. The results from this analysis uphold the conclusion of the Garvey and Whiles report. As expected, dissolved oxygen concentrations declined in all streams during summer, with diurnal fluctuations varying among them. All eight streams violated the Illinois state's standard, although violations occurred as infrequently as 1 percent of days and as frequently as 65 percent of days. Among the unlisted, unimpaired stream segments, oxygen dynamics varied widely with Lusk Creek, a functioning stream in a forested watershed, regularly violating the Illinois standard of 5 milligrams per liter during 22 percent of days. In two of the impaired, 303-d listed streams, the Illinois standard was violated frequently, with concentrations often declining below 2 milligrams per liter, which is regarded to be lethal for many aquatic organisms. However, in other listed streams, dissolved concentrations were typically greater than the 5 milligrams per liter minimum.

We might expect that nutrient enrichment is a primary factor affecting dissolved oxygen

dynamics. Streams with greater nutrient loading should have lower oxygen. However, Salt Creek, an impaired stream, with low biotic integrity and high nutrient enrichment, had higher average dissolved oxygen concentrations than Mazon River, which was only listed for PCB and pathway contamination. Nutrient enrichment must interact with other factors, such as stream physical habitat to affect oxygen dynamics.

Application for proposed standard. Adoption of the proposed standard greatly reduces the number of violations in unimpaired streams, such as Lusk Creek, while still capturing violations in impaired streams. In fact, the proposed standard increased the frequency of violations in two of the severely oxygen-impaired streams and identified the time period when oxygen problems occurred. It may be tempting to regard Lusk Creek as an intermediate between a functioning and an impaired system and suggest that its frequent violations of the current state standard are a warning signal. However, this is quite far

from the truth. This stream segment is in the Lusk Creek Wilderness area of the Shawnee National Forest and is considered to be in a pristine state, with a highly regarded intact and diverse fish and macroinvertebrate assemblage.

A concern of the Board during the first hearing was that minimum oxygen concentration of 3.5 milligrams per liter, which occurred during summer in Lusk Creek, would negatively affect summer-spawned, early life stages of resident species. It is quite clear, given the robust assemblage of this system, that natural summar declines in dissolved oxygen concentration below the state mandated 5 milligrams per liter and occasionally reaching 3.5 milligrams per liter, did not negatively affect fishes reproducing during this time. Lusk Creek demonstrates that seasonally appropriate proposed standard protects both spring and summer reproducing species.

Temperature effects. Dissolved oxygen concentrations were quantified in a pooled area of Lusk Creek as recommended in the

implementation guidelines of the Garvey and Whiles report. It is in this area that we would expect to encounter the most conservative dissolved oxygen concentrations. In contrast, the Middle Fork of the Vermilion River, in which oxygen concentrations were consistently the highest, had a logger located about a hundred meters below riffle area, where we would expect oxygenated area to be abundant. Although it may be argued that Lusk Creek is a Southern Illinois stream, and warm temperatures may be responsible for declines in oxygen during summer, dissolved oxygen concentrations were lowest at intermediate summer temperatures, indicating that it is not the seasonal temperature maxima of streams that reduce oxygen concentrations.

Further, I found no substantive differences in temperature among streams across the north-south gradient of the state. These data effectively show that the proposed standard effectively captures oxygenated dynamics that occur in natural fully functioning Illinois streams, such as Lusk

Creek. A revised general use dissolved oxygen standard in Illinois such as that proposed by Garvey and Whiles is needed.

Habitat modification. Some investigators have argued that artificially pooling streams and rivers by building dams will reduce oxygen and therefore negatively affect resident species. Recent reports in the Fox and DuPage Rivers have shown the pooled areas of streams violate the current standard more than open reaches and that fish composition differs between them. The problem with implicating violations of the current dissolved oxygen standard as responsible for altering or degrading species composition in pooled reaches is that the habitat of the river changes as well as the oxygen dynamics. And in short, flow declines, sedimentation increases, and more fish that rely on accumulation of organic matter and open water will prosper. Oxygen declines because of the increased biochemical oxygen demand of the sediment and increased retention time of the water. As long as oxygen concentrations remain above the proposed

standard in pools, species adapted to pool conditions will be abundant while flow-dwelling species will be rare or absent. Of course, if oxygen concentrations decline below the proposed standards, even species adapted to pooled conditions will cease to persist. Garvey and Whiles recommended monitoring pooled areas of natural streams because of their lower expected oxygen concentration.

The eight intensively monitored streams provide more insight into the problem of teasing apart changes among habitat, oxygen and other quality parameters. Across the streams, no relationship existed between biotic integrity scores and oxygen minima as estimated by frequency of violations of either the current or proposed standards. Typically, integrity scores are closely related to measures of habitat quality, which include factors such as the stream's substrate, habitat diversity and riparian vegetation. Habitat quality fosters the diversity of organisms providing food, shelter and reproductive areas. As such, it appears that habitat, rather than

oxygen, primarily influences species composition. Reduced oxygen concentrations and increased diurnal fluctuations are a secondary effect of habitat degradation or modification.

Comparison between oxygen and ammonia standards. The most conservative ammonia standards for the state are designed to protect early life stages of all fish species for the duration of spawning, which may extend through October.

In the first hearing, I was asked why the most conservative proposed oxygen standard extended only through June, while the conservative ammonia standard is extended through the entire reproductive cycle of fishes. Dynamics of total ammonia and oxygen differ in streams. The total concentration of ammonia in streams typically depends on discharge and does not vary naturally on a seasonal basis. Further, the toxicity of total ammonia increases with increasing in temperature during summer, necessitating stringent standards for all early life stages of fish, particularly those that are produced

during summer. Conversely, the data summarized in my report clearly show that oxygen concentrations in the pooled area of a natural functioning stream do decline well below the current standard during summer, but not below proposed, seasonally appropriate one. As I noted earlier, because the community in such a stream is intact, summer-spawning fish species must reproduce successfully during this time, demonstrating that the proposed standard better reflects natural fluctuations in this system while protecting resident fishes.

Review by Gary Chapman, author of the National Criteria Document. To determine whether the seasonal standard was consistent with the United States Environmental Protection Agency's 1986 Natural Criteria Document, I solicited a review from its author, Gary Chapman, following the first hearing. He had provided a review to the Water Quality Section of the Illinois Chapter of the American Fisheries Society on June 28, 2004, and he forwarded this review to me.

To summarize, he felt that the timing of

seasonal standards depended on the working knowledge of fish community in the state and should be, quote, "left to the experts" unquote. His largest concern was the omission of a 30-day running average of 5.5 milligram per liter in the proposed standards. Although I still think that such a standard is generated over such a large time scale that it is generally biologically meaningless, it may be worth considering as part of the proposed standards, given his expert opinion.

His other comments were relatively minor, revolving around the interpretation of recent findings in dissolved oxygen research. He supported our implementation recommendations and thought they should be adopted.

Regarding protection of fish during summer, he commented, quote, "I have seen no data over the past 20 years that would indicate that the 3 milligram per liter minimum would not be adequately protective against lethal effects", end quote.

Chemical interactions with oxygen. In the first hearing, I was asked about the potential

effects of low dissolved oxygen concentrations on water chemistry in streams and lakes. To the best of my knowledge, reduction-oxidation chemical reactions are unaffected by oxygen concentrations until they decline far below the proposed 3.5 milligram per liter minimum.

Conclusions. In summary, much more is known about fluctuations in oxygen and temperature in streams in the State of Illinois than during the first hearing. The results of the new analysis confirm the conclusions of the Garvey and While report for other aquatic systems. Semi-continuous measurements in pristine, forested Lusk Creek were quantified in the appropriate location and provide a useful baseline by which general expectations for dissolved oxygen concentrations can be generated. Although the proposed standards may be generally applied across the state, either regional standards or a stream classification system should be adopted to better reflect use expectations. Such a system will need to incorporate biotic integrity, habitat quality, and water quality goals rather than focussing

solely on dissolved oxygen expectations. Given the data from the Illinois streams and other systems in the state, the likelihood that the current dissolved oxygen standard will not apply to many of these systems and produce false violations is confirmed. Adopting the proposed standard and standardized monitoring outlined in the Garvey and Whiles report will not only reduce the probability of detecting a false violation in functioning streams, but it will provide robust, long-term water quality data sets for improving management of surface water in the state.

QUESTIONS BY MR. HARSCH:

Q In terms of clarifying questions. When you referred to Mr. Chapman's comments, that would be what has been marked and accepted into evidence as Exhibit 10?

A That is correct.

HEARING OFFICER MCGILL: Mr. Harsch, you have some additional witnesses today?

MR. HARSCH: I might have a couple clarifying questions.

HEARING OFFICER MCGILL: And you wanted to

follow up with now?

MR. HARSCH: Right.

Q Dr. Garvey, essentially then, Mr. Chapman's recommendation to include the 5.5 day mean for the summer months, that was contained in the National Criteria Document as the suggested standards?

A Yes.

MR. HARSCH: On behalf of IAWA, we would welcome that change if the Board chose to make that change.

Q When you're talking about the implementation sampling procedures set forth in your report, if I show you a copy of an email, are these the recommendations that are consistent with your recommendations?

A Those are consistent with our recommendations on page 39 of the original report that we, Whiles and I, authored, and Gary Chapman in his comments suggested that that would be the ideal, or at least a great starting point from implementation guidelines associated with dissolved oxygen.

MR. HARSCH: At this point, I would like

to have this marked and accepted into evidence as an email that I have referenced, I believe, in our response to pending motion and as an email I've sent out to a number of folks that are here today and took part in the state holders' meeting this morning.

HEARING OFFICER MCGILL: Let's go off the record for a moment.

(Whereupon there was a short discussion off the record.)

HEARING OFFICER MCGILL: Let's go back on the record. There's been a motion to enter the document Mr. Harsch described as a hearing exhibit. It would be Hearing Exhibit 11, a one-page copy of an email regarding parameters for implementation rules. Is there any objection to entering this document as a hearing exhibit? Seeing none, I'll enter that as Hearing Exhibit 11.

(Whereby, the Hearing Officer marked Exhibit Number 11 and entered it into evidence.)

Q (By Mr. Harsch) Dr. Garvey, if the DO values are sampled in accordance with procedures set

forth in Exhibit 11, based on your report, is it your -- what is your opinion regarding whether the 5.0 and 3.5 minimum values, would they be fully protective of all of the aquatic life you would expect in the system?

A According to the implementation guidelines in this exhibit, it is my feeling and it is both by the National Criteria Document and the report that Whiles and I authored to be protective of all aquatic life in Illinois.

Q That would mean that if you took a sample at the sediment water interface, which would not be in accordance with Exhibit 11, would you not expect that DO value to be below three and a half?

A Yes.

Q Or be a lower value than what you would expect, taking two-thirds of the stream depth?

A Yeah, that's correct. And in fact, I have data from tributaries to show that that is the case. If you take a reading near the sediment water interface, it's going to be quite low, and that's because there's high biological oxygen occurring at that point. And it's essentially -- it might or might not be reflective of dissolved oxygen

concentrations in the remainder of the water column.

Q And would that account, in part account for the difference in the macroinvertebrate you would expect to habitat -- to live in those pooled areas versus, say, the riffled area?

A Correct. In pooled areas, you're going to expect a different aquatic life assemblage than you would in a riffle area, which is the area where there's fast-flowing water being re-aerated. If you have a lot of organic matter accumulation, that might occur in the acquiescent area, in a stream or pool area, typically what you're going to have is a fair amount of respiration by the microbes that live in that organic matter, and it's going to naturally consume oxygen. That's the reason why you see low oxygen concentrations at that point.

Q Based on your review of the intensive sampling data from the eight locations, do you have any opinion as to what would happen with respect to the ability of those segments that are listed for impaired, for DO purposes, if you remove the point source, the non-point source biological oxygen demand for those segments?

A I think the closest stream segment that we

have that shows that would be the Lusk Creek system. It's an over 70 percent forested area. There's no wastewater discharge in the vicinity or any other discharge in the vicinity that I know of. Very little agriculture.

So that particular system would be the one that we would sort of look to as being the system that's relatively unaffected by human activities, the best we can. And, of course, that was the system that routinely dropped to dissolved oxygen concentrations that were near what our proposed minimum is for the state. Suggesting then, that there's other processes that are important.

Now, water quality or essentially dissolved oxygen was quantified in a pooled area of that particular stream as outlined in our implementation guidelines in the report. And so that would be in the place where we would expect to see the lowest oxygen concentration to occur at any given time. So that would be our best probably stream segment for comparison for the other states as I noted in my testimony.

Q So is it then your opinion that for those impaired stretches that were sampled, if you remove

the input point, the nonpoint source, those segments would still not comply with 5 and 6 current standard, based on what you observed in Lusk Creek?

A Well, it's tough to say. I'd probably say the closest stream to compare the Lusk Creek, because they're at the same latitude, would be Rayse Creek, and that's the one who has a lot of agriculture in the watershedding. Typically, it was very low in terms of oxygen concentration during the entire summer. So I consider that severely impaired. If you reduce the nonpoint and the point source, I would expect it probably to behave the most like Lusk. They're similar in size, similar in the occasional reductions in flow that occur. So we would expect Rayse, if there was enough ripe vegetation, to behave probably most closely to Lusk.

Q Have you had a recent opportunity to discuss -- have you had recent opportunities to discuss further the question regarding oxidation reduction potential since the preparation of your written testimony?

A Yes, I have. That was a question that I've heard conflicting information about over time. The general concern is, if I understand it, in a

situation where you get close to that 3.5-milligram per liter minimum in dissolved oxygen concentration during the summer time, will that affect, for example, total phosphorous in the water column. Typically what would happen in the hypolimnion of lakes, that the area of the bottom of lakes, it tends to be completely oxygenated depleted during the summertime. And in a stratified lake, there is phosphorous, which is a chemical that obviously is important from a perspective of available nutrient for algae in particular streams and lakes. When it's combined with oxygen, it tends to be fairly voculent; you know, actually precipitate out of a particular system and hand down to sediments. But when oxygen is reduced in a particular system, phosphorous then can become available. What it does is it becomes more soluble, and will come back up in the water column and will be easily consumed, because it becomes easily available to the plankton, to the other plants that are in a particular system.

And so the concern is if we get down around 3.5 milligrams per liter, that will create a situation where oxygen becomes essentially limited around where the phosphorous and the sediment is,

and then phosphorous becomes more available from the sediments.

I talked with folks who are biogeochemists. In general, basically they said that you would have to have basically dissolved oxygen concentrations near zero for those conditions to occur in the sediment. So probably under the conditions that we suggest for the summer of the state, you shouldn't run into the problem with having phosphorous suspended from the sediment.

MR. HARSCH: At this point, I would like to mark -- I apologize, because we didn't copy it correctly with the date. It appeared in the Daily Herald approximately a week and a half ago, a letter to the editor. And I have copies. I'd like to mark this as an exhibit. And I will provide the date to the Board that it actually appeared in the Daily Herald.

HEARING OFFICER MCGILL: And do you have a witness who's going to be testifying regarding this?

MR. HARSCH: Just responding to it. Basically it's a letter to the editor.

HEARING OFFICER MCGILL: Mr. Harsch, if I

could just ask you to bring your microphone closer. Thank you.

MR. HARSCH: It was a letter to the editor that appeared in the Daily Herald approximately two weeks ago. And, again, I will apologize and will clarify the exact date. By David Horn from Aurora, entitled, "Find Effort to Lower Fox Oxygen Criteria."

Q Dr. Garvey, you reviewed this letter?

A You know, I've just looked over it very briefly. Since I have seen it just today, it's been difficult for me to, you know, come up with a strong opinion one way or another.

Q But is it the intent, as you understand it, of IAWA to propose a standard that, in fact, will result in the stream dissolved oxygen water quality?

A Certainly not, or I wouldn't be working with you.

Q Is your opinion that adoption of the standard by the Board, will that lead to a lower water quality in terms of dissolved oxygen in the Illinois streams?

A No. My belief is that it will not have an

effect on the dissolved oxygen concentration in the streams of Illinois.

Q And is that in part based on your understanding of how your standards apply to those segments where there was continuous data available?

A Absolutely. The continuous data certainly increased my confidence, and many of the conclusions that Whiles and I made in our report.

Essentially, we believe that in these natural systems in Illinois, we have natural fluctuations in oxygen that often decline 3.5 milligrams per liter. And they will sustain 3.5, sustain an essentially intact functioning aquatic assemblage in the state.

MR. HARSCH: Mr. Callahan, do you have anything further in response to what has been -- this letter to the editor?

HEARING OFFICER MCGILL: If I could interrupt just for a moment. You have yet to give your full name and title.

MR. CALLAHAN: My name is John Michael Callahan, and I'm the Director of the Bloomington Normal Water Reclamation District. I testified previously at first hearing, and

I've been sworn in today as part of this panel.

I'd simply like to call the Board's attention to the fact that I think the general tone of that editorial implies that this standard will, in one way or another, allow a deterioration of the water quality of waters of this state by not demanding the minimum, 5.0 milligram per liter, which we now have.

I think as Dr. Garvey has presented here this afternoon in his testimony with the EPA and geological survey data, our original contentions at first hearing have been borne out. Our national ambient systems violate this standard in and of themselves. Once again, the violation of this standard removed from a biological context and applied to today's regulatory context results in a number of actions through the total maximum daily loading program, as well as development of nutrient standards, which become particularly critically important in terms of cost effectiveness.

So, again, I would reiterate the point that the standard, as it is being proposed, is not going to allow any slippage from where we

are today, but what it's more going to precisely do is define where we need to go in the future, in terms of realistically enhancing our water quality.

MR. STRICHER: Dennis Stricher, Director of Wasterwater Systems with the City of Elmhurst, Illinois, and representing IAWA.

HEARING OFFICER MCGILL: This gentleman has also been sworn as part of the panel, just so the record reflects that. Thank you.

MR. STRICHER: When IAWA undertook this effort three years ago now, our understanding of the dissolved oxygen standard was that it was flawed, and that it needed to be corrected, and that it would be used, as Mike has just stated, to develop future water quality standards, specifically for nutrients. Our goal was to develop a correct standard, a foundation from which IEPA and those who are charged with developing these standards can work from the dissolved oxygen. Our goal is a crucial foundation block or fundamental value that will be used in developing these future standards.

Our goal -- in reading these opinions, these newspaper articles and some letters that have been submitted, it's frustrating because we feel that the goal of IAWA has been misunderstood. And that, in fact, the science that Doctors Garvey and Whiles have presented here has been misunderstood. Our goal is not at all to reduce at all the water quality standard, but, rather, to develop a more accurate way. So that's our testimony.

MR. HARSCH: That would conclude the questioning that we have from the prior testimony.

HEARING OFFICER MCGILL: We still have the motion to enter this letter to the editor of the Daily Herald, the letter from David J. Horn, we will enter that as a hearing exhibit. Is there any objection? Seeing none, I'll mark that as Exhibit 12.

(Whereby, the Hearing Officer marked Exhibit Number 12 and admitted same into evidence.)

HEARING OFFICER MCGILL: Let's go off the record for a moment please.

(Whereupon there was a short discussion off the record.)

HEARING OFFICER MCGILL: Back on the record. We'll move on to questions for the IAWA's witnesses.

Member Girard, you had a question?

BOARD MEMBER GIRARD: Thank you. Yes, I did. In fact, I had several questions, but Mr. Harsch did a good job of asking them before, but he did leave me one.

QUESTIONS BY BOARD MEMBER GIRARD:

Q So Dr. Chapman (sic), on page 4 of your testimony there, under the subsection, application to proposed standard, it's actually about the second sentence, you mentioned that the proposed standard increased the frequency of violations in two of the severely oxygen-impaired streams and identified the time period when oxygen problems occurred. Could you please explain how that happened?

A Essentially because we're looking at the proportion or the frequency of violations that occurred in the spring where we had the one standard, and then during the remainder of the year we had the other standard. Essentially what we did

is we looked -- well, I looked at the continuous data for those particular seasons. So I looked at the spring continuous data, dissolved oxygen data that we had semi-continuous.

Just to clarify, the data was collected every half hour. So we have a very good estimate of fluctuations in this particular stream.

And, of course, as there are with all data, there are gaps here and there. And the reason why those gaps occurred is because, you know, if the probe was down or something like that. So we excluded any data that looked as if they were suspect from the analysis. Typically, if you get a really low dissolved oxygen reading and there wasn't any prior to that, or after that, something went on with the probe. So those data were excluded from the set.

Essentially, then, what we did in the analysis was take a look at the proportion of dates essentially when dissolved oxygen concentrations went below that particular standard, either the current Illinois one or the proposed one. And what we found is, or what I found -- I keep saying "we" -- is essentially that if you use the current

Illinois standard, which is a one size fits all for all seasons, you get a certain number of days or proportion of days that that minimum was violated. When we -- when I apply the proposed standard to that particular analysis, what I'm doing is dividing up our criteria for the spring months when we expect to have early life history of fishes present particularly, and then also the summer months when we expected that most spawning to be completed. And essentially if there's a system where most of the violations or the oxygen became very low during the summertime, the relative proportion of dates during the summer can actually increase in terms of relative to looking at it during the entire season with the current standard.

Essentially, so that's the reason why it didn't actually increase the number of the proportion of dates data violation occurred is because you're focussing primarily on the months when the violations are occurring. And in case it would be during the summer when we got the 3.5-milligram per liter standard.

Does that answer your question?

So essentially what it does is it

isolates one that during the summertime we have a 3.5-milligram per liter -- well, let me roll back and just find out how much you understand, just exactly what.

So essentially we propose, Whiles and I propose two standards. We have the springtime standard of 5 milligrams per liter minimum. And I'm just going to stick to that right now. I'm not talking about average. And we have the summertime average or summertime standard, which is 3.5 milligrams per liter. And essentially what we found in the summertime is that gives us one idea of when the standard is being violated versus during the springtime when the standard can be violated. And so, essentially, in the two streams where we essentially had a higher level of impairment was in the summertime, which the Illinois standard cannot detect because it's basically for the entire year.

I'm not sure if I made that clear or not. Can you clarify and tell me where you're confused? I'm really sorry I'm butchering this.

It's obvious we have to apply two different standards to two different time periods. It gets complicated.

Q What I'm trying to find out is, if you know, from your work with the data, you see anything that would give us some idea on how often these measurements need to be taken, if you have any sort of recommendations on that. It's different for when you're talking semi-continuous, which is what we're doing, whether you're taking a reading once a day and you just happen to hit certain cycles, or whether you're taking, as you said, every half hour, and you know, how much data we need to collect to be able to be comfortable with, you know, as you said, not going below the toxic levels.

A Okay. Let me roll back and say that the data said, as I mentioned in my testimony, is unprecedented, because it gave us almost -- it's a great data set because it provides us with daily fluctuations in dissolved oxygen concentration as well as seasonal average that we could look at as well. Some people might argue that it's too many, too much data to work with because it does take a lot of time to get the data worked up and then try to get the maximum and minimums for each day, calculate the averages and do all those sorts of things. However, you can write statistical programs

to sort of tease that apart.

The historical tool that these data provide are unprecedented because what they can do is give us a long term on oxygen concentrations and how they fluctuate in these particular systems and pinpoint the time of year and also the time of day that we're expecting to see oxygen decline.

So, essentially, as we continue to do this, and hopefully if we do, adopt these standards in the implementation procedures of this continuous or semi-continuous monitoring program associated with it, it will help us to further refine periods of time during the year when we should expect to see the important decline in oxygen, to secure whether it's in the springtime or in the summertime.

Currently with what we have in the state right now, we can't do that because, you know, we're basically taking one grab sample, and if it's above 5, we're fine. We don't know anything else about the system. But if we implement this set of procedures, I think we'll be able to understand more about that particularly, because we can look to see whether most of the violations occurred during that summer period when the minimum was 3.5 milligrams

per year or most of the violations occurred during the springtime when essentially the standard was 5 milligrams per year.

Now, what I found in the analysis is that most of the violations occurred in that summer period, which is really scary, because that means that a lot of these systems were declining far below -- well, not all of these systems, but two of the systems are declining far below 3.5 milligrams per liter, which established what would be the minimum wasn't a critical lethal impact on particular organisms of that particular system, which would suggest to us that summertime is the main time that we need to be working on restoration of those particular streams that have impacted, and we wouldn't be able to do that, basically look at the data, the way we do for the 5-milligram per liter standard.

So hopefully that explained a little bit better than my butchering of my explanation prior to that. Is that clear or --

Q Well, yeah. That just brings up some other questions.

A Sure. That's great.

Q You know, if we go to a different standard, does that mean we're going to have to quit semi-continuous loggers on most stream segments in the state?

A Well, personally, my hope would be that we would be able to identify the critical times of the year when we need to be out monitoring.

Now, currently most of my information or my understanding of how the EPA goes out and collects data on the streams is associated with the intensive base survey that we do right now, which is a summertime project where they hire students to go out and help sample the organisms in the streams.

The reality is that according to the data that I have looked at for the eight streams that I worked on, there were virtually no violations that occurred during the winter, late fall or very early spring months. Temperatures are just so low in those particular stream segments throughout the state, and dissolved oxygen is never going to be a problem for most organisms. It's not going to be a problem. The time to focus would be late spring, probably June, when we transition from the spring standard to the summer standard. A lot of

violations occurred during that time with our proposed standard and also during the summer. And the summer months is the time when, you know, you're going to really begin to see potential slumps in oxygen because you have a high, high oxygen demand just due to high productivity in the systems.

So the time to probably be taking a hydro lab, which is what you collect continuous oxygen data, would be probably during the months of June through August. And that's probably when we begin to see the major problems if you have a problem with oxygen in a particular stream segment.

So the data sort of showed that, and that would be what my recommendation would be from an implementation standpoint. And, of course, having them in every stream in the state. You know, every one of the -- I guess, as I heard today, there's like three thousand some stream segments, which is not going to be feasible, but if they're rotated around, and IEPA does what they do right now where they focus on biotic integrity, find streams that look like there's going to be a problem, and then hit those hard and find out what the problem is, and if DOs is one of them with a continuous

monitor, great. If it's something else, great, too. But that's really how they are going to have to, I hope, focus on sort of implementing our recommendations.

BOARD MEMBER GIRARD: Thank you. That's all for now.

MR. HARSCH: Could I ask sort of a follow-up question to that?

MR. RAO: I had a follow-up question, too.

BY MR. HARSCH:

Q If you use, in your opinion, can you use the existing kind of method where you go out and take a DO grab sample, for lack of a better word, and look -- and use a normal diurnal fluctuation to help pinpoint areas where there might be a problem?

A Yes, you can. I also, just playing with the data, looked to see what the average diurnal fluctuation in oxygen is. And as you might expect, and actually what most of the textbooks predict, is that in a system that's severely impaired, you're going to get huge swings in oxygen. And in the morning hours, you're going to get it very, very low. And then in the daytime hours, it gets very, very high. And the swings are almost more

interesting to look at than the average during the day. And you can get swings of 4 or 5 milligrams per liter with no problem.

But even in the systems, like Lusk Creek, which we consider to be fairly well functioning, you still get swings during the summer of oxygen and would be up to 3 milligrams per liter.

So if you go during the day, you take a grab sample, and it's a certain dissolved oxygen concentration, you can pretty well predict on average it might be during the summertime up to 3 milligrams per liter less during the pre-dawn hours, which will give you sort of a rule of thumb to go out and send somebody with the continuous monitoring logger or semi-continuous monitor. You're not really going to get too many monitors that's going to take continuous data. Put it in that stream segment to see if you really have a problem or not. And I think that's probably the best way to use time and resources, that kind of thing, to pinpoint where the problems are.

Q Or you could get up earlier and take the samples at 4:00 o'clock in the morning.

A That's too much work, getting up in the

morning. But you could do that, too.

MR. HARSCH: Thank you.

BOARD MEMBER JOHNSON: I had a follow-up to that.

MR. RAO: Mine is a follow-up, too, to Dr. Girard's question.

QUESTIONS BY MR. RAO:

Q You know, referring back to your testimony on page 4, where you stated that the proposed standard increased the frequency of violations in the two severely oxygenated-impaired streams; first I just wanted to, you know, get it on the record which streams segments were you referring to most impaired?

A Okay. Rayse Creek, and as far as I know, that would be the Mazon.

Q Mazon River?

A Those are the two that are the most problematic.

Q You know, you proposed two different standards where you had a one-day minimum and seven-day standard. So when you did that analysis in terms of the frequency of violations, which standard did you find was more frequently violated,

I guess?

A Most typically it was -- you know, it's interesting because the reality is, is that when one was violated pretty regularly, the other one seemed to be violated pretty regularly as well. They're telling us two different things.

When the critical minima are violated, it's suggesting that occasionally dissolved oxygen concentration dips, and then it pops back up again. If in conjunction with that, you get a seven-day mean that's low as well, that's suggesting that you have a chronic low oxygen problem on top of it, you know, dropping below that critical minimum. When that occurs, you know that you have a severe -- severely impacted problem.

And so if I take a look here, Rayse Creek had both problems with the violating a 3.5 minimum, and it did that 70 percent of the time. And it's got to be during the summer months. And then it also violated the 4 -- the average of 4 milligrams per liter as a minimum of 78 percent of the time. So in this case, it was actually showing more of a chronic signal than was even the violation minimum. That creek has got some problems.

And what's amazing is I looked at the IBA scores for that, and they were actually fairly high. So, you know, I was expecting to see this severely impaired stream segment from that respect, but it wasn't as low as I expected it to be, where as --

HEARING OFFICER MCGILL: What is IBA? Just stick to the record.

THE WITNESS: That's biotic integrity. It's an index that's used based mostly on fish data essentially to give you an estimate of the quality of the stream in terms of its fish assemblage. Actually, it was developed here in Illinois, and it is continuing to be modified to be a little bit more sensitive for each region within the state.

And so a high IBA score indicates that you've got a system of high integrity. Low IBA scores suggest that there's a habitat problem, maybe a water quality problem that's negatively affecting the fish in there, which usually then translates to the same thing with the macroinvertebrates. And there's a real problem, so in terms of shedding light on

whether the chronic problem in the stream, in this longer averaging period is what you think would be more useful. Both are important pieces of information.

The critical minimum, of course, is telling whether you're getting a lethal, potentially lethal effect, that organisms that might already be stressed for other reasons are going to have a high mortality if it drops considerably below 3.5. Again, we picked 3.5 to be a relatively robust protective number. If it's a seven day -- if it's chronically at 4 milligrams per liter for seven days, you know, you need to take a look and find out what the problem with that particular stream segment is.

Q And is it your position in terms of you did testify that Chapman recommended a 30-day --

A Yes.

Q -- average standard?

A Yes.

Q And you had mentioned that personally you don't think that would add a whole lot more to what you proposed. So I just wanted to see if you had

analyzed the data on a 30-day basis to see if it changed.

A I didn't have time to do that, but I could. And the 30-day minimum is -- or 30-day average is only recommended for the summer months or the months when early life history stages are present, which, of course, we've all talked about that before. So that would be -- I guess if we applied it to our standard, would be for the summer through the nonspring months. So, yeah, I haven't analyzed it in that fashion. I could.

Q Would it be possible for you to do that? You know, to have it in the record to see how that number works?

A Yeah. Generally, what we do with that number is that, you know, I suspect obviously here under -- I don't whether -- I'm not going to say anything.

Q If it's possible, that would be helpful.

A Sure. I could do that.

MR. RAO: Sure.

BOARD MEMBER JOHNSON: Spending your money, right.

QUESTIONS BY BOARD MEMBER JOHNSON:

Q Mine is just kind of a big picture question, that, I guess, to make clear I'm a lawyer, not a biologist.

I'll yell. I've got two kids.

I just wanted to make sure I'm not mischaracterizing your testimony. It seems to me what you're saying is one of the goals of this proposed rule making is that currently we have good streams, for lack of a better word. And I guess with respect to these false violations, as you call them, there are currently good streams in Illinois that violate -- there are now good streams in Illinois that violate the current standards, but that will not violate the proposed standards. And there are bad streams in Illinois that now violate our current standards, and that will continue to violate the proposed standards. Is that a fair characterization?

A That is a fair characterization. And indeed the streams that there's a severe oxygen problem is probably associated with habitat degradation, nutrient enrichment typically probably associated with land use, ground area. They're

usually in agricultural areas. Whether it's the Illinois standard or the proposed standard, they're both going to get picked up, because there is a true problem in those particular impaired streams.

With the Illinois standard, it picks up streams that are as close to what our goal is for an ideal stream in the state, which would be Lusk Creek, that violate the Illinois standard a lot. I think here I've got it Lusk Creek being violated for the less than 5 milligrams per liter of 22 percent of the time. So that would force the hand of IEPA to, you know, basically take that segment and say, you know, there's something wrong with it, when according to all of our integrity measurements, there's likely not a problem with the functioning of that stream. I mean, it's in a nicely forested watershed, you know. We're proud of that stream.

If you take a look at the, you know, the listings, it's that part of the state where there isn't a lot of streams that are listed, you know. It's kind of what our ideal is, and yet it's still violating the Illinois 5 milligram per liter standard.

BOARD MEMBER JOHNSON: Thanks.

THE WITNESS: Sure.

MR. HARSCH: Since I'm sworn in, further response to that question, it really is one of the goals, why IAWA has proposed this rule change is that we want to focus the expenditure of resources by the state on the areas where there is in fact a real problem that needs to be addressed, not two DMLs on segments where DO isn't the cause. And if DO is the contributor to the cause, use a realistic scientifically based standard as the goal you want to achieve when you go through and do your modeling exercise and set your load allocations.

Currently it's our understanding that Illinois uses 6 milligrams per liter with a margin of safety based on the existing standards. That just doesn't make -- we're wasting scarce resources.

HEARING OFFICER MCGILL: Let's go off the record for a moment.

(Whereupon there was a short discussion off the record.)

HEARING OFFICER MCGILL: Go back on the record. The Board may have some follow-up

questions later, but I'd like to open it up at this time to the audience's proposed questions. I understand that the Agency may have some questions posed for IAWA, and the Environmental Law & Policy Center has some questions as well, and others may have questions. So I think at this point, I'd let the Agency pose its questions. If you would just, again, identify yourselves for the record.

MS. WILLIAMS: Sure. I'm Deborah Williams from the Illinois EPA, and next to me is Stephanie Diers. And we have maybe a couple questions. I think most of them have, between Roy and the technical staff on the Board, have probably been addressed already. So thank you.

QUESTIONS BY MS. WILLIAMS:

Q Like Chairman Johnson, my question will reveal I'm a lawyer, and not a scientist.

But I want to clarify a little bit for the Board and the record; in your testimony and in all of our discussions, we're kind of going around this term "implementation rules," "implementation guidelines," and I'm not sure we're ready to completely explain for the Board what we

mean by that, but maybe we can clarify for them some of the things that we don't mean at least.

Do you mean those terms differently when you use those? Are they interchangeable?

A You know, I know we talked about them earlier this morning, and I think I used them interchangeably with implementation, those sorts of things.

Q And one thing that I believe that you don't mean, but I want to clarify for the record; you're not talking about how the standard, once adopted, is placed into permit limits for discharges, correct?

A No.

Q Okay. And do you necessarily -- primarily what you're talking about are guidelines for how monitoring should be conducted?

A I think that's a very, very important part of what our recommendations are. If you don't measure oxygen in the right place, and don't do it in a standardized fashion, the information you have will be not particularly useful.

Q And that those recommendations do not necessarily go to where the standard does or doesn't

apply? They go primarily to how monitoring --

A Correct.

Q I think Mr. Rao asked you the basic question I had about the relationship between the 7-day standard and the 30-day. I don't know if you had anything you can add to that about what the 30-day does add to the process or doesn't add.

A What the 30-day average will do is, you know, essentially with the way you took it is you'll take an average on a daily basis of the DO concentration, and then you take another average, which is a running average across 30 days.

And so essentially what it is, it's a way of integrating the dissolved oxygen concentration across a month period. And if it's below 5.5-milligram per liter at any time, then you're in violation. You know, there's a problem, or there's a perceived problem. Which Chapman recommends under the National Criteria Document, it doesn't provide a huge amount of justification for why that is chosen.

My problem with it -- and I mentioned in the first hearing -- alluded to it in my testimony, and I think Whiles feels the same way, is

that the 30-day is over too long of a time period to integrate changes in fluctuations in oxygen concentrations that occur, in that you could have a period of time during the month where you have very, very high dissolved oxygen concentration and very low, but the average will still come out to be some level, and it's just not biologically meaningful.

Q So with regard to -- the seven-day standard comes also from the criteria document?

A Yeah.

Q Do you have any opinion on if that were to be lower to a three- or four-day average, would that make a difference?

A It would certainly be -- it would still be incorporating, you know, seven days arbitrary. I mean, that's the only thing I can say. My feeling is whatever the time period, it has to be over sufficiently a long period of time to essentially capture enough daily variation in dissolved oxygen concentrations to give you a feel for what the daily variation is and how that might affect the aquatic organisms there. Seven days sounds like a reasonable number. Three days? Probably too short because you're taking an average across, which

doesn't really tell you much. So I guess the thing is, that I'd have to talk with other folks and see what they think.

Q Typically with a lot of national criteria documents, when they use the 30-day standard, that is for prime effects?

A Yes. That's not really the same still because you're taking a running average, and then -- so the way I did my analysis is you take seven days, and then move one day, and take seven days, and move one day, and then take seven days. You're still gaining a seven-day moving average through time. So in a way, it is still providing you an estimate of the chronic effects. Probably over a seven-day period is probably more indicative of the long-term effects that are being occurring to our organisms than, I guess, 30 days.

Q And I think in your -- in the proposals somewhere, or maybe one of the IAWA folks' testimony, too, there was some discussion about the proposal being more conservative than the NCD. Is that based primarily on the point five safety factor?

A Yeah.

Q That's the basis for that?
A That would be the basis for that statement.
MS. WILLIAMS: I think that's all I have. If I if could have one minute.
HEARING OFFICER MCGILL: Sure.
MS. DIERS: I am Stephanie Diers with Illinois EPA.
QUESTIONS BY MS. DIERS:
Q I have a question on the proposal that you filed.
It's my understanding that Lake Michigan and wetlands have been excluded from this proposal. And can you explain by what you mean by the exclusion of wetlands?
A Wetlands are going to be a tough system to work with, primarily because one of the characteristics of wetlands is low oxygen in some areas at some times. So it's going to be very difficult to develop the set of dissolved oxygen criteria for wetlands. There so many different definitions of wetland that are out there, that it's very difficult to nail that down. So Whiles and I just didn't even want to touch that. So really we

just left it be, because I'm not really sure what the standards are that should be set up for wetlands.

Q I also thought you stated earlier that if we follow your implementation suggestions, aquatic life is protected. So if there's any deviation from your suggestions, is the aquatic life still going to be protected from your implementation suggestions?

A You mean exceeding or going below the 3.5 milligrams per liter?

Q Just like in your -- I think it was on page 39 where you list suggestions on where we should monitor this, that and the other. I guess my question is, if you deviate any from that, is aquatic life still going to be protected?

A In terms of if, for example, we're going to monitor the location of the stream, where we're going to monitor?

Q Yes.

A I think you have to be really careful, because, again, say, for example, you'd measure a 3.5 milligram per liter minimum in a riffled area of a stream, rather than what we would recommend at two-thirds depth of the pool, that might not be

representative of the true, I guess, integrated dissolved oxygen concentration, because I would probably assume that it's in a 3.5, in a fast flowing area, and you move to the pool, it's going to be much lower. And so you're actually -- it's not as protective.

So you definitely need to follow those implementation guidelines to the best of your capacity, or like all bets are off with our recommendations.

HEARING OFFICER MCGILL: Do you have any further questions?

MS. WILLIAMS: I have one more question from the technical staff. They passed me a note. So I'll ask it.

QUESTIONS BY MS. WILLIAMS:

Q I think we'd like to know if you have sort of a definition of what you consider to be a lake, and whether you consider the Illinois River or the Mississippi to be backwater?

A Yeah. My argument is that except for some of the natural glacial lakes in Illinois, most of the lakes in Illinois are streams. They're reservoirs. So it's real fuzzy in terms of what

your definition of a lake versus a reservoir is.

Now, when you're talking about the Illinois River or the Mississippi River, the pooled portions is what you're talking about?

Q Backwater. The backwater lakes for those particular systems? Are those lakes or are those streams? Wetlands?

A I'm not a hundred percent sure. I think we would have to talk with EPA and follow up with some definition as to what those are. The problem with those areas is that sometimes they'll tend to be anoxic in the wintertime. They'll freeze over. They're heavily sedimented, and they can become a problem naturally in a lot of conditions. And so, again, that might follow under more like a wetlands characteristic, but I'm fuzzy on that one. I'm not going to be much help.

MS. WILLIAMS: Thank you.

QUESTIONS BY MR. RAO:

Q I have a follow-up question to those questions Ms. Williams asked about following the recommendations that you made on page 39.

Do you know if those eight monitoring sites that you got the data from, whether those

monitoring sites follow your recommendations? Or do you have any information about those eight sites?

A I have fairly good information for the location of where these loggers were placed in. Probably the closest to our implementation recommendation in terms of placement was Lusk Creek. It was placed in a pool area.

Most of these, if I understand correctly as to where they were located, they're all placed at a portion of the stream where at the lowest flow level, they would still be submerged. So they would be well below probably the 50 percent line. So they're closer to two-thirds depth. The problem is that some of those were placed below riffled area in a faster flowing area, rather than in an area where you get slow flow, making it difficult to compare those qualitatively.

MR. RAO: Thank you.

HEARING OFFICER MCGILL: I just had a follow-up, too.

QUESTIONS BY HEARING OFFICER MCGILL:

Q You may have addressed this. What would the 30-day standard, what type of dissolved oxygen problem for an Illinois stream would that pick up,

do you think, that your proposed seven-day standards might not detect?

A I can't -- I have a very hard time foreseeing it. The only thing is that because the 30-day standard is 5.5 milligram per liter instead of 4, minimum of 4, that it's going to, you know, have a higher standard associated with it. And that's the only thing I could see that that would be, you know, useful.

But, again, unless we take a look and analyze the current eight streams, and compare that to what that 5.5 milligram per liter 30 day is, I don't know what it's really telling us, to tell you the honest truth, because I don't know how it applies into the natural variation we'd expect from streams.

Q I look forward to that analysis.

A I'm not even sure how I'm going to analyze it yet, because I'm working on a 30-day window, but I don't know what -- I'll get into that later. But it's trying to figure out what the cut-off is for that. It's going to make it tough what you design is when you start taking that 30-day running medium, since you have a cut-off between the spring months

when we have the special protective period and the summer months when you start taking that 30-day average. It's got to be -- I guess if it starts July, it would have to be the first of August when you start measuring that, so. So, yeah, I can do that before we meet again.

HEARING OFFICER MCGILL: I think --

MR. HARSCH: I have one follow-up question to one of the Agency's questions.

QUESTIONS BY MR. HARSCH:

Q From a general mathematical averaging, if you shorten the number of days that you average to have equivalent number, that number would have to increase, would it not?

A If you're saying that for an average, you know, you become more sure of an average with the more days that you have behind it. So it's kind of a balancing act between having too many days where it no longer is meaningful because you have a lot of differences.

Q If you reduce the seven-day average with four-day average in setting standard purposes, you would normally want that number to be a higher number because the variability associated with, say,

four days versus seven days?

A In terms of the number of four day? Yeah, I think you would. Now, I understand what you're saying. Yes, I think you would need probably more days to sort of get a good feel for that.

MR. HARSCH: Yes.

QUESTIONS BY MS. LIU:

Q Dr. Garvey, you mentioned earlier that the seven-day average could probably just be an arbitrary number. Is it possible that the National Criteria Document used seven days to capture the schedule of human activities where you've got a work week where people do one thing, and a weekend where people do another thing, and it is on during the weekend and off during the weekends?

A It's just a phone call away, and I can call Gary, and he can tell us what the recommendations were. I suspect it was probably based on -- yeah, probably, you know, we'd have this defined seven-day week that we work on, but I'm not sure. The 30 day, I think, had something to do with that 30 days post-spawning period.

HEARING OFFICER MCGILL: Can we just go off the record for a moment?

(WHEREBY A SHORT BREAK WAS TAKEN.)

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

At this point, we're going to interrupt the questioning of IAWA's witnesses temporarily so that Toby Frevert of the Illinois Environmental Protection Agency can provide some testimony.

If the court reporter would go ahead and swear in Mr. Frevert.

(Witness sworn.)

HEARING OFFICER MCGILL: Thank you, Mr. Frevert.

MR. FREVERT: Okay. I believe the reason I'm here is to give a status what we're doing now to help the Board to evaluate the proposal.

Prior to the first hearing in conjunction with IAWA's members, we scheduled a hearing with the United States Environmental Protection Agency's region five standard staff. They were given a proposal and backup documents in advance of that meeting and probably spent two to three hours talking about some of the

various technical aspects of it with various perspectives on our side and IAWA's scientific people.

Subsequent to that meeting, I've got a commitment from the region five status people, that they will forward to us as soon as it's completed, and it contains their management review, a written summary of their evaluations and the issues they think we ought to focus on as an approvable and better standard.

As of Monday morning, I had a meeting with the branch chief -- I believe is the terminology -- is the head person in charge of water quality standards for region five. And she was checking in with her staff on the status of that letter, but they have continued to promise me they'll have a letter identifying the issues. And I can assure everybody in this room, the letter is not going to say what is and what is not acceptable. It's going to say here is our reaction to these issues, and these are the areas you need to focus on. There are some problems or some uncertainties we'd like to address. So that's underway.

This morning we hosted a meeting at the request of IAWA for virtually anyone who had received notice and participate in some broader discussion of the proposal and all of the interests surrounding it. I'm just going to guess we had about 25 attendees. It was a fairly well attended meeting. In addition to IAWA and numerous of its members, three or four representatives of environmental advocacy groups were there; Illinois Department of Natural Resources was there. Several of our staff were there. And they may --

MR. HARSCH: Farm Bureau.

MR. FREVERT: That's right. Farm Bureau.

MR. HARSCH: Illinois Environmental Regulatory Group.

MR. FREVERT: That's right. They were there. So typically the more active participants in environmental rule making in Illinois, we have reached out to when they had representatives attending that. It was a nice, healthy discussion. There were a lot of complexities and issues raised where there is obviously not yet complete consensus on how to

deal with them, but I believe there are consensus on those important issues that we need to focus on.

I have committed the Agency's commitment and willingness to provide the resources and assist that part in discussing the various issues and kind of provide what's hopefully a positive forum to talk about these issues.

I am going out of my way to restrain on having any specific optimism, because I believe it's too early for us to reach a conclusion. And there are pluses and minuses in virtually everyone's argument. So we'll work through that.

I believe there is a general agreement this morning in terms of at least a preliminary strategy on how to proceed, scheduled to proceed. And I don't want to, again, steal the thunder from Wayne Albert, but I think they're going to provide some motions on how the Board can consider proceeding at the close of this hearing.

To that extent, I believe we've identified most of the interested parties that have data

and information and expertise. So often rendered in this proceeding to the extent there are others will come forward, we'll certainly make them welcome as well, and our staff and our data are available in this process to move forward.

That's about all I have to offer at this point. And I'll take any questions you might have.

HEARING OFFICER MCGILL: Thank you.

MR. HARSCH: Not a question, but on behalf of IAWA, we'd like to thank Toby and the Agency for listening to me today.

HEARING OFFICER MCGILL: Any questions for Mr. Frevert? Seeing none, thank you for everyone's flexibility in accommodating that testimony. We wanted to avoid a scheduling conflict.

So we can now resume with questioning for IAWA's witnesses. At this point, we were going to turn it over to Albert Ettinger, the counsel for Environmental Law and Policy Center for questions.

MR. ETTINGER: Okay. I am a lawyer, which

means I know everything. So we don't have to worry about me apologizing for my lack of knowledge.

Also I will say that I think I will be able to, although Board Member Moore admonished us to be civil, I'll have a harder time avoiding being bored, because I've got a lot of technical questions here, of what does this mean and things like that.

QUESTIONS BY MR. ETTINGER:

Q First, I'm looking through your testimony, and I've got questions on that and then on the report.

First of all, you mentioned again there's unpublished data on tributaries on the Ohio River. Are we going to see that at sometime?

A (By Mr. Garvey) Sure, yeah. I can provide that at any time. I just -- basically it's submitted to the Transaction American Fisheries Society, and I'm waiting for the reviews to come back. So, you know, I can either provide it in rough form right now, or I could wait until hopefully the publication is worked out.

MR. HARSCH: What is your preference?

THE WITNESS: Yeah. What is your preference?

Q (By Mr. Ettinger) I guess it would be useful to have it now, since we're talking about things now.

A Sure.

Q Although we can get comments.

A Yeah, I'm waiting. But I mean, they don't have the stamp of peer review on it, which is at least a good thing.

HEARING OFFICER MCGILL: I'm sorry. Are you indicating that would be something filed with the Board as a public comment?

THE WITNESS: Yeah. Actually, I'm not sure. Should I just provide it to --

MR. HARSCH: Provide it to -- it's still a draft. That's acceptable as we go forward with our discussion.

HEARING OFFICER MCGILL: At some point, it sounds like something we'd want to look at, another hearing exhibit or public comment.

THE WITNESS: Okay.

MR. ETTINGER: Okay.

Q Just looking at page 3 of your testimony

here, you talk about diurnal fluctuations varying among the minimal dissolved oxygen patterns and oxygen standards. It says expected result oxygen concentration decline in all streams during summer diurnal fluctuation bearing among them.

A Correct.

Q What was the range in which they varied?

A In the Lusk Creek, for example, given the decline of 3.5 milligrams per liter, the fluctuations probably occurred between 1 and 3 milligrams per liter. And the more impaired stream fluctuations could occur during on a daily basis as much as like 6 or 7 milligrams per liter. I'd have to go back and look at the data to be sure.

Q If you have a stream with a lot of nutrients in it, and you took and measured, and it said 6 at 3:00 o'clock in the afternoon, you wouldn't be comfortable?

A I would be concerned if -- Rayse Creek, for example, was a good example of that. And so that would be one where you'd definitely have to measure the minimum in the morning, or you're going to have a very incorrect estimate.

Q And this is just a question I had here.

It says later down, that Lusk Creek, a functioning stream in a forested watershed, regularly violated Illinois standard of 5 milligrams per liter during 22 percent of days.

A Right.

Q You mean all year or during some period?

A That would be for the spring period from February through June.

Q Okay.

A When we set that -- wait, wait, wait. Excuse me. I'm sorry. The Illinois standard was for the full year. Actually, it was over the two-and-a-half year period of that study. So 22 percent of all days. And I could look at the inside. I'm not exactly sure how many days that was. I'd have to go back and look at the data, but that's over -- yes.

Q Probably 80 days?

A It's more like 700 days. So 22 percent of 700 days or whatever it is.

Q Okay. Turning down to page four, it says you might expect that nutrient enrichment is the primary factor affecting dissolved oxygen dynamics. Streams with greater nutrient loading should have

lower oxygen.

Is it the nutrient loading, does it affect the overall oxygen level or lower minimums? -- I guess is my problem here.

A It will affect -- it will affect both the minimum during the summer period, and it will also affect the mean minimum during the summer as well. That 4 milligrams per liter is obviously due to production for that particular system. And since we're using that minimum as our, you know, our estimate, which would be taken lightly at the lowest point during the day, yeah, it should be low.

Q And can it not have any effect of actually increasing oxygen levels during some parts of the day?

A Well, it would, but since we're using, at least during summer months, the minimum on a daily basis, and if we are using semi-continuous data, we're likely going to include the morning hours. And so, yeah, what I mean by lower oxygen, I mean it from the perspective of minimum.

Q And I guess that's what's confusing me. You're talking about lower or minimum?

A Lower oxygen minimum would be a clearer

thing to put in that statement, you're correct.

Q Okay.

A You'd make a great copy editor for a journal.

Q I don't think so.

This, I didn't understand. I think this was asked, but I still don't understand it. On page 4, you say on here, in fact, the proposed standard increased the frequency of violations in two of the severely oxygen-impaired streams and identify the time period when oxygen problems occurred.

A You know, you'd think I was a teacher, right, but I can't explain this.

Q Well, maybe I'm just missing it. How did it increase the number of violations?

A It's increased the proportion of violations, all right? So basically what -- I mean, if you look at the table in the report, it's proportioned by violations that we look at. It's a way of standardizing instead of total days, because the number of days differed, depending on which stream you looked at, how often the monitor worked, that kind of thing.

So essentially what this is doing, if for the 5 milligram per liter standard, we're looking at all year round, because it's the Illinois standard is just one size fits all, one season is all seasons. Essentially what you're doing is you're basically looking at proportion across all those days of when you went below 5 milligrams per liter.

Now, when we apply the proposed standard, which is divided into spring and the rest of the year, the proportion of days is going to depend on the number of days within that particular season that we were focused on.

So what will happen is that if you have a greater proportion of days in the summer that went below 3.5, then that would deflate the number of the proportion of violations that you have. And that is exactly what happened, because if it's mostly where the violations are occurring mostly in the summer months, and then that's going to inflate those proportion relative to the 5 milligram.

Q So it doesn't increase the total violations, but it changes the proportion of violations?

A Absolutely. So it's more sensitive. I mean, basically, it's more sensitive to what goes on. It's a little complicated, but in a way, the information content associated with proposed standard is better, because you can focus in on both the chronic effects and the season effects and the acute minimum, too.

Q Okay. Again, on page 5, it says dissolved oxygen concentrations were lowest at intermediate summer temperatures, indicating that this is not the seasonal maxima of streams that reduce oxygen concentrations.

A Yeah.

MR. HARSCH: When he read his testimony, he read in seasonal maxima temperature.

THE WITNESS: Temperature should be in here. It's not the seasonal temperature maxima.

Basically what that sentence means is the lowest oxygen in Lusk Creek and the other streams as well, didn't occur when you had the highest temperatures in the stream. They actually occurred sort of at intermediate summer temperatures between 20 degrees C and

about 30 degrees C.

So I think often we often expect that on the hottest days, you'll have the lowest oxygen, which I actually expected when I did the analysis. But the reality is, is that on average, the lowest oxygen occurs in sort of the mediocre warm days.

Q (By Mr. Ettinger) Is there a table on the back of your report that shows the relation to this?

A Yes, sir. That would be table four for Lusk Creek in the report. It's on page 20 of the report attached.

HEARING OFFICER MCGILL: Just for the record, this is Exhibit 9.

Q (By Mr. Ettinger) Yeah, okay. Let's talk about table 20, because I didn't understand this very well. Is this looking at readings within the day, or is this dealing with some sort of daily average?

A These are readings within the day, all right? So these are half-hour intervals within a day across a two-year period or for however long it was for Lusk Creek.

Q So most violations occurred either five or

four, depending on -- well, before it was 41 or was it 25? On 25, you had the most violations of 4?

A Yeah. So basically it was different below 4 for 41 of the however many days when it went below that, that level.

Q Okay.

A Remember, this is just a subset of the days that temperatures either declined below 5 milligrams per liter or below 4 milligrams per liter. So this isn't all the day. It's not proportional. It's just a total number.

Q Most of the violations occurred mostly around the 26th?

A Yeah, yeah, which is what typically occurs. I mean, you're going to see that in northern streams in Illinois as well as southern streams.

Q Well, I guess my question is, well, did you measure how the temperature of the water varied over the course of a day?

A If you're -- these temperatures were taken at the same instantaneous point that the oxygen was taken. So this would be -- you know, it would be wind temperature was 25, because oxygen and

temperature are taken simultaneously most of the time. And if it didn't match up, I threw them out of the analysis.

Q I guess my question then -- and I think I understand now what you're doing. The water temperature falls a little at night?

A Yeah.

Q And your minimum DO level is generally going to occur at night. Wouldn't you expect the DO to be at the lowest at something less than the hottest part of the day?

A Potentially, but remember water has a huge heat capacity, and it takes a lot of time. I could look at it and see how much the temperature fluctuates on a daily basis, but I don't think it would be more than a degree. But, again, on the record I want to make sure.

Q I guess that's the answer to my question. How much of that lack of relationship between temperature and DO is due to diameter temperature changes in the water?

A You should work for a journal. You're doing a good job.

Q I think I'm paid well enough where I'm at.

A Join the club.

Q Okay. Where was I? On page 6, and we were just in your statement. You said no relationship existed between biotic integrity scores and oxygen minima as estimated by frequency of violations of either the current or proposed standards.

What was the data that you relied on for that?

A I acquired data from the various IEPA offices that collect either IBA or MBI data for those particular stream segments or areas that were close to the stream segments that were measured. And then I plotted the frequency of violations just against the most recent IBA or MBI score, and it was basically a giant shotgun. There wasn't any clear pattern.

Q And that's --

A That's for those streams, yeah. Salt Creek had the lowest by far of all the eight streams in terms of integrity scores, just to let you know.

Q Do you have that shotgun somewhere prepared?

A You know, I don't. I can prepare that.

That came after this -- I got the data basically after I had to file the testimony, so I just looked at it. Or I mean, after I had to file report.

MR. RAO: Just for the follow-up. We were also interested in looking at the data, if it's possible for you to submit it in the record sometime.

THE WITNESS: Sure. I'll include that with the other data of the tributaries.

MS. LIU: Could you also supplement with an explanation of ranges of IBA, indicating good health? Thank you.

THE WITNESS: Yeah, I can do that certainly.

Q (By Mr. Ettinger) Is there any relationship, to your knowledge, between algae blooms and pH levels in streams?

A In streams, I know in lakes and ponds -- in particular, in small ponds, the increases at photosynthesis will affect pH. If you've got a situation where carbon dioxide is being taken out of the system, that's going to alter the pH. And conversely if there's -- at nighttime, there's a lot of respiration and a lot of carbon

dioxide at night. It's going to change the pH as well. In terms of the actual overall impact, you know, it's going to depend on what kind of geology you have, how much lime stone and buffering capacity you have in the water.

And so the answer is, I don't know, in terms of what the amount of pH change is going to occur in the streams. I don't think it's going to be huge, but, again, I could be proven wrong on that one.

Q And have you looked at the toxicity or ammonia in its relationship to pH?

A In terms of -- there is a relationship between pH and toxicity of ammonia.

Q What generally is that relationship?

A Generally -- oh, gosh. I used to know that. Typically on an increase in pH is usually -- off the top of my head, I can't remember.

Q Thanks. There's been discussion about the level of dissolved oxygen typically found at the benthic level of the water. What would that normally be in relationship to what you would expect other than higher levels?

A Can you repeat that question?

Q I guess -- I'm sorry. What would be the relationship of the DO at the benthic level of the water body in relationship to higher up in the water column?

A I think that's really difficult to pin down from the perspective that there's so much variability on a patchy nature on the bottom of in terms of what's sucking up oxygen. Obviously, the organisms that live in sediment are going to have a strong impact on what oxygen is there.

And as I mentioned this morning, we all talked, you could move just a few feet from one area and the dissolved oxygen demand in the sediment can, you know, change very, very, very rapidly. So it's very hard to pin that down.

Q Is there any relationship that you can -- that we know of between benthic levels of dissolved oxygen and levels higher than that?

A In lakes, yes. In streams, probably not as good.

Q What's the relationship in lakes?

A Obviously, the stratification that occurs in lakes and below that stratified point, typically dissolved oxygen declines exponentially. And then

at the sediment water boundary, usually oxygen is completely depleted, but that's just a natural characteristic of natural lakes for that stratification to occur, at least in this latitude, in this region.

Q So in a natural lake, you could actually have something like zero dissolved oxygen at the very bottom of the lake?

A It's actually very typical in a lot of systems. It's the microbial fauna that live there, that they need oxygen. So they use it up and then basically deplete it.

Q Have you looked at all the dissolved oxygen in glacial lakes?

A Actually, there's very little information about that available to me. So, no, I haven't really taken a hard look at that.

Q I want to go now and look at your study that was prepared, and just ask some questions to help me understand the study.

You praised the site location of the study site of dissolved oxygen as being the sort of location that you would pick, and why is that?

A Because it's in a pooled area of the

stream, which we recommend. It was at a depth that's close to the two-thirds. So I think it was, you know, obviously probably most of the time at 50 percent or greater the depth. And so it was just generally in the kind of area that the implementation guidelines we'd recommend.

Q Now, I'm just asking; what do we know about the site location of the North Fork site? North Fork Vermilion site. Do you know where that site location was?

A In general, if I understand correctly -- and obviously I have not visited that site myself, it is over a gravel riffle sort of area. When you take a look at the site descriptions that USGS has for that particular area, it appears that there is a riffle area in the vicinity of that logger or that gauge that was at that point.

Q And then the Middle Fork Vermilion site that you do mention, I think I read somewhere that that was close to the below riffle?

A Below riffle. Again, probably, again, a very low flowing area as well.

Q A lot have riffles, don't they?

A That's the thing. I mean, obviously, you

get riffle and run and pool. So you're going to want to pick an area that is, to the best of your ability, that you can find acquiescent in terms of flow as possible, where you get some organic buildup where you can expect to see the lowest oxygen concentration occur.

Q And then the Vermilion site location, do you know anything about that?

A Yeah. I don't know that much about it. Again, when I took the sheets, it looked like it was in an area with a, you know, a fairly wide laminar flowing area with the gravel substrate, and that's the best I know about that area.

Q And the Mazon River data. That's probably the most puzzling in our set. Do we know anything about the site location?

A There again, looking at this site description for USGS, it was near a rock and gravel riffle area. So most of these sites are riffle, flowing areas.

Q And Rayse Creek, you don't know anything more about that site location?

A I think from my understanding of this, this was a stream area that was a pooled area as

much like Lusk. And like I said previously, I think that Rayse and Lusk are probably kind of in terms of size, in terms of their intermittent nature, probably the most comparable. Also in terms of where the loggers were placed seemed to be the most comfortable in terms of their location.

Q So it's kind of looking at Rayse as the polluted Lusk?

A Yeah. You know, the evil brother.

Q That's good. That's helpful.

A I hope it is.

Q And what about the Salt Creek site location?

A Yeah. Partial riffle, heavy aquatic occurred in that particular area according to USGS site.

Q And then the Valley City site was not the inner river, or in the side?

A It sounded like it was in a pretty big portion of the river. If I understand right, I think it was on a railroad pier, but I'm not sure. I'd have to check.

Q Now, what's your understanding as to how they develop these IBI scores and grade these areas?

Do they look at segments? Or how do they come up with an IBA score?

A I'm going to have to defer to some of the folks in here who measure these IBA scores.

From my understanding, it's taken, you know, by one of the survey programs that occur in the state. They go out there.

And usually, I believe, it's -- and someone needs to correct me if I'm wrong; Bob or whoever is in the audience, but essentially you're taking an electric sample and going over a particular area in a standardized fashion, scooping up all the fish that come up, and basically looking to see what appears. And then using region specific developed IBA scores, grading; a lot of other factors go into that. But what your expectation is what kind of organisms or fish in that particular area.

MR. HARSCH: Again, Albert, I think Gary Letterman from IDR or Bob Mosher is probably better to answer that question.

Q (By Mr. Ettinger) I guess my question is, could you have a stretch of water which had a very good degradation of species in it, even though it

had, you know, bad spots or dead zones within that water? I guess that is my question to you or somebody else.

A You know, my hope is that would be something that's going on in the stream at large. If it is not, then why are we even bothering going out and doing it? But we need to have folks within EPA, I guess, to depend on their techniques.

Q I'm not criticizing their technique. I'm not saying that's not a good way to judge the whole segment as to what its biological integrity is.

My question is, is it your understanding, for instance, if you have a spot, okay, within that, that segment, that had, you know, very bad conditions for fish, where the segment as a whole might have strong conditions?

A Yeah. Depending the locality of where you put the logger, yeah, sure. I mean, you stick it in some sludge, that could happen. Or it could depend on where the location is.

By the way, I think it's IE pH that has the more toxicity.

Q I think you're right.

MR. HARSCH: Was your question that there

would be spots in the stream that might have very low IBI scores, but the stream segment in general would have high IBI scores?

MR. ETTINGER: Well, I didn't word it quite that way. But, yeah, presumably not every part of the stream is equally good for fish, but I mean, that's probably true of every stream.

Q But I was just saying, and my concern is, is that you might be measuring a particular spot that had particularly low DO within that segment, but the fish -- correct me if I'm wrong -- can swim and will not be in that spot typically?

A You know, I think it's going to depend on what kind of fish species you're talking about. But a little darter can't swim away from it or a sucker that can. That's probably going to influence it. Again, it all comes down to it's the heterogeneity, and it's the quality of the stream. That there's a lot of good habitat and changes from rough riffle to run and pool. That's when you're going to see a system basically -- according to the analysis that I've done to date, it's not dissolved oxygen, per se, as I have mentioned in my testimony.

Oh, and there's also 188 species of fish in the state. That's been driving me crazy, too.

Q I'm glad that we got that out.

A For at least right now.

Q There's a lot of statements here on temperature that are sort of confusing to me.

On page 10, you discussed temperature relationships. I believe I'm correct, and I believe you had been consistent with the lowest DO during summer months?

A Yeah, in all the systems. And that's just physics, you know. That's basically the way it works.

Q Okay. But then you say here temperature -- I'm sorry. The last paragraph on page 10, temperature and dissolved oxygen concentration were negatively related in all streams. So I assume we're talking about something different there?

A Right. I'm talking about -- I'm talking seasonal temperature. And from the perspective as it gets warmer, on average dissolved oxygen is going to decline because it's summertime. That's what I

meant by that.

Q But you didn't find any north/south difference in dissolved oxygen?

A Not as clear. I mean, obviously, I was expecting if you ever -- but, anyway, with Salt Creek, I was expecting to have very low oxygen, given what I've seen in terms of its history, given why it was listed. And it was behaving more like a, you know, a stream, than it should be operating or functioning normally from an oxygen perspective when it was obviously -- if you take a look at the number of fish species that are there, it's not operating very well.

Q Do you have an understanding of how sewage treatment plant discharge affects the temperature of the water?

A Not at all, not a bit.

HEARING OFFICER MCGILL: I'm sorry. You don't have an idea, or it doesn't affect it a bit?

THE WITNESS: I don't have an understanding. I honestly -- I'd have to leave that up to other folks who have measured that to answer that question.

Q (By Mr. Ettinger) And how does getting a lot of groundwater into the stream typically affect the temperature?

A It will cool it off, but, again, as we mentioned in the last hearing, often groundwater is deplete in oxygen. So it could be a bad thing. In fact, there's some studies throughout that, though, that fish are under stress because of some monitoring, that are stressed because the stream gets too warm, go to try to find groundwater input, and sit in there, but it's the oxygenated water. They're, yeah, in trouble.

Q Badly advised?

A They're badly advised, yeah.

Q So if you had a stream which had a lot of groundwater flowing into it, you would expect it to have a generally lower temperature and a lower DO than another similar?

A Yes, at first, but, you know, it doesn't take much to oxygenate water. If there's a fairly hydrating and riffle area, you can hydrate that area pretty quickly and bring it up close to saturation.

Q You mentioned on page 12 of your report; in small, intermittently flowing Lusk Creek, the

logger was placed in a pool with surface flow that becomes disconnected from the stream.

A Right.

Q What did you mean by that?

A At least on one occasion from the USGS report, the riffle area and the pool became disconnected on the surface. But more than likely, there was still groundwater flow between the two pools. Now, when we talk about groundwater flow at that level, it's just essentially there's obviously -- you know, it's a gravel alluvial area, and the water can just flow underneath at that point. I think that occurred on one occasion according to this. It wasn't a chronic occurrence.

Q Were you able to study from any of the data in relationship between flow and dissolved oxygen?

A No. I considered doing that. There are discharge information associated with gauges in each one of these areas. I think that that would be a nice next step in terms of the analogy.

And if I decide to do -- if I do the 30-day running mean analysis, I also look at discharges relationship. I think that's important.

I think flows are very important factors to see the dissolved oxygen in streams.

Q I will admit on page 19, table three, despite knowing nearly everything, that table largely mystifies me.

A That's my goal.

Q Could you tell me -- first of all, this is a regression of just temperature versus dissolved oxygen using all of the data, and this isn't like daily averages versus --

A Right.

Q It's just all of the data?

A So when you see 37022, that's 37022 points for North Fork and Bismark. And the sample size F is what's called the F statistic, which is basically just looking at the variance and the data set. "A" is the slope of the relationship. And "B" is the intercept of the relationship. And the "R" squared explains -- basically tells you how much of a variance. If you have a "R" squared of one, that means that the relationship is perfect, that there's a perfect relationship between temperature and dissolved oxygen. The lower that number is from 1, the less -- the least or less variation is explained

by the relationship.

So the argument that we're trying to make for table three is if temperature was the main factor driving dissolved oxygen in these streams, there should be an R squared of 1. And as you can see, that varies across streams with Illinois River having one of the higher values of .84.

But if you take the Mazon River, it's .33, which means that there's a lot of other factors in the Mazon River, influencing dissolved oxygen than temperature, like the flow, like the effluent of some sort or non-point source of nutrients that might be coming in, you can't tell with this.

Q But in every case, the relation -- it gives you a negative relationship?

A Yeah. And they're all significant, but, you know, with the regression with as many data points as that, usually you can get a pretty strong relationship even with very little of an actual -- any relationship there. But the explanatory power is not driven all by temperature. It's definitely other factors.

If I did a multiple regression, which can include other variables, maybe those might be

important there. You know, honestly, habitat characteristics, that kind of thing.

Q Okay. We talked about table four already. I had a question with regard to page 23 and 24, Middle Fork Vermilion near Oakwood, and the Vermilion River near Danville. It's kind of a narrow chart here, but it looks like both streams had their low pretty much at one point, and I think these waters are fairly close together. Do you know what happened then? Or is there some explanation for that?

A You know, I suspect there's probably a flow issue. What I usually do is take a look at the discharge values, and that will provide us with some more information to see what happened.

Q Might there have been a drought at that point?

A There would have been. I know there was one in 2000. I'm not sure what happened. Now, there was a decline in the Vermilion River in 2002 in the summer, too, for several days below that 5 milligram level, but it's not as pronounced.

MR. ETTINGER: Can I have a few minutes to talk to my partners here?

HEARING OFFICER MCGILL: Sure. Why don't we go off the record.

(Brief break.)

HEARING OFFICER MCGILL: Why don't we go back on the record then. Let's go on the record. And if you could just -- Mr. Ettinger, if you could restate that question.

Q (By Mr. Ettinger) My question was, how does -- well, I don't -- I can't remember exactly what I asked before, but my question now is, how does sewage treatment plants' discharge affect the temperature?

MR. CALLAHAN: On average, during the summer months, the discharge will decrease the temperature. During the winter months, it will increase the temperature. Our processes are principally stabilized both by the temperature of the ground through which the waters flowed to get to the plants, as well as the compressed air that we apply to keep the process. So customarily in the winter, the effluents will hold warmer than the ambient water and a little cooler in the summer.

MR. HARSCH: Dennis, do you have anything

to add to that?

MR. STRICHER: That would be the same appraisal I have. It stays pretty constant throughout the year, and it is the receiving stream that will function in my case.

MR. HARSCH: What is your normal temperature?

MR. STRICHER: In the range of 50 Farenheit year round.

MR. ETTINGER: Depending on how long your discharge is compared to the flow, could it have a pretty big effect in terms of stabilizing the temperature?

MR. STRICHER: That's correct.

MR. ETTINGER: Let's see if I can remember.

Q The first question I was asking -- I asked was, did you make an effort at this point to calculate the percentage of saturation as to any of this data?

A (By Dr. Garvey) When I analyzed the means, I did normalize them to 100 percent saturation. And I did not find a single example, honestly. I didn't do the analysis. It was just sort of my cursory,

looking over the data. But there were really no instances where the water was super saturated, most likely because we weren't taking a surface reading. It was low enough that you didn't have those super saturated readings occurring. So I'm pretty sure we didn't have super saturation on any of the data sets. I'm pretty sure I could go back and look.

Q The other question that I brought up is on page 4 of your testimony, you say from the top here, sentence, however, in other listed streams, dissolved oxygen concentrations are typically greater than the 5 milligram per liter minimum.

A Yeah.

Q Which other listed streams are you referring to?

A Salt, in particular, I believe I was talking about. And the North Fork Vermilion were the two, I think, primarily what I meant by that.

Q Okay. The Salt violated the 5 milligram per liter 90 percent of the time. Still the North Fork Vermilion violated 1 percent of the time, but they're both listed. The North Fork is listed for pathogens?

A Pathogens, yeah, of unknown origin, I

believe. Whatever that means.

MR. ETTINGER: Thank you very much.

HEARING OFFICER MCGILL: Thank you. Are there any other questions for any of the IAWA's witnesses? We've got just a few follow-up questions. Alisa, go ahead.

QUESTIONS BY MS. LIU:

Q Mr. Harsch, I was wondering if someone on your panel could expand a little more upon how the proposed DO standards or even the current DO standards would play into the nutrient standards that you've been talking about?

MR. HARSCH: Mr. Callahan?

MR. CALLAHAN: Well, as I have said several times, this whole effort had its origin with Bob Mosher and the EPA's nutrient science advisory committee.

One of the things that is key, I think, to the successful development of the nutrient standards in the state is to assess what the naturally occurring minimum dissolved oxygen standards are.

In other words, if we end up establishing some kind of correlation or relationship

between phosphorous concentrations and dissolved oxygen concentrations, principally that's what we're after.

So what limit do we want to maintain in terms of dissolved oxygen, but how does that correspond to phosphorous levels? Very, very unknown situation right now. There's not much information. That's apparently why USEPA and all of us developed the standards at the state level, because there wasn't a whole lot they could rely on at the federal level to give a little bit more precise guidance than they did.

So that was the essence of it all was to try and come up with a oxygen -- everyone realized that our ambient waters were violating 5 minimum.

And, again, we go back to cost. You know, the wastewater industry can distill water, if you want, and discharge that. It's just a matter if society wants to pay for it. And it seemed it would be prudent not to try and come up with standards that address more than what we needed to ensure adequate dissolved oxygen concentration. That is taking the -- measure

the relationship between the dissolved oxygen and nutrients, like phosphorus, that would help you to establish that.

That's what we're trying to discover. That's the bulk. Our work that's going on right now is trying to establish that relationship. But there again, the relationship is really fairly meaningless if we don't know what numbers are protective of the necessary dissolved oxygen concentrations to maintain a good healthy, aerobic community.

Q Somebody is whispering next to me. Someone was wondering what CR stood for. Could you explain that?

A I think that's the Council for Food and Agricultural Research. That is it? It's an Illinois Department of Agricultural program that sponsors agricultural research.

And the agricultural community is very much into the nutrient issue business on -- very involved with the work that's going on there currently.

DR. GARVEY: They are currently focussing on watershed effects, the relationship between

water chemistry and factors like oxygen. In terms of the biotic component of the work that they're doing, they're focussing on macroinvertebrates, but not on fish. So there's very little fish data that are being collected relative to that.

BOARD MEMBER MOORE: Why is that?

DR. GARVEY: I was not involved in the planning process. So that's -- I'm not familiar with what it is. I do believe that DNR is helping collect data on occasion with them, but I don't think that's a core integral part of the project, which is frustrating, since obviously we're using fish as sort of our end point. That would be useful information to have associated with this massive project that we're conducting.

Q (By Ms. Liu) Mr. Callahan, what other types of nutrients, besides phosphorous, might come into future --

A (By Mr. Callahan) The other principal nutrient that federal guidance is requiring the states to address right now is nitrogen. And that principally will be present in the form of nitrate.

Most of our wastewater treatment plants now discharge nitrified effluents. The ammonia in our influent is oxidized microbially within our plants to nitrate. Nitrate is not viewed universally as being the causative factor to fresh water eutrophication as phosphorous. Principally, I think the main suspicion of nitrate impacts involve Gulf hypoxia. And to the best of my knowledge, that's debated at this point.

But, nonetheless, there seems to be a prevalence of opinion that feels that nitrate concentrations contribute to that.

Nitrates don't just don't bother us so much in the wastewater industry. There's a process by which we can run our treatment plants called denitrification where we can remove a lot of nitrate. All it does is cost more money. And in this case, not to operate, but principally in terms of capital capacity, I would imagine that most conventional plants, like Dennis and mine, would probably look at losing a third of their hydraulic capacity right now to denitrify quickly. So nitrate, besides phosphorous, are the two key elements.

Q And nitrates are also affected by the dissolved oxygen concentration in the receiving stream?

A Well, not necessarily, because when we release the nitrates in our plant, we've already nitrified. So nitrate already exists. Our treatment plants represent a very artificially high rate of what actually occurs in the stream. So we artificially maintain that rate of decomposition. And we're effectively getting the stream end products, in many instances, those end products that would have produced by itself.

MS. LIU: Thank you.

QUESTIONS BY MR. ETTINGER:

Q I'm sorry. I'd just like to clarify that what you do in the plant. You go from ammonia, which would have taken oxygen out of the water if it had reached the water, and you have to go from NH to NO within your plant. And that way it's not taking the oxygen out of the water when it hits the water?

A That's correct, that's correct. And that ammonia, as we've -- the Board has visited several years ago, and we've discussed a little bit about that, has its own toxicity, which is significantly

different than the toxicity that we're concerned about with dissolved oxygen. I hesitate to use the term "toxicity" with oxygen. With ammonia, it's very definitely a toxilogical issue if that enters into the life stage discrepancy, alleged discrepancy, that's been brought up a couple of times.

HEARING OFFICER MCGILL: Well, that's a nice segue to the one question I had or question that the panel addressed, the merits of whether the rule, proposed rule, should have some sort of a safety valve provision that would allow, for example, the Agency to specify for a given body of water based on site-specific circumstances that the sensitive months be expanded.

MR. CALLAHAN: I think Mr. Johnson asked that at first hearing or a question.

HEARING OFFICER MCGILL: We touched on it and revisited the hearing transcript and wanted to discuss it again.

MR. CALLAHAN: Well, it's certainly a possibility. We did that with the ammonia standard. My reticence with it is probably

even a little more advanced now than it was at the time that we discussed it before. I think we may be on the verge of developing a reasonably sophisticated set of stream classifications in Illinois, and those classifications systems might have their own particular parameter limits.

I would love to see DO addressed that way, rather than on a case-by-case basis. It would be more comfortable to the Board in the interim. I don't know that there's any difficulty with that. The paragraph in the ammonia reg has caused us some trouble, but I do think its citing regulatory concept to begin to develop these levels of classification and designated use that incorporate different levels of regulated parameters.

MR. STRICHER: If I could elaborate on that a little bit. We're looking at this being very much a first step in developing DO standards that can be modified and perhaps will be modified as these streams are identified, their uses are identified, from changing from a one size fits all general use category to a

variety of categories. So rather than looking so closely at biotics, which would be a part of it, but the whole stream may be involved as well.

HEARING OFFICER MCGILL: Thank you. Are there any other questions at this time for the IAWA's witnesses? Seeing none, let's just go off the record for a moment.

(WHEREBY A SHORT BREAK WAS TAKEN.)

HEARING OFFICER MCGILL: Why don't we go back on the record. At this point in time, we are going to hear testimony from Dr. David Thomas, the Illinois Natural History Survey. I'd ask that Dr. Thomas come up front. I'll just mention that Dr. Thomas is going to be reading into the record his testimony. This was not pre-filed testimony. Dr. Thomas has indicated that, assuming the proceeding goes forward, he would make himself available at a subsequent hearing for follow-up questions, and we'll certainly try to accommodate his schedule, and we appreciate his making himself available today and potentially down the road.

Welcome. And in fact, do you want to go ahead and state your name for the record?

MR. YONKAUSKI: Before we launch into Dr. Thomas's testimony, my name is Stan Yonkauski. I'm attorney from the Illinois Department of Natural Resources. We weren't -- I wasn't actually expecting Dr. Thomas to be testifying. So I've got a few little legal questions that I'd like to ask before we launch into Dave's reading of his testimony.

HEARING OFFICER MCGILL: Well, welcome. Thank you for being here.

MR. YONKAUSKI: The department has not entered an appearance; though we have participated in the previous hearings and attended and have been in conversations in the state holders, two of the three state holder meetings that have taken place. And we will be certainly following the proceedings and participating as well as we can in future meetings, making sure that we have full participation in those meetings.

HEARING OFFICER MCGILL: We very much appreciate your input. And if we can go ahead

and swear in Dr. Thomas and proceed with your initial questions.

(Witness sworn.)

QUESTIONS BY MR. YONKAUSKI:

Q Tell us who you are and where you work please.

A My name is David L. Thomas. I am the chief of the Illinois Natural History Survey located in Champaign.

Q Tell us what the Natural History Survey is please.

A The Natural History Survey is a very old research institute in the state. We're over 140 years old. Our primary mission is to do research on various biotic resources of the State of Illinois.

Q How is it that you come to testify here at this hearing?

A I received a letter from the Lieutenant Governor on June 24th with a series of questions related to the dissolved oxygen issue. And my letter that, I guess, I'll be reading today was a response to those questions.

Q Do you have a copy of the Lieutenant Governor's letter by any chance?

A Yes, I do.

Q What did he ask?

A Specifically, I was asked that the Natural History Survey would, one, provide a peer review for the scientific literature review submitted by the Illinois Association of Wastewater Agencies as a basis for the proposed dissolved oxygen standard, to comment on the different water quality needs of aquatic communities and different geographical regions of the state, and respond to the proposals characterization of two categories of fisheries, i.e. warm water and cold water.

Three, comment on the minimum dissolved oxygen level that fish communities can tolerate without measurable detrimental effects that should include discussion of sublethal impacts, such as growth reproduction and feeding and the seasonal timing of the proposed rule.

Four, assess the effects of the proposed dissolved oxygen rules on macroinvertebrate species and populations of mussels and aquatic insects.

And five, if possible, spell out the impacts to Illinois sport fishing and other

natural-based tourism.

Q Does your response to that letter include and address each of those five requests?

A Mostly. I actually did not go through each one of these as a point-by-point basis. So what you will see in my response with responses that address a number of the points. But, for instance, I don't think I discuss nature-based tourism directly at all. But I did reference potential impact on sport fishery.

Q Okay. Dr. Thomas --

MR. HARSCH: Mr. Yonkauski, can we have a copy of that letter?

MR. YONKAUSKI: I don't have any copies, but I will make sure they're presented to the Board and distributed around.

MR. HARSCH: Thank you.

Q (By Mr. Yonkauski) Dr. Thomas, what's your response to the letter then? What's your testimony?

A Dear Lieutenant Governor Quinn, I am pleased to offer the following comments regarding your letter of June 24, 2004 on the dissolved oxygen proceedings now occurring before the Pollution Control Board. These comments are based upon my

review of the materials submitted to the PCB, including the report by Garvey and Whiles, titled, "An Assessment of National and Illinois Dissolved Oxygen Water Quality Criteria." They are -- my comments are also derived from an independent review of the literature, which included some studies not referenced in the above document, and on my professional judgment. I have been involved in analyzing the impacts of various water quality parameters on aquatic life since the late 1960s.

The present criteria of not less than 6 -- and there is quotes. "Not less than 6 milligrams per liter during at least 16 hours of any 24-hour period, nor less than 5 milligrams per liter at any time" end of quote, has a degree of conservatism build in that should be protective of all aquatic life in Illinois. I find the proposed change, quote, "during the months of July through February, dissolved oxygen shall not be less than a one-day minimum concentration of 3.5 milligrams per liter and a seven-day mean minimum of 4 milligrams per liter" end of quote, as not being conservative enough, and of potentially endangering some aquatic life in the state. Some of the reasons I reach this

conclusion are addressed below.

The Garvey and Whiles report lumps Illinois fish into warm water and cold water. Many biologists recognize that there are many fishes that would fall into a more intermediate category of cool water fish. While there is no clear definition of what species could be classified as cool water fish, there would be general agreement that some fish communities thrive under conditions of more moderate summer temperatures and in well oxygenated water. Some of our finer Smallmouth bass streams would fall into this category, as would some of our spring feed streams and some of our wooded streams and lakes, particularly in northeastern Illinois.

The State of Oregon differentiates between salmon spawning streams and water bodies that support cool water and warm water aquatic species. Their water quality standards for the Umatilla subbasin are a DO level for cool water aquatic life of not less than 6.5 milligrams per liter and the minimum for warm water aquatic life of not less than 5.5 milligrams per liter.

The Illinois DNR has developed a preliminary list of some 55 streams and rivers in

the state that they would classify as cool water. Again, while there is no strict definition of cool water streams, there is some recognition that fish communities in these streams differ (need generally better water quality) from other warm water streams and rivers in the state.

There is a rationale in the literature for the 5 milligram per liter minimum. While further studies have modified this level lower for a number of species, there are other species that probably would not be protected at lower levels.

Dowling and Wiley, 1986, did a review related to this issue on, quote, "The Effects of Dissolved Oxygen Temperature and Low Stream Flow on fishes: A literature review." In discussing minimum oxygen standards, they cite the work of Ellis, 1937, who concluded that a minimum summer dissolved oxygen concentration of 5 milligrams per liter was necessary to support good and mixed fish faunas.

They also cited the work of Coble, 1982, whose work in Wisconsin indicated with that measure of dissolved oxygen concentration of daytime

or averaged values, the level of 5 milligrams per liter could be identified as a point of departure between good and poor fish populations.

Chapman, 1986, in the discussion of field studies, cited the above two references, plus a study by Brinley, 1944, who conducted the two-year biological survey of the Ohio River basin. Brinley concluded that his field results showed that a concentration of dissolved oxygen of 5 milligrams per liter seemed to represent a general dividing line between good and bad conditions for fish.

Smale and Rabeni, 1995, in their studies of Missouri headwater streams, found that DO minimum values influenced species composition up to approximately 4 to 5 milligrams per liter, which is similar to recommended standards for oxygen minima in warm water streams. And references there is Welch and Lindell, 1992. They also stated in this paper that dissolved oxygen requirements for long-term persistence of stream fishes are typically much higher than those determined in laboratory survival tests.

Garvey and Whiles, 2004, discussed this effect in their paper and state that the growth

of a number of fish is reduced at 4 to 5 milligrams per liter. They cite the work of Brake, 1972, who found that growth of Largemouth bass was reduced by as much as 34 percent at DO concentrations of 4 to 5 milligrams per liter, a level that had little effect on growth in the laboratory. And it is well documented in the literature that Largemouth bass are more tolerant of low dissolved oxygen levels than Smallmouth base.

Furimsky, 2003, found that progressive reductions in water oxygen levels had a much greater impact on blood oxygen transport properties, acid-based status, ventilation rates and cardiac variables in Smallmouth bass than in Largemouth bass.

The document by Garvey and Whiles recognizes that the egg and larval stages of fish are more sensitive to low DO levels than juveniles and adults. They suggested more stringent criteria from March through June (the spawning period for most fish) with lower DO levels the rest of the year. However, many fish continue to spawn until later in the summer, and sunfishes, and bass, in particular, re-nest a number of times if early

attempts to spawn fail or are delayed.

In the testimony by Sheehan, he stated that, quote, "Most Illinois fish spawn in the spring and summer seasons. So the months of April through August are without doubt within the early life history stages present," end quote, period.

Garvey and Whiles recognize that, quote, "Some macroinvertebrates, such as burrowing mayflies and freshwater mussels, are less tolerant of prolonged exposure to hypoxic conditions than most fish."

Chen, Heath and Neves, 2001, did a comparison of oxygen consumption in freshwater mussels during declining dissolved oxygen concentrations. They found for P. cordatum, that's the Ohio pigtoe, and the P. cordatum bottom is underlined. That's a scientific name, which is a species that's found in the southeastern Illinois. And Villosa iris, again, underlined. That's a scientific name, which is called the rainbow, found in central, in northeastern Illinois, that the former -- that DO levels above 3.5 to 4.0 milligrams per liter in the latter above 6 milligrams per liter to ensure that aerobic metabolism remains relatively

unchanged.

Garvey and Whiles state near the end of their document that DO standards in Illinois, based on daily minima are likely, which this is bolded, in my emphasis, too conservative. However, there seems to be enough evidence in the literature to indicate that the new DO standards that they recommend may not be conservative enough to protect some threatening and endangered species, (most of which we have little data for), or coolwater fish assemblages. The authors go on to state that, quote, "With increased scientific information, region or basin specific standards likely will more realistically set criteria based upon expected conditions in oxygen, other water quality parameters, and habitat characteristics," end of quote. It seems that given the above, it would be more prudent to keep the present standards and allow for exemptions on particular water bodies where it can be demonstrated that lower DO minimums could be protective of the aquatic species within that water body. Criteria would have to be established for making the case for an exemption.

Another approach could be to convene

a panel of experts on the topic, including biologists familiar with Illinois streams, that could review the literature and available information and come up with recommendations, possibly by grouping water bodies with somewhat similar species compositions. Certainly we'd want to see more stringent criteria for those streams that DNR feels would fall in the cool water stream category, or which have sensitive threatening and endangered species for which we would like to see additional protection provided.

Finally, in terms of possible impacts on sport fishes, there will be significant concern in the state from sportsmen groups that Smallmouth bass streams are not adversely affected by lowered DO levels. And based on the literature, there appears to be some chance of an adverse effect on this species and fishery with the proposed lower standard.

While I appreciate the fact that the present DO standard is probably overly conservative for some of our water bodies, it probably isn't for other water bodies. If we are going to adopt one standard for the whole state, then it needs to be a

more conservative standard to protect some of our more sensitive species. If we decide to adopt DO standards by water body, then we can have different standards for different water bodies.

I hope that answers some of your questions. I would be glad to provide additional information should you need it.

Now, I do have a list of literature. I'm hoping I don't have to read all those in, but just the reference I cited, I did cite as an additional page.

HEARING OFFICER MCGILL: So we have those literature records in the record, did you want to go ahead and offer this letter as a hearing exhibit?

MR. YONKAUSKI: Absolutely.

HEARING OFFICER MCGILL: Is there any objection to entering this letter as a hearing exhibit? Seeing none, I'll go ahead and enter Dr. Thomas's letter into the record as Exhibit 13.

(Whereby, the Hearing Officer marked Exhibit 13, and same was admitted into evidence.)

HEARING OFFICER MCGILL: At this point, are there any questions that anyone has for Dr. Thomas?

BOARD MEMBER GIRARD: I have a question.

QUESTIONS BY BOARD MEMBER GIRARD:

Q Dr. Thomas, you talked in your letter about this preliminary list of 55 streams and rivers in this state that could be classified as cool water. Can you provide a copy of that list to the Board in this rule making?

A Yeah. I'd have to -- this was developed by some of the DNR fisheries folks, and I can't even verify that they're all in agreement on the list because I don't think it's anything we've actually published or put out.

MR. YONKAUSKI: It could be argued that it's a listing in formation, but as we've discussed earlier this morning, that's a list that we were going to provide to other parties who have been involved in this. So we will certainly for the Board's consideration.

BOARD MEMBER GIRARD: Just put "draft" on the top. That's fine.

Q Also along the same vein, I notice one of

these references on the back, Dowling and Wiley, which was not referenced in Dr. Garvey's report, but I can see why. It looks like an unpublished report from the Natural Resources. Could you also provide that in this rule making, a copy of that?

A Sure.

HEARING OFFICER MCGILL: Are there any other questions at this time for Dr. Thomas?

MR. CALLAHAN: I might have a couple.

HEARING OFFICER MCGILL: Again, for the court reporter, could you state your name and title.

MR. CALLAHAN: Mike Callahan. I'm with the IAWA.

QUESTIONS BY MR. CALLAHAN:

Q I'll go to what Dr. Girard asked, if I may here.

Dr. Thomas, one of the things that caught my eye here initially was that when we talk about cool water species, you indicate that there is no clear definition of what a cool water species is?

A That's correct.

Q And then you say that DNR has come up with a list of 55 waters that probably contain cool water

species. Does that seem a little self-contradictory to you?

A What I meant by there's no clear definition, you can't go to a single reference and find the definition that people have generally agreed on. Among biologists, stream biologists, though, I think you do find general agreement on a stream that might be considered more of a cool water stream versus one that is truly a warm water stream. Is there overlap between them? Absolutely. And you'd probably be hard pressed, which is probably why it is not a definition, to draw a very strict line between cold water when it switches over to cool water and cool water when it switches over to warm water.

It's interesting, if you go out east and you follow a trout steam, it's usually the headwaters are usually the cool water and you have the trout there. And as you go down and you get into more cool water, and then you'll get into a more warm water section.

Again, there's no strict line. You'll have some overlap of species between those areas, but if you take that grain -- there would be

general agreement on where the cold water section is, where the cool water section is and where the warm water section is in the stream.

Q So that would be similar to the situation that you referenced here, I presume? Is it pronounced Umatilla subbasin in Oregon?

A Yeah. That was just -- that was just a reference I happened to have available. They must do their standards out in Oregon by basins. And so for that basin, they divided that up. I assume if they use cool water there, they must use it state wide, but I didn't have access to the whole state wide standard. I was just pointing out that that has been used in other places.

Q Well, could it be similar to what you just described, about the gradient issue?

A That's very possible.

Q And those both involve areas of relief that we here in Illinois, we don't see?

A Well, yeah. I mean, you can have a gradient because -- I mean, you can have a gradient of temperatures because of a gradient in elevation, but you could also have it in the very flat area because you've got springs coming in, and then the

water is warming as it progresses. So it doesn't always have to be associated with elevation.

Q But in those two situations, in all likelihood, it is?

A Yeah, partially.

Q Have you read Doctors Whiles' and Garvey's discussion of cool and warm water species in their report?

A Yes, I read their report.

Q Have you read their -- Dr. Garvey's discussion of that under cross examination?

A I don't think I've seen the cross examination material.

Q If I may ask you, sir, how long have you been with the history survey?

A Well, about six and a half years as chief, and then I was back at the survey for about three years in the '60s as a graduate student. I worked on the Kaskaskia River in Illinois.

Q And I'm curious here; I'd like to know where we failed. We have made an effort for several months to involve the Department of Natural Resources, and presumably your agency, within in these discussions as a reach-out effort to other

state holder groups. How did we not get you into this prior to this date?

A I wouldn't characterize it that you failed. Actually, although I've taken issue with some of the plans made, I think in some ways we're probably closer to agreement than it may appear.

I mean, I think probably for a lot of the water bodies where your waste treatment facilities are on, the standard probably is too high and can be modified. My only concern is to modify it for the whole state, because I think there will be areas where I would have some concern biologically about some of the aquatic resources. But if it can get in a water body by water body, I think, in fact, the standard that was proposed will probably be adequate for a lot of our warm water systems. So I don't think we're that far apart.

I'm just having a concern that we've gone from being quite conservative with our present -- and I didn't disagree with that, being a conservative value -- to a value that I don't feel is conservative enough for some species. And especially as it is applied to the whole state.

Q Well, I appreciate --

A So anyway, that doesn't answer all of your question. But I think that I'm not -- I don't -- my argument isn't that you failed.

And the other part of your question, why wasn't I involved earlier? I don't know. Just sometimes we are and sometimes we aren't.

Q Well, Dennis here and Jim both made quite an effort to reach out to most of the agencies within DNR, and you come as bit of a surprise to us here today when we've tried to cover the bases in the past, so.

A And I might not have been involved if I hadn't got a letter from the lieutenant governor, so, other than I've been involved through our agency.

Q So your involvement with this was at Mr. Quinn's direction?

A Well, that got me specifically involved in the literature review because I had a very specific request for information. If you would have sent me a request for information, I would have gone through the same exercise and provided you probably with the same information, depending on what your request was.

Q What general waters, would you give me an example of two or three water bodies in the state where you think our proposed standard would not necessarily be protective?

A Well, actually, one of them was the Vermilion North Fork of the Vermilion River that you mentioned. And I know we would disagree, Dr. Garvey and I probably, but I think if you had a whole group of biologists, we'd all sit down and hash it out, we'd probably not be that far off.

Q What particular species would you typically find that would be oxygen sensitive?

A There's some darter, I think. If we were down for a week around 4 parts per million, 4 milligrams per liter of a low level, I think what would happen is it's not going to kill them, in that, you know, 3.5 would unlikely kill them. The problem is, we don't have good data for a number of those species.

And, secondly, I think over time if levels were reduced, that then I think you would begin to see a change in the fish community. Some of the more sensitive fish might very likely disappear from that system.

Q Am I understanding you to say that if we maintained the level of four, that we would end up undoubtedly with some kind of negative response from the fish community?

A Yes.

Q Are you aware that our standard doesn't talk about maintaining the level four?

A Yes, I know that's a seven-day minimum you're talking about.

Q Minimum?

A Right. All I'm saying, I don't know what the maximum is.

I mean, a lot of the literature shows that between four and five -- you drop below five, you start getting some physiological changes in some of the fish that you're dealing with. And it depends on how long that goes and where -- I don't know if the minimum could only be 4, but maybe the maximum is only 5 or 4.8. And that over a week, I think could make a difference, and especially in those seven-day periods, one after another had values in that range.

So all I'm saying is, it pushes me to an uncomfortable level for some of the species,

particularly ones that we don't really -- you know, we've got the Blue Breast darter. That's a species in the middle fork of the Vermilion.

Q That's another thing --

HEARING OFFICER MCGILL: I'm sorry. If you can just let him finish his response.

MR. CALLAHAN: I'm sorry. He gave me another answer or question.

THE WITNESS: I'm just saying, we have some of these species that are already stressed in the state. So I don't know that if oxygen levels were lower there, that this might be the final peg to eliminate them from the water body.

So I think if you went on a water body by water body basis, some of those streams, you might decide it's just not worth trying to go to a lower standard. There's too much risk. Others you would say, yeah, you're probably fine.

Q I apologize for my interruption.

A That's okay.

Q As I say every now and then, I have an epiphany, and I had one there.

What is your feeling about Chapman's proposition, as well as questions raised by the Board here today, about the monthly average of 5.5? Your concern for these species, if we have a minimum of 4 and a monthly average requirement of 5.5?

A Well, based on the kind of variation that Dr. Garvey has showed, having an average of 5.5 might assure that it's staying in the range. That might be all right.

I tended to agree with Dr. Garvey, though. I think 30-day averages are hard to biologically really understand. So I realize I didn't answer that question. I'm sort of talking around in circles. But I'm not sure that I'd be comfortable with that either. I think I'd agree with Dr. Garvey.

Q If we have 3.5 in two-thirds of the depth of the pool, how many darter species are we going to impact in that pool, that DO concentration?

A Well, one thing about darter species, I actually did my Master's thesis on darter, so I do happen to know something about them. They do move a lot, by the way. The Black Side darter, which is one that I worked on, will move up to 40 miles. So

even though they're small, and we think of them just hopping around on the bottom, some of them will actually move fairly long distances.

The other thing I have problems with, and in this one DO level taken at some mid point in the pool, is that there's a lot of gradients even in streams, in temperature, in dissolved oxygen. And fish move around a lot, and they'll move towards preferred habitats. And in fact, a lot of the labs that have either been under my direction or I've been associated with or done gradient studies of the fish, to response to temperature and oxygen and other variables. And so I sort of need to know something more about a stream than just what a temperature is at mid point of one pool. That doesn't tell me an awful lot.

I think the IBI -- and some of the DNR people can correct me -- but it's taken over a stretch of steam that usually includes a riffle and a pool. So you're getting a little bit broader sample, not just at one location, but you're getting a sample over a stretch where fish could move between -- I'm not sure --

Q Where I was headed with this is, you

studied darter, so you're probably very much aware of the fact that they have no swim bladders.

A Correct.

Q And their customary habitat are with riffles, with very fast water. That's their specific habitat to live in?

A There are a lot of species -- there's some that live in swamps, and there's some that like one. Darter, some of the Precina darters that I studied will be up in the water columns. But in general, you're right. They're down in the bottom. And the majority of the species prefer riffles and runs.

Q The point I was trying to make is that a 3.5 in the pool that deep is probably going to result in a dissolved oxygen in a riffle, which would be the customary habitat of most of these species? That would be significantly higher?

A It should be. The only thing that I wondered on this standard was how do we know that isn't the average over the -- I mean, a true riffle run stream, I agree. But I wonder if this is one of our more typical rivers, which is just sort of a habitat as far as you can see upstream and downstream. And so that average now is over a large

area, and you don't have riffles there.

In fact, that's what's happened in the Kaskaskia because we've dammed all the areas that are riffles, that were riffles. So now we have no riffle habitat almost.

Q Well, if we don't have riffle habitat, are we going to have darters?

A Yeah, we still have darters.

Q Where?

A They're living in the pools or they're going up tributaries.

Q But they're not in the area without the riffles and tributaries have the riffles?

A No. There's some species.

Q Some, all right. I'll leave it to you at that.

But my point was the dissolved oxygen level that we're recommending is not what you'd customarily expect in the area of darter habitat? We would anticipate higher. That's fine. I thank you for your patience, sir.

HEARING OFFICER MCGILL: Actually, I'm sorry. The question, could you just repeat that? You've been sworn. So I've got to let

you make some statements during your questioning, but you kind of trailed off there with your last statement. I don't know if you care to repeat that. I don't think the court reporter got it.

MR. CALLAHAN: I said, "Thank you very much, sir, for your patience."

HEARING OFFICER MCGILL: Okay. Well, I'm glad we got that on the record.

BOARD MEMBER GIRARD: I have a question.

HEARING OFFICER MCGILL: Go ahead.

QUESTIONS BY BOARD MEMBER GIRARD:

Q Dr. Thomas, where are Smallmouth bass distributed in the state?

A Well, I would have to get out my Fishes of Illinois book. I could give you a map that has a distribution. But they're in some of our eastern streams that are in the more deciduous forested areas, and they're throughout a lot of Northern Illinois and North Central Illinois. I'm not sure how common they are. I think they're in some of the lakes in Southern Illinois. And I'm not sure how many streams. Dr. Garvey probably knows more about some of the streams in the Shawnee.

DR. GARVEY: They're in the higher quality flow streams with higher quality flowing streams with, you know, nice riffle. It's a habitat quality issue. And they have been -- what's the name of that? That power reservoir? Where they are found? It's a thermal cooling lake, power thermal cooling lake. So it's kind of the last -- you wouldn't expect them to thrive in that, but it's actually a pretty large fishery for bass.

BOARD MEMBER GIRARD: Where is that reservoir located?

DR. GARVEY: Peoria. I've never actually been there.

HEARING OFFICER MCGILL: I'm sorry. If one person could try to respond to Dr. Girard's question.

MR. HARSCH: Outside Peoria.

DR. GARVEY: Peoria, Central Illinois.

BY BOARD MEMBER GIRARD:

Q Well, it seems that in your letter, one of your major concerns is the Smallmouth bass fishery and preserving that. And the interaction between dissolved oxygen levels and the Smallmouth bass; is

that correct?

A Well, I think the Smallmouth bass represents a variety of species that are probably in our somewhat cleaner flowing streams, with as I characterized, maybe generally having a little better dissolved oxygen and little bit lower temperatures. The reason I use that species is, well, one, it's a sport fish and a species of concern, but it's also one of the fish that we have a fair amount of data for. As I said, a lot of other fishes associated with this Smallmouth bass, we just don't either have any information or what we have, you know, is very sketchy.

So I didn't mean to overly focus on Smallmouth bass, but it's a species that at least we have a fair amount of data on, and we know something about the type of habitats that it's found in, so.

Q But what you're saying is, if we feel comfortable drafting a DO standard that protects Smallmouth bass, we will protect other species that are typically associated with its habitat?

A Well, I tried to focus a little more on the cool water habitat, because we will, I'm sure, have some cool water streams or spring feed ones

that maybe don't have Smallmouth bass at all, but still I think it could be argued it should have a little more stringent criteria than, say, what was proposed in this, in this hearing.

BOARD MEMBER GIRARD: Thank you.

HEARING OFFICER MCGILL: Any other questions for Dr. Thomas?

MR. ETTINGER: Actually, I had a question for Mr. Callahan, but I think I am just going to drop it.

MR. HARSCH: You are going to be available at a future hearing so we can respond, correct, Mr. Yonkauski?

MR. YONKAUSKI: Absolutely.

QUESTIONS BY MR. HARSCH:

Q Dr. Thomas, did you have discussions with Mr. Miller about the letter, at the lieutenant governor's office?

A We have talked about the subject. Why I'm hesitating is because you said about the letter.

Q You wrote the letter at the lieutenant governor's request, and that was your response.

The reason I ask the question is, Mr. Miller requested that IAWA make a consultant

available, and Mr. Callahan and Dr. Garvey participated in a meeting, telephone conference, with Mr. Miller from the lieutenant governor's office, and we were not apprised that this request had been made or the report was forthcoming at that time, nor you didn't participate in that meeting either, did you?

A No.

MR. CALLAHAN: I believe he had it on July 29th, which was the day before.

MR. HARSCH: Which was the day before the letter was prepared. I think I made my point.

HEARING OFFICER MCGILL: I see that Mr. Mark Miller of the lieutenant governor's office is here. If you wanted to respond to that, I am going to need to have you -- swear you in. Is that okay?

(Witness sworn.)

HEARING OFFICER MCGILL: Go ahead.

MR. MILLER: Mark Miller, senior policy advisor for the lieutenant governor.

HEARING OFFICER MCGILL: If you could try to speak up, too, please. Maybe come up front, if that's all right. Thank you.

MR. MILLER: In response to Mr. Harsch's question, it was my task, and I was asked to monitor these proceedings and to provide information, gathering information, if you would, on the different positions that are being taken among these different parties and to provide that to my boss, the lieutenant governor.

In that gathering mode, I was not, you know, using a prudent manner of doing operation. I wasn't giving out information as to what I was finding, except to the governor. So wherein we did request this information in order to make sure that we had enough scientific information to know whether or not we should weigh in or not. And I'm not saying at this point that I actually can weigh in on this or not. We were gathering information so that we could ascertain what our position was going to be. And that was my task.

I will say that, if I may --

HEARING OFFICER MCGILL: Sure.

MR. MILLER: -- that I value very much the conversations I had with Mr. Callahan, and

gained a very worthy perspective, one of which I would say is that the wastewater agencies are a valued partner that ensures that we achieve fishable waters in our state. And I assume a great deal of promise in continuing those conversations.

And I understand that this is an adversarial proceeding, more or less.

HEARING OFFICER MCGILL: Actually, it's not. We're here to gather information in a quasi-legislative process. It may come up a little contentious at times, but it's not a adversarial proceeding.

MR. MILLER: And that shows how actually new I am to this.

The task that I had was to gather information, and then if possible, provide that information to the Pollution Control Board in the proceedings. And that's what we did. I received the official response from Dr. Thomas -- well, actually, the final version today. I had a draft yesterday with a typo. And so I didn't have enough time to provide that to Mr. Harsch and Mr. Callahan. The other

parties received it for the first time today because I didn't have the opportunity to do that and provide that courtesy to them at all so they could have a copy.

HEARING OFFICER MCGILL: And we appreciate getting Dr. Thomas's insights. And assuming this proceeding goes forward, I believe all the participants will have a meaningful opportunity to cross examine Dr. Thomas. And, again, I appreciate the doctor's willingness to make himself available in the future.

DR. THOMAS: Thank you.

MR. HARSCH: Again, on behalf of IAWA, we would hope that Dr. Thomas will participate in a going forward basis in our discussions, because we did try to reach out, and you know, in a telephone conversation with Mark, Mike and I had that led to setting up that meeting in Springfield. It would have been very helpful had we known this, and we could have reached out to Dr. Thomas and included him in the discussions that did not occur regrettably. We are where we are, to move forward.

MR. CALLAHAN: I think many of Dr.

Thomas's concerns could probably have been addressed. To a great extent, I believe they have been in the discussion to date. This is something that would not be before the Board, but we'll be glad to meet with him and discuss his concerns privately prior to the next hearing.

HEARING OFFICER MCGILL: Fair enough. Any other questions for Dr. Thomas or Mr. Miller at this time?

Great. If you could go ahead and just identify yourself for the record.

MR. MOSHER: Bob Mosher, Illinois EPA.

QUESTIONS BY MR. MOSHER:

Q Dr. Thomas, I'd like to know at the time you wrote this letter, did you review Dr. Garvey's second paper submitted for this proceeding, which is entitled, "Long-term Dynamics of Temperature and Oxygen in Illinois Streams"?

A (By Dr. Thomas) No. The first I saw that was today.

Q Okay. We spent a lot of time talking about that paper today. I think it's very important, because it's kind of the real world

conditions out there. Could you review that paper in time for the next hearing?

A Yes, I'd be glad to.

Q You mentioned some of our finer Smallmouth bass streams. Do you have a list of those streams?

A That's tough. Well, the Illinois Natural History Survey maintains both collections, as well as records of fish captured all over the state. So that is something that I can make available, but I could not sit here and rattle them off to you.

Q Can you give me the names of a couple of them at least?

A Central Illinois, the Salt Fork has become a pretty good stream and the Middle Fork. Jordan Creek is probably the more famous one in Vermilion County because of all the research that was done on Smallmouth bass by Dr. Larry Moore on the Natural History Survey. And so there's a lot of peer review papers and literature on the Smallmouth bass that come from studies on Jordan Creek.

Q And you mentioned the Middle Fork. Is that the Middle Fork Vermilion River?

A Yes.

Q That's interesting, because that's one of

the streams that we studied with the continuous monitoring data.

A Yep.

Q Good. The Oregon DO standards, do you happen to know the date those standards were adopted?

A No. Actually, if I was preparing testimony, which I didn't think I was -- I was writing a letter -- I might not have used that, because I had a single sheet that was given to me from someone that works in Oregon that had that, but didn't have a reference on. Otherwise I would have referenced it. So I mean, it probably would be worth someone tracking down with more details on it.

But my only point of that was, just there is some place else that has tried to define cool water fish, and that's the only point I was trying to make.

Q The reason I'd like to know the date is, I'd like to know if the DO standard is as old as Illinois, the Illinois standard is, and if they're as happy with theirs as we are ours.

A I could not answer that.

Q The citations on the second page of your

letter that refer to 5 milligrams per liter as a good minimum, do you know if those researchers were even considering the diurnal cycle of dissolved oxygen in these streams? In other words, were they just measuring and commenting on the daytime dissolved oxygen or not a nighttime minimum?

A Well, there are field studies, of course, that were mentioned in the first full paragraph there, and those are looking at the overall fish communities. So that's sort of averaged over many years.

Some of the laboratory studies really show that you begin to get a physiological response and change once you drop below 5 milligrams per liter. And that you can document -- and that has very little -- well, you probably get that in a daily cycle, but this is something that you can measure in the lab. Now, whether that physiological response has any biological meaning is a whole another question. But you can certainly measure increased respiration rate, you can measure some of the other variables that physiologists measure.

The one thing I didn't get into my testimony is that once you change the physiology of

the fish, once its respiration increases, it can be impacted by other variables in the natural environment, if there's toxins in the water. Some of those may have been a synergistic effect. Or you may have an increased effect because of increased respiration. And there's also been studies that show changes in growth if oxygen falls below 5-milligrams per liter.

So, sure, there's excursions below five. It's pretty common in most fish. Even cold water fish can tolerate short intervals of below -- but you are still getting a physiological response. And as duration goes up, or as you drop father below that level, then you -- it depends on the species, but you run a potential risk of longer term changes in the fish population.

Q Maybe you didn't understand. I don't think your answer was to the question I was posing.

A Okay.

Q Are these researchers saying that when they cite the 5 milligram per liter as it says here what is needed for a good fish population, do they mean the daytime dissolved oxygen never goes below five or that the stream never goes below five even

at night?

A Yeah. Some of the literature wasn't -- I understand your question. And I think they're looking more at longer term data. And I'm not exactly sure. I'd have to go back to the papers to try to tease out whether they were looking at some average level. I'm sure if they're doing field studies, I mean everyone knows that you're going to have your daily variations in dissolved oxygen. And as Dr. Garvey pointed out, if you work in lakes, it can be dramatics from 13 down to zero. So but in streams, it's less than that.

But so I think those are recognized. I think what they are trying to do is paint a general picture that once levels start dropping below certain levels, what does that mean? I'm not sure of duration. But that what they were saying is changeovers in the fish population.

MR. MOSHER: Thank you. That's all I've got.

HEARING OFFICER MCGILL: Thank you. Any other questions for Dr. Thomas? Or Mr. Miller?

Seeing none, is there anyone else who wishes to testify today?

Seeing no indication of interest, I'm just going to quickly move on to an item that we statutorily are required to address, the economic impact study issue. And after that, we'll wrap up with a few procedural items.

But since 1998, Section 27B of the Environmental Protection Act, has required the Board to request the Department of Commerce and Economic Opportunity to conduct an economic impact study on proposed rules. Before the Board adopts the rules, the Board must make the economic impact study or DCEO's explanation for not conducting one available to the public at least 20 days before public hearing. The Board requested that DCEO conduct an economic impact study for an IAWA rule-making proposal. DCEO's statement in the June 22, 2004 letter said fiscal constraints preclude it from preparing the study.

Is there anyone who would like to testify regarding DCEO's explanation? Seeing nobody --

BOARD MEMBER JOHNSON: Someone stood up.

HEARING OFFICER MCGILL: At this point, I have a few procedural items to address, but I

think at this time, I'd like to ask Mr. Harsch and Mr. Ettinger if there are any procedural items you wanted to raise regarding these proceedings.

MR. HARSCH: We had discussed today's meeting, how the Board most likely would proceed, and how maybe we would like you to proceed. There still is pending before the Board a motion. It may be a little moot, now that we've gotten through this hearing, but we've responded to it. It's ready for Board decision if and when the Board rules on it, and if and when Mr. -- requests them to rule on it, I guess.

We were thinking that it might be helpful if we could establish a status conference for approximately 30 days from today where we could discuss what progress we had made as we continue our dialogue to see what our schedules might be in terms of where we might be reaching agreement, as Toby alluded to earlier, and perhaps then schedule an additional hearing. At that point in time, if we had made progress, we might be approaching you and suggesting to

push that status conference back, but we would like to fix it so you know we have some pressure on us to talk.

So we had suggested approximately 30 days from today for a status conference with whomever has filed an appearance or wants to participate in the status conference on how we might move forward.

MR. ETTINGER: I think that's where we are.

And I guess I also wanted to suggest to the Board that maybe it should suspend consideration of my motion to suspend. The concern that it was primarily aimed at, and I'm not going to argue the motion now, but our basic concern was we felt this was very important, and it required a much longer period of time for consideration, and more discussions would take place before the Board would go to first notice. In some, many proceedings there's one hearing for the petitioner and then another hearing for people responding, and then we go to the first notice decision. And we felt very strongly that that was not

appropriate in this case. I think now that we've sort of reached a set of understandings as to how we'll proceed in discussion now, we don't know how they're going to come out, but we're hoping that in 30 days, whenever this status hearing is held, we'll have some idea at least as to how the discussions will proceed or not proceed.

And at that point, I could tell you whether or not to, you know, reinstitute my motion to suspend or whether we should just continue the suspension of the motion to suspend so that we can all have the discussions that the motion was designed to develop.

HEARING OFFICER MCGILL: Okay. And so by a status conference, you're talking about a telephone conference?

MR. HARSCH: Yes.

HEARING OFFICER MCGILL: That I would preside over?

MR. HARSCH: Yes.

HEARING OFFICER MCGILL: So we would need to establish -- well, you guys are meeting on your own all the time. So I just want to make

sure by status conference, you're talking about something where procedurally the Board is involved.

MR. HARSCH: Procedurally how we might schedule a hearing, and what would seem appropriate from that hearing, what might take place.

MR. ETTINGER: These other things that we've discussed, and that's what we'll be discussing. And all we contemplate that the status conference will be is to discuss with you how we're going to proceed before the Board.

MR. HARSCH: Procedurally.

MR. ETTINGER: Yes.

HEARING OFFICER MCGILL: Okay. Can we go off the record for a second?

(Whereupon there was a short discussion off the record.)

HEARING OFFICER MCGILL: So we've just been having a discussion off the record, and we have established September 13, 10:00 a.m., as a time and date for having a status conference.

I'm just going to address a couple items

very quickly before we adjourn. Just a brief word about public comments. We've received a couple already. You're still free to file public comments with the clerk of the Board. If you want to be placed on the notice for service list in this rule making, please contact me or Sandy Wiley at our Chicago office.

The hearing transcript from today's proceeding should be available with the Board by August 26th or 27th. Shortly after that, the transcript will be available on the Board's Web site. If anyone has any questions about the procedural aspect of the rule making, feel free to contact me.

Are there any other matters that need to be addressed today? Seeing none, I would like to thank everyone for participating today. This hearing is adjourned.

(End of proceeding.)

C E R T I F I C A T E

I, Ann Marie Hollo, CSR, RMR, do hereby certify that the foregoing proceedings came before me on August 19, 2004, held in the Stratton Office Building, Springfield, Illinois, and was taken in shorthand by me and later transcribed into computer-aided transcription under my supervision, and that the said proceedings is a true record of the proceedings.

IN WITNESS WHEREOF, I have hereunto subscribed my name and affixed my seal this 18th day of August, 2004.

Ann Marie Hollo, CSR, RMR