ORIGINAL

ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:	)	
WATER QUALITY STANDARDS AND	)	R08-09
EFFLUENT LIMITATIONS FOR THE	)	(Rulemaking-
CHICAGO AREA WATERWAY SYSTEM	)	Water
AND THE LOWER DES PLAINES	)	
RIVER: PROPOSED AMENDMENTS	)	
TO 35 Ill. Adm. Code Parts 301,	)	
302, 303 and 304	)	

REPORT OF THE PROCEEDINGS held in the above entitled cause before Hearing Officer Marie Tipsord, called by the Illinois Pollution Control Board, taken by Steven Brickey, CSR, for the State of Illinois, 100 West Randolph Street, Chicago, Illinois, on the 27th day of June, 2011, commencing at the hour of 10:00 a.m.

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I N D E X

THE WITNESS: ADRIENNE NEMURA

E X H I B I T S

MS. TIPSORD: Good morning, everyone. My name is Marie Tipsord and I've been appointed by the Board to serve as Hearing Officer in this proceeding entitled Water Quality Standards and Effluent Limitations for the Chicago Area Waterway System and Des Plaines River Proposed Amendments to 35 Ill. Adm. Code 301, 302, 303 and 304. This is Docket Number R08-9 Subdocket C.

With me today to my immediate right is acting Chairman G. Tanner Girard, the presiding Board Member. To his right, Board Member Andrea Moore and to her right is Board Member Carrie Zalewski. To my far left is Board Member Thomas Johnson and to my immediate left is Alisa Liu from our technical unit. I just want to note for the record that both Anna Rao and Gary Blankenship are heading downstate for a hearing in Edwardsville tomorrow so they won't be able to be here. We're getting a lot of rulemakings and we're actually bumping up against one another. We actually had rulemaking hearings on the same day. So Member Blankenship is sorry to be missing us, but he is driving in this rain.

Today's hearing is the eighth day of hearing in Subdocket C. It is the 51st day overall in this proceeding. Today, we will hear the testimony of Adrienne Nemura and she will be questioned first by the IEPA, then Prairie Rivers Network and the Sierra Club. Ms. Nemura filed written responses to her pre-filed questions. Both the testimony and each set of answers will be marked as an exhibit and entered as if read. However, if there is a follow up to a specific question in order to keep the record clear and so that we are all on the same page we'll read the question and the answer into the record before we begin following.

Anyone may ask a question. I do ask that you raise your hand, wait for me to acknowledge you. After I have acknowledged you, please state your name and whom you represent before you begin your questions. Please speak one at a time. If you're speaking over each other, the court reporter will not be able to get your questions on the record. Please note that any question asked by a Board Member or staff are intended to help build a complete record for the

Board's decision and not to address any preconceived notion or bias. I would also like to take this opportunity to introduce to you four of the Board's summer interns. We have Ethan Pressly, Vermont Law School, Kristen Carl -- sorry, Kristen, from DePaul. We have John Clark from SIU, great law school, and Erica Yee from Kent. Also a good law school. I happen to be partial to some. Dr. Girard?

MR. GIRARD: Good morning. Welcome to Hearing Day 51, is that right?

MS. TIPSORD: Mm-hmm.

MR. GIRARD: Hearing Day 51 in this rulemaking. We appreciate all the time and effort all the participants have put into this. We look forward to the testimony and questions today. Thank you.

MS. TIPSORD: With that, does anyone have anything preliminarily? Great. Let's have Ms. Nemura sworn in and we'll get her testimony.

WHEREUPON:

ADRIENNE NUMERA

called as a witness herein, having been first duly sworn, deposeth and saith as follows:

MS. TIPSORD: Do you have a copy of Ms. Nemura's testimony to be admitted into the record?

MR. ANDES: I do. So you want the testimony and both sets of answers, is that right?

MS. TIPSORD: Yes.

MR. ANDES: All right.

MS. TIPSORD: Do you have those? If you do, that's great. We'll mark them all at once.

MR. ANDES: I have the testimony and both sets of answers. There's one attachment to one of the sets of answers that I don't have with me. We had difficulty printing it out this morning. I can have a copy sent over if you need it.

MS. TIPSORD: Okay. That's -- is that the District's report on dissolved oxygen?

MR. ANDES: Yes.

MS. TIPSORD: I thought I had a copy of that one. I do have a copy of that. I have a clean copy. So we'll put that one in now.

MR. ANDES: Okay.

MS. TIPSORD: If there's no

objection, we will mark the pre-filed testimony of Adrienne D. Nemura as Exhibit 465. Seeing none, it's Exhibit 465.

(Document marked as Hearing Exhibit No. 465 for identification.)

MS. TIPSORD: And the pre-filed responses to the IEPA's questions, their first. We'll mark as Exhibit 466 if there's no objection. Seeing none, it's Exhibit 466.

(Document marked as Hearing Exhibit No. 466 for identification.)

MS. TIPSORD: And, Fred, did this go with the District or with the Agency?

MR. ANDES: Prairie Rivers responses.

MS. TIPSORD: We'll amend them then. And then the answers to Prairie Rivers Network, Sierra Club, we'll mark as Exhibit 467 if there's no objection. Seeing none, it's Exhibit 467.

(Document marked as Hearing Exhibit No. 467 for identification.)

MS. TIPSORD: And the attachment to those responses which is Monitoring and Research Department Report Number 09-50 Continuous Dissolved Oxygen Monitoring in the Deep Draft Chicago Waterway System During 2008 dated August 2009 from the Metropolitan Water Reclamation District of Greater Chicago will be marked as Exhibit 468 if there's no objection. Seeing none, it's Exhibit 468.

(Document marked as Hearing Exhibit No. 468 for identification.)

MS. TIPSORD: And, Ms. Williams, or, Ms. Diers?

MS. WILLIAMS: Fred, did you want to put the proposed regulatory language as an exhibit also before you reference it?

MR. ANDES: We can do that if there's going to be questions about that.

MS. TIPSORD: It has already been marked as a public comment. So we can just refer to that as a public comment number. It was not initially marked as a public comment, but we backed up and put it in.

MS. WILLIAMS: Do you know the number offhand?

MS. TIPSORD: Yes. PC 1031, since it came in with the pre-filed answers, John just included it and when I realized -- when I started looking at pre-filed answers, I realized I hadn't put it in as a public comment because I figured we'd be talking about it.

MS. WILLIAMS: Thank you. For the record, PC 1031 is the District's proposed aquatic use and dissolved oxygen water quality standards and implementation procedures filed with the Board on June 17th, 2011. Just to be clear. If I have a follow up on one of her answers, you'd like me to read the question into the record and have her read the pre-filed answer and then follow up?

MS. TIPSORD: Yes, I think that makes the most sense.

MS. WILLIAMS: Good morning, Ms. Nemura. Good to have you back.

THE WITNESS: Good morning.

E X A M I N A T I O N

BY MS. WILLIAMS

Q. I am going to get us started off

with question three and see how it goes. Question three reads "On pages two to three of your pre-filed testimony, you state, quote, because it is not possible to eliminate or fully treat these wet weather sources in the foreseeable future, the impact of these events on dissolved oxygen levels in the CAWS needs to be considered when establishing the highest attainable designated uses for these waterways." Question A, how long do you consider, quote, foreseeable future?

A. At least until 2029, 18 years when TARP is fully implemented and probably longer. I believe a wet weather limited use will still be needed after TARP is fully implemented. This is because there will still be discharges from CSO'S and municipal separate storm sewers and overlaying runoff to the tributaries.

I don't see how these discharges can be eliminated or fully treated. This is going to be a long term issue.

MS. WILLIAMS: Can you tell us what contributions these municipal separate storm sewers and overlaying runoff to the tributaries, what contributions these sources make to low

dissolved oxygen levels?

A. No.

MR. ANDES: You mean you can't tell us what specific contributions?

THE WITNESS: Correct.

MR. ANDES: Can you discuss generally what kinds of contributions they make?

THE WITNESS: Yes. When the District analyzed the continuous dissolved oxygen monitoring, or CDOM data, they looked at the discharges of CSO's and the pumping stations and they did see dissolved oxygen impacts from these other sources at low rainfall events and these other sources would be significantly higher, in my opinion, during larger rainfall events.

BY MS. WILLIAMS:

Q. So explain what you mean in low rainfall events they saw an impact?

A. When there is rain, it takes a while for the interceptors to fill up that would trigger the gravity CSO's and then it takes larger rains when the Water Reclamation plants reach their practical maximum flow and then the pump stations need to operate.

So even when you don't have CSO's or pump station events you do see impacts of other wet weather sources and based on general knowledge of the Chicago Area Waterways you would see significant impacts during the high flow events.

For example, even when the District did a hypothetical simulation of their water quality model where they eliminated the gravity CSO's, you still had instances where dissolved oxygen was significantly impacted by other sources.

Q. So let's talk about that. Will you clarify what hypothetical simulation you're referring to and whether it's in the record?

A. In my previous testimony, I summarized results of the simulations that were conducted for the District with their water quality.

Q. Can you identify more specifically where that is in the record?

MR. ANDES: In her previous --

BY MS. WILLIAMS:

Q. Are you saying you summarized that

or you provided that information?

A. I provided that information in my testimony.

Q. And which attachment?

MR. ANDES: I don't think we have that handy. We can provide that if you don't --

MS. WILLIAMS: You're saying you don't have the reference handy or you don't know whether it's in the record at this time?

MR. ANDES: We know it's in the record. We just don't know the specific attachment to her previous testimony.

MS. WILLIAMS: Okay. If you can find that at the break, that would be helpful because it wasn't clear to me.

BY MS. WILLIAMS:

Q. Can you tell us, Ms. Nemura, this hypothetical simulation, did it eliminate pump station discharges?

A. No.

Q. Why not?

A. The question that the District wanted to address with the simulation was if CSO discharges could be eliminated, would they be able

to -- what level of dissolved oxygen would be attained in the waterways.

Q. Would you agree that pump stations are really just very large CSO's that are collected together?

A. Because of the operational nature of the waterways where the District has to ensure the flooding of extreme proportions is limited, the CSO discharges that occur at the pump stations I think would represent a blend of CSO and very large storm water events.

Q. Would the wet weather limited use you proposed still be necessary if those discharges were eliminated?

A. Could you repeat the question?

Q. If the pump station discharges were eliminated, would the wet weather limited use still be necessary in your opinion?

A. I believe it would.

MR. ANDES: You believe it's --

BY MS. WILLIAMS:

Q. What do you base that on?

A. Because you still have dissolved oxygen impacts at locations that are not affected

by the pump station discharges during wet weather.

Q. So would any dissolved oxygen impact justify a wet weather limited use?

A. Within this unique system because of the wet weather sources that have to all be funneled to the Chicago Area Waterways, I suspect that you would still need a wet weather limited use provision.

Q. With regard to the modeling simulation you mentioned, you mentioned, I believe, that that hypothetical simulation concluded a wet weather limited use would still be needed, is that an accurate paraphrase of your testimony?

A. I did not say that.

Q. Can you correct -- what did it include?

A. The results of the simulation concluded that even if gravity CSO's would somehow be hypothetically eliminated, there would still be impacts to dissolved oxygen that would be below the dry weather criteria.

Q. What do you mean by dry weather criteria?

A. Dry weather criteria would be the dissolved oxygen that is needed to protect the aquatic like under conditions that are not affected by wet weather sources.

MR. ANDES: Were you talking there in terms of dry weather criteria about the IEPA's proposed criteria?

THE WITNESS: Correct.

MR. ANDES: In terms of gravity CSO's, let's talk for a minute about what you mean by that. Does that mean the several hundred CSO discharge points on the CAWS other than the pump stations?

THE WITNESS: Correct.

MR. ANDES: Do you believe it's at all feasible to eliminate every one of those stations?

THE WITNESS: No.

MR. ANDES: Do you believe it's feasible to eliminate the pump station CSO's?

THE WITNESS: No.

BY MS. WILLIAMS:

Q. Why not?

A. When it rains, there's a tremendous

amount of water that is funneled to the manmade waterways and even if it were possible to somehow eliminate or significantly reduce the impervious area in the watershed that is receiving all this rainfall, I can't see what you would do with that water.

Q. Have you studied the engineering design of the Tunnel And Reservoir Project?

A. I have not.

Q. Do you know what -- I just want to be clear because we don't have the attachment in front of us from your testimony. What dissolved oxygen number did that hypothetical simulation target?

A. It was the Illinois EPA proposed criteria.

Q. And does that include 5.0 mg/L of dissolved oxygen in certain waters?

A. I'd have to check.

MR. ANDES: It appears attachment four to her previous testimony is what we're referring to. That's the testimony that was filed back in 2008.

MS. WILLIAMS: Thank you, Fred.

BY MS. WILLIAMS:

Q. Let's move onto question four. I think I'll be able to skip some of my follow ups on that question four. Are there benefits to elimination or treating CSO -- that's not question four. Sorry about that.

MR. ETTINGER: Sounded like a particularly good question.

MS. WILLIAMS: I noticed there was a misspelling in that.

BY MS. WILLIAMS:

Q. Question four. On page two of your pre-filed testimony you state that, quote, it is my professional opinion that a wet weather provision needs to be included in the water quality standards for protection of aquatic life uses in the CAWS, end quote. How will a wet weather provision help to protect aquatic life uses in the CAWS?

A. Let me clarify. There are water quality standards for protection of aquatic life use. This provision needs to be included in the standard because if there is no provision the standards cannot be attained and standards need to

be attainable. The standards will still be protective even with this provision as discussed in Ms. Wasik's testimony.

Q. What do you mean the standards need to be attainable? Where is the basis for that statement?

A. That is the basis of the whole use attainability analysis provision under the Clean Water Act.

Q. So would you agree that its use designations that are reviewed for their attainability under the Clean Water Act?

A. Under the Clean Water Act, you would set appropriate use designations that could be attainable and with respect to dissolved oxygen, for example, take the Cuyahoga River which is a dredged navigation system. They had chronically low dissolved oxygen. They had CSO discharges. They developed a computer model of the ship channel and they looked at hypothetical simulations with their model to determine whether the uses could be met and in order to determine whether the uses could be met you have to use some kind of associated criteria.

Q. Why?

A. Because if the uses you're trying to protect which is like the Cuyahoga deals with fish, fish need a certain level of dissolved oxygen at times to survive under the appropriate environmental conditions associated with where they're living.

So with the modeling that was done for the Cuyahoga, they looked at whether you could achieve the 5.0 mg/L dissolved oxygen that would be necessary to protect an assumed fish population and they learned that unless they were somehow to stop dredging meaning instead of a 20 plus foot channel bring it back to, say, 10 to 12 feet, there was no way they could ever achieve that 5.0 mg/L dissolved oxygen.

So that is how they determined that the appropriate aquatic life use for that system was during a particular season. It was suitable only for fish passage and then once they established that it was only suitable for fish passage they looked at what the appropriate dissolved oxygen criteria would be to accompany that use.

Q. So did the chicken come first or the egg?

A. I don't know how to answer your question.

Q. That's fine. I'll withdraw it. I don't think you answered the original question, which maybe we'll reword to make clearer. Isn't it true that its use is that needs to be attainable, that there's nothing in the Clean Water Act or elsewhere that says water quality criteria needs to be attainable?

A. Well, the Clean Water Act requires that once uses are established that the states also adopt water quality standards which consist of the designated uses, the narrative or numeric criteria and antidegradation provisions. So typically what is done under use attainability analysis is to not only look at, say, what is the appropriate -- or what is the current aquatic community, but also look at what could potentially be attainable if the physical and chemical parameters would be addressed and the physical and chemical parameters are often tied to what the appropriate criteria would be.

Q. Are you saying -- I just want to make sure I got my question answered. Does that mean your answer is, no, criteria must also be attainable?

A. If you're establishing the highest attainable use with the use attainability analysis and if the criterias that are needed to protect that use are also attainable, then the criteria would have to be attainable.

Q. What if you establish the highest attainable use, but for some reason the criteria was not attainable?

A. I don't understand how that's possible. Every use attainability analysis that I've been involved in or researched never looks at whether some use is attainable with criteria that cannot be met.

MR. ANDES: If the criterion is not attainable, doesn't it stand to reason then that the use is not attainable?

THE WITNESS: Yes.

BY MS. WILLIAMS:

Q. So you've looked at quite a few recreational use attainability analyses, right?

A. I have, but I thought we were discussing aquatic life?

Q. So you haven't looked at a situation where swimming is occurring currently unattainable as a use, but bacteria criteria can't be met?

A. If you have a situation where under non-wet weather impacted conditions swimming can be attained, then you can say the use during these particular conditions is swimming. However, during wet weather when the bacteria levels are high that's why US EPA has included a provision like in Indiana where it's clear that during wet weather conditions the criteria cannot be met and, therefore, the use of swimming is not appropriate.

That's the same thing, for example, in the Huron River watershed where I live a woman wanted to swim the entire length of the river and she actually had people calling her to say has it rained in this portion of the river and then she knew it wasn't safe to swim there and then she would delay her swim. So the concept of a wet weather limited use is appropriate even though the Huron River when it's not raining is safe for swimming.

MR. ANDES: Isn't there also a difference, and perhaps you can clarify this for us, between having an exceedance of a standard at one given point versus concluding that a given standard is not attainable in a given waterbody?

THE WITNESS: Yes.

MR. ANDES: Do you want to explain how those differ? If you have a temporary exceedance in a given waterbody, does that necessarily indicate that the use is not attainable?

THE WITNESS: No.

MR. ANDES: But here as to the CAWS, was it your testimony that during wet weather conditions this use is simply not attainable?

THE WITNESS: Yes.

BY MS. WILLIAMS:

Q. That will sort of segway into my next area. Let's skip ahead to question seven. I'm going to read the intro, but I'm going to ask a follow up related to 7B. On page four of your testimony, you state, quote, establishing a WWLU, which recognizes that there will be periods when the dissolved oxygen criteria cannot be met will

not result in degraded water quality, end quote. B, do dissolved oxygen values of zero mg/L constitute degraded water quality?

MS. TIPSORD: Just for the record, WWLU is wet weather limited use. That's the first time we've used it in a while.

MS. WILLIAMS: Thank you.

MS. TIPSORD: Go ahead, Ms. Nemura.

BY THE WITNESS:

A. If the resident fish are able to tolerate intermittent periods of zero dissolved oxygen, then I don't see how providing a wet weather limited use will degrade water quality. The wet weather limited use is based on the current understanding of wet weather impacts and will not result in more hours of low dissolved oxygen.

BY MS. WILLIAMS:

Q. Is it possible that these low dissolved oxygen levels are not tolerated by the highest attainable fish community in the CAWS?

A. The habitat study showed that habitat was limiting the fish community in the CAWS and the data showed that the resident fish

community was self supporting given the different types of pollution tolerant fish that were present in the system because --

Q. Are you saying the study concluded that DO was not limiting fish in the CAWS?

A. The study concluded that the limitations to the resident fish community were habitat driven.

Q. Primarily or solely?

A. There was -- the habitat factors that were evaluated showed that improvement -- if hypothetically you could improve those habitat factors, you might see a response -- a positive response in the fish community. The dissolved oxygen was a factor, but was insignificant.

Q. Didn't the study show that the highest quality fish community occurred in the areas with the lowest DO values?

MR. ANDES: Are you going to ask her the same questions you asked Mr. Bell because I don't want her to be put at the risk of inconsistent testimony? We'll just refer to his testimony. You already asked that question of him.

MS. WILLIAMS: I think she is interpreting that study differently than he testified so I would like to clarify her interpretation of the study. I don't think I'm going to ask her all the questions I asked Mr. Bell. That was a long day.

MR. ANDES: I assume you're not going to ask her any of the questions you asked Mr. Bell because that would be repetitive.

MS. WILLIAMS: I can repeat the question if you want.

MS. TIPSORD: Before we do that, let's be clear because we are starting fresh with a new transcript. We're talking about the CAWS habitat study done by Limnotech when we talk about the study and habitat study just for purposes of the record.

MS. WILLIAMS: The Habitat Evaluation Report. There's a Habitat Evaluation Report and a Habitat Improvement Report and I'm referring to the Habitat Evaluation Report, is that the one you're referring to?

THE WITNESS: Yes.

MS. TIPSORD: From Limnotech. Ask

your question again and I would agree if she is interpreting the study then if there's some inconsistency we'll have to clear that up.

BY MS. WILLIAMS:

Q. I would like to know if you agree that the study showed that the highest quality fish communities occurred in the areas with the highest DO values?

A. I don't agree with that.

Q. Did you also review the habitat improvement study?

A. Yes.

Q. Do you agree that study showed that fish would possibly benefit from improved DO values?

A. No.

Q. In 7B, you use the term tolerate. You say resident fish are able to tolerate intermittent periods of zero dissolved oxygen. Can you explain what you mean by tolerate?

A. They -- the resident fish community is primarily pollution tolerant fish and the data suggests that you can have these periods of low dissolved oxygen that the fish are either able to

tolerate or they are able to go to an adjacent segment to wait out the impacts of the wet weather.

Q. Now, when you say they are -- or -- they tolerate or they avoid -- tolerate or avoid?

A. Avoid.

Q. Do we know which one or are you saying some fish tolerate and some avoid?

A. There is literature studies that have shown that even juvenile fish can experience dissolved oxygen levels that are less than 4.0 or 5.0 mg/L and not show problems. So --

Q. For how long?

A. That was covered in Ms. Wasik's testimony, but under existing conditions there are low dissolved oxygen events that can occur for multiple days in a particular segment and the adjacent segments the dissolved oxygen is not low and if the fish were not able to tolerate or avoid these low dissolved oxygen pockets then you would see fish kills and we don't see fish kills, chronic fish kills in the system like I've seen in other systems.

Q. So I think what I'm just trying to

simply get at with my question is whether there's any science in this system that tells us whether these fish are able to tolerate dissolved oxygen or whether they leave if we know. Do we know?

A. There is some preliminary research that's being conducted to determine -- how these fish are able to tolerate or avoid these low dissolved oxygen pockets.

Q. What is the scope of that research?

A. It's a research project under the Water Environment Research Federation that Limnotech and the University of Illinois and other researchers are conducting.

MR. ETTINGER: Can I have one quick question?

MS. WILLIAMS: Yes.

MR. ETTINGER: I've been generally holding off this time, but you mentioned you had seen other systems with chronic fish kills. Which systems have you seen that were like that?

MS. TIPSORD: Albert, you need to identify yourself.

MR. ETTINGER: I am Albert Ettinger. I represent several environmental organizations in

this proceeding. Do you remember the question?

THE WITNESS: Yes. I was at the Metropolitan Washington Council of Governments in Washington DC and my responsibility was to evaluate water quality and water resources issues in the Potomac and Anacostia Rivers. The Anacostia is a title fresh estuary and because of the hydraulic conditions in estuary and because of impacts of wet weather sources there were periods during the summer where there were chronic fish kill problems due to low dissolved oxygen.

MR. ETTINGER: What is a chronic fish kill problem as opposed to an occasional fish kill problem?

THE WITNESS: A chronic fish kill problem is seeing fish kills that are reported and observable and quantifiable on an annual, semiannual basis and there is a direct correlation between these fish kills and the water quality conditions that are measured at the time.

Q. Is that the only one that you were studying or that you know of in which you experienced chronic fish kills that you were talking about?

A. Yes.

Q. Did the City of Washington then decide to just put up with it and change the standards applicable to the Potomac or did they take steps to address their CSO's?

THE WITNESS: They have been taking steps to address their CSO's, but they only took those steps after extensive water quality studies to help determine whether corrective actions would improve the water quality conditions such that the water quality would not hopefully result in these fish kill situations and I, in particular, were involved in those studies.

MR. ETTINGER: Thank you.

BY MS. WILLIAMS:

Q. Let's move onto 11. Question 11. Explain how, quote, the appropriateness of the trigger and the maximum duration for applying a wet weather limited use designation could be examined periodically, end quote. A asks would the reexamination still be required?

A. Not necessarily. The annual reports would contain the data needed to alert the District, Illinois EPA or a member of the public

that reexamination might be in order. Or if major changes were made to the operation of the Chicago Area Waterway System, the appropriateness of the wet weather limited use could be reexamined.

Q. Does the Agency have the burden of proving that the wet weather limited use designation is no longer needed?

MR. ANDES: I'm sorry. Are you talking about would Illinois EPA?

MS. WILLIAMS: Correct.

BY MS. WILLIAMS:

Q. Would Illinois EPA have the burden of proving to the Board that the wet weather limited use designation is no longer needed?

A. Well, the question was related to the trigger and the duration and in the annual reports that the District would prepare, they would provide data to the Agency about the trigger and the duration and how often the wet weather limited use was actually needed.

Q. Will the District have to prove that the trigger and the duration was still needed?

A. I don't understand your question.

MR. ANDES: Is it accurate to say

that you believe on a long-term basis the limited use will be needed, it's just a question of the specific details of it?

THE WITNESS: Yes.

MS. TIPSORD: I guess what Ms. Williams may be trying to get at when you say reexamine would you envision this part of the rulemaking, would you envision this part of the District's permit would be reexamined periodically to look at this trigger or would this be set in a rule? I mean, how do you envision this reexamination working?

THE WITNESS: I believe that the District as part of their permit requirement would be required to provide annual reports that contained all of the continuous dissolved oxygen monitoring data, all of the rainfall data, and evaluation of the dissolved oxygen conditioning during dry and wet weather periods. They would also include specific details about when the wet weather limited use was actually needed which would include which rainfall events were associated with that.

Until something significant were

to happen, say, you know, TARP was fully implemented or the diversions associated with Lake Michigan water if you could somehow get more fresh water into the system or there were some major efforts to reduce storm water or tributary loads or other problems that the data would show that this wet weather limited use was still needed in each of those annual reports.

At any time as part of the triennial water quality standards review process, someone could say we've been looking at these reports and we have been looking at, you know, conditions that suggest that perhaps the wet weather limited use is no longer appropriate for this particular segment, for example, then the data would be available to suggest that perhaps the standards should be changed for that particular location.

MR. ANDES: So would it ordinarily be the case that Illinois EPA would initiate that change in their rule?

THE WITNESS: Yes.

BY MS. WILLIAMS:

Q. Good. Now, we're back to my first

question. Would the Agency have the burden of proving to the Board in that context that the wet weather limited use designation is no longer needed or would MWRD be required to demonstrate that the wet weather limited use is still required?

A. I don't know the Agency rules.

Q. If a higher use were to become attainable, would it be required to be adopted?

A. Yes.

Q. Let's jump onto 13. This should be quick. Question 13, will the wet weather limited use still work if the Board adopts the Agency's aquatic life use designations rather than the categories proposed by MWRDGC? Why or why not?

A. Possibly. Additional study would probably be needed to evaluate what facilities would be needed during dry weather, but I believe a wet weather limited use would still be needed.

Q. A, explain why the wet weather limited use is not needed for the category three waters in MWRD's proposal?

A. There is no minimum dissolved oxygen criteria associated with the narrative criteria

for category three waters.

Q. So it's your testimony that the wet weather limited use is not needed for category three based on the criteria that's been proposed, is that correct?

A. The category three waters have a separate designated use associated with them and those category three waters do not include or would not include numeric criteria and the narrative criteria would be used to protect the fish that use those category three waters. And the wet weather limited use is needed for category one or category two waters because there is a numeric criteria associated with those uses that cannot be met during wet weather.

Q. So when I ask the question the wet weather limited use isn't needed for the category three waters based on the criteria proposed, the answer is yes? It was just a yes or no question. I think you answered it yes?

A. The category three waters have a different aquatic life use and they do not --

Q. So do the category one and two, correct? They have their own use also; one, two

and three?

A. Right.

Q. So the reason that the category three waters do not need the overlaying additional wet weather use as you're calling it is because of the different criterion, correct?

A. No, they have a different use.

Q. B, does the narrative criteria applicable to these waters allow the dissolved oxygen levels to fall to zero?

A. At times, these waters already have dissolved oxygen less than 1.0 mg/L and sometimes zero. So adopting narrative criteria would not allow anything worse. However, the narrative criteria still protects against adverse impact such as fish kills.

Q. Explain how the narrative criteria proposed by MWRD protects against adverse impacts?

A. It would be -- that provision would be included in the water quality standards.

Q. But how does the provision that is proposed to be included in the water quality standard and I'll reference it if I can -- would be the proposed 302.405(d), I believe. How does

that provision -- what about that language would protect against adverse impacts?

A. Can you repeat the question, please?

Q. The original question was how does the narrative criteria protect against adverse impacts?

A. With the narrative as --

Q. What part of the narrative? What narrative language? How?

A. The proposal states in Public Comment 1031 Section 302.405(d) for the Chicago Area Waterway System severely limited aquatic life waters listed in Section 303.234 waters must maintain sufficient dissolved oxygen concentrations to prevent offensive conditions as required in Section 302.203 of this part.

Q. Let's stop at that first sentence. Does that first sentence help protect against adverse impacts?

A. Yes.

Q. Okay. How?

A. Offensive conditions.

Q. So that's directed towards impacts on aquatic life?

A. It could be odor. It could be other things.

Q. Go ahead.

A. The next sentence says "Quiescent and isolated sectors listed in this section must maintain sufficient dissolved oxygen concentrations to protect their limited ecological functions and transient aquatic communities."

Q. So how does that protect aquatic life uses?

A. I'm sorry?

Q. How does that protect the residents -- what does that do to protect against adverse impacts? That's your term. Adverse impacts.

A. It says that -- it essentially is saying that you have a resident fish community already. You have those quiescent and isolated segments in the waterways that have certain habitat and flow and dissolved oxygen conditions and those segments are supporting a current fish community that exists throughout waterways. They did play a role in supporting that fish community and so the narrative language requiring conditions

to be supportive of their limited ecological function and transient -- and used by transient aquatic communities must be preserved.

MR. ANDES: So if --

BY MS. WILLIAMS:

Q. What is a transient aquatic community?

A. It means that the fish may at times swim into these segments, but they don't stay within that segment on a routine basis because take, for example, Bubbly Creek where its subject to rapid changing functions or changing conditions if the fish were to hang out in Bubbly Creek during some of these events, there more than likely would be fish kills.

MR. ANDES: But they don't actually hang out there?

THE WITNESS: Correct.

MR. ANDES: And if you had a situation where there were adverse impacts such that the limiting current functions weren't supported or the limited fish community right now were not supported or adversely effected so your reading of that would be a violation of this

narrative standard?

THE WITNESS: Yes.

MR. ETTINGER: How would we know that?

THE WITNESS: Fish monitoring data would be used as well as -- there have been other systems. For example, on the Shenandoah, for example, in my native State of Virginia where the anglers have actually noted a decline in the fish community or problems with their typical fish community and have alerted state agencies that they're seeing a problem. That could be used to trigger a study. The Agency could say data is suggesting that this is a problem and they could require additional study in the District's permits at any time.

MR. ETTINGER: Okay.

BY MS. WILLIAMS:

Q. So do you consider all of Bubbly Creek to be an isolated sector?

A. I'm sorry?

Q. Do you consider all of Bubbly Creek to be an isolated sector?

A. Yes.

Q. Do you know how long it is?
A. How long Bubbly Creek is?
Q. Yes.
A. I did it one time. I can't recall.
Q. Do all -- are all of the waters listed under category three both quiescent and isolated all the time or some of the time?
A. Quiescent some of the time.
Q. So does the water have to be both quiescent and isolated for this standard to apply?
A. The standard includes a list of the segments that belong in category three.
Q. So is the conclusion that when it says "Quiescent and isolated sectors listed in this section," does that mean all the sections listed are quiescent and isolated or only the ones that are quiescent and isolated have this criteria?
A. Right. That is a general description. Ms. Wasik's testimony includes the reasons as to why certain segments are considered category three segments.
Q. Do you know if any of the category three segments besides Bubbly Creek were studied

for this proceeding?

MR. ANDES: Can you clarify what you mean by study?

BY MS. WILLIAMS:

Q. Any way. Was habitat data, biological data, chemical data studied in any way?

A. Ms. Wasik's testimony included information about why the segments are different from category one or category two waters.

Q. I agree, but I think that testimony also indicated those were not studied. So I'm trying to see if you can help me understand how we will justify this lower use category for waters that have not been studied, if you know?

MR. ANDES: Let me see if I can expand the net.

MS. WILLIAMS: Can she answer first or no?

MR. ANDES: Go ahead.

BY THE WITNESS:

A. Can you repeat your question, please?

MS. WILLIAMS: Steven, can you read it back?

(Whereupon, the record was read as requested.)

BY THE WITNESS:

A. Well, for example, the Grand Calumet River which was not evaluated by Limnotech during the physical habitat assessment exhibits stagnant conditions during dry weather. 75 percent of the sediment samples showed toxicity. Between 2001 and 2008, only three fish species were collected from the Grand Calumet River. Other information regarding beneficial use impairments on the Grand Calumet River can be found on the US EPA website as an area of concern and there are stagnant conditions during dry weather and a preponderance of fine, green, organic toxic sediments and that is why the District proposed to designate the Grand Calumet River as a category three water.

Q. Do you know --

A. So I don't agree these systems weren't, quote, studied.

Q. So you feel they were studied. Can you tell us what is the collateral channel that's listed? In this list of segments, we have South Fork South Branch Chicago River, A, B, Grand

Calumet River, C, North Branch Canal. Can you tell us where that is?

A. The Collateral Channel is across the river from Bubbly Creek along the Chicago Sanitary and Ship Canal just south of Bubbly Creek.

Q. That might help. That might merit some clarification at some point. Is there any map that identifies the other off channel slips that are referred to in this last item?

A. There are maps within specifics. I would have to defer to the District.

MR. ETTINGER: I think I put in an exhibit at the last hearing that had proposed for a number of those.

MS. WILLIAMS: Have you looked at all --

MR. ANDES: I'm sorry. I can't hear anything --

MR. ETTINGER: You'll recall we put in some documents that I think originated with the wetlands initiative that I got from the Corps of Engineers that contain proposals from many of those waterbodies and identified them in the process.

THE WITNESS: That was where you were asking Mr. Bell about wetlands?

MR. ETTINGER: Right. Exactly.

BY MS. WILLIAMS:

Q. Let's move onto question 15. Explain why the WWLU is a use designation rather than a site specific criteria.

A. Use designation is more representative of what exists. During dry weather, the dissolved oxygen conditions across the Chicago Area Waterway System are similar for periods of time and fish might have to swim a long ways to find different conditions. During wet weather, not all of the segments are affected at the same time. If the dissolved oxygen is depleted, the fish appear to move to the adjacent segment to avoid the low dissolved oxygen. The dissolved oxygen then recovers as the slug of low dissolved oxygen moves through the system.

Therefore, the wet weather limited use recognizes the aquatic use is different during wet weather conditions. In my opinion, you need to establish the appropriate aquatic life use first and then determine the

dissolved oxygen criteria to support the uses.

Q. So with regard to your last sentence, was that how Bubbly Creek was determined? Aquatic life use was established first and then the dissolved oxygen criteria to support that use?

A. There are no dissolved oxygen criteria, numeric criteria, proposed for Bubbly Creek.

Q. So that sentence only applies when you're doing your numeric criteria?

A. The narrative criteria proposed for Bubbly Creek are intended to support the aquatic life use in Bubbly Creek.

Q. You state in this paragraph that fish appear to move through the system. How do we know that?

A. Because in the segments where the dissolved oxygen goes down to, say, zero for six days, if there were fish there and they didn't move, you would probably see fish kills.

Q. Do fish sense dissolved oxygen the way they would sense temperature or physical movements?

A. Physical movements.

Q. Let's just stick with temperature. Do fish sense dissolved oxygen the way they would sense temperature change?

A. There is literature that suggests that fish can detect and avoid low dissolved oxygen conditions and the fish kills that occur -- and I apologize to Mr. Ettinger, I have studied fish kills on other systems such as the White River in Indiana.

MR. ETTINGER: That was ammonia.

THE WITNESS: No. There are also dissolved oxygen fish kills on the river.

MR. ETTINGER: Oh. Thank you.

THE WITNESS: They have explainable reasons.

BY THE WITNESS:

A. In some rivers, you will find during low flow conditions that fish are trapped in, say, an area of the river that they can't swim out of and because of the high heat and the oxygen demand in the water or in the sediment, the dissolved oxygen drops and the fish die because they can't get away from the low dissolved oxygen conditions.

BY MS. WILLIAMS:

Q. Can you explain how the goal aquatic life use for these waters would change with the weather?

A. I don't understand your question.

Q. A wet weather limited use, correct, does the goal for the waters change when the wet weather conditions are triggered?

A. The goal for the waterways is to establish the highest attainable use for aquatic life and based on all of the information the resident fish community, which is a community of pollution tolerant fish with multiple species that can support their existence, including predators, that is the goal for the waterways because of the unique nature of the waterways. There needs to be an understanding that during certain times and certain locations during wet weather you can't expect the conditions to support the resident fish community. They have to move to adjacent fish communities to avoid being adversely impacted by the low DO conditions that occur during wet weather.

Q. So I -- does this make sense? The

fish have to move, right? Is that what you just said? Because of the low DO conditions, the fish will have to move?

A. Under certain conditions, yes.

Q. Which is, I think, a little different than your earlier statement that they either tolerate it or they move, but what I'm hearing you say now is we need the wet weather limited use because the fish have to move out of these areas?

A. I think you're simplifying what I said.

Q. That's probably true.

A. This is a very highly complex system where transient, low, dissolved oxygen conditions occur and my testimony is that those -- the wet weather impacts affect a particular location at a particular time and the impacts can range from, say, 3.5 mg/L at times down to zero mg/L at times, but it occurs in an isolated area and then as the slug of low dissolved oxygen water moves through the system because of reiteration, oxygen recovers and then it's possible for fish to come back and do their usual thing.

So it's a highly transient situation. Not all segments are affected at the same time. The dissolved oxygen conditions are highly variable as is the impacts of wet weather. So trying to simplify my testimony to it's either, you know, avoid or tolerate, it's a mix of both.

Q. Let's move onto question 18. Why are there no continuous dissolved oxygen monitors listed for the South Fork of the South Branch of the Chicago River?

A. Since the District is proposing narrative criteria for Bubbly Creek, there are no numeric dissolved oxygen criteria proposed. The wet weather limited use designation, therefore, doesn't make sense for Bubbly Creek and a continuous dissolved oxygen monitor is not needed for evaluating compliance.

Q. Okay. So I just have a really quick follow up. What I really wanted to get out of this question, is there actually a monitor on Bubbly Creek and it's just not listed or is there no monitor?

A. There are two monitors currently operational on Bubbly Creek.

Q. Thank you. Question 19, why are there no CDOM's listed for the Chicago River Main Stem?

A. The District had operated a station at Clark Street from 1998 to 2009. The dissolved oxygen was above the general use criterion and the station was not impacted by the water reclamation plant effluents so the District notified Illinois EPA that they would discontinue the station.

Q. Can you explain -- based on your answer, can you explain why the Chicago River Main Stem is a category two water rather than a category one main water?

A. Based on my answer?

Q. That the dissolved oxygen is above the general use criterion and the station was not impacted by water reclamation plant effluents. Why is the Chicago River Main Stem, therefore, not in the higher use category?

A. As stated in Ms. Wasik's testimony, the Chicago River Main Stem was borderline in terms of the habitat index and, therefore, was a candidate for category one waters, but in terms of the habitat improvement potential the physical

nature of the Chicago River and/or sediment toxicity indicated that they belonged in the category two rather than the category one.

The Chicago River demonstrates no potential for habitat improvement due to 97 percent vertical wall armored banks and the lack of overhanging vegetation and bank pocket areas. As stated on page 49 of the Habitat Improvement Report, quote, because of the developed urban nature of the riparian land of the Chicago River, it is assumed that any measure requiring significant use of that riparian land for habitat improvement would be infeasible, end quote.

Q. What page are you reading from?

A. Page seven of her testimony.

MS. TIPSORD: Ms. Wasik's testimony is Exhibit 461 for the record.

BY MS. WILLIAMS:

Q. Let's move onto question 20. Is the CDOM network you describe in your testimony a mandatory component of the wet weather limited use proposal? Are there a mandatory number of monitoring locations?

A. Continuous dissolved oxygen

monitoring is mandatory to assess the wet weather limited use hours and I described the District's 2011 monitoring program in my testimony. Changes may need to be made to the program for a number of reasons including technical reasons (biofouling, navigational disturbance, et cetera) or safety reasons (if location is contributing to work-related injuries during deployment/retrieval).

In the event that the District were to propose a change to the program, Illinois EPA should be notified and given an opportunity to approve the change before it was implemented.

Q. What happens if EPA objects?

MR. ANDES: Are you speaking of US EPA or Illinois EPA?

MS. WILLIAMS: I'm sorry.

BY MS. WILLIAMS:

Q. What happens if Illinois EPA objects?

A. Objects to what?

Q. The change in the program.

A. I believe that the District and the Agency would need to discuss the objection and

reach an appropriate decision.

Q. What if the Agency's decision is it objects?

A. Can you repeat that question, please?

Q. What if the Agency's appropriate decision is that it objects to what the district wants to do?

A. Well, if after discussing the objection with the District, the Agency could require that the District keep the monitor in place and the Board wouldn't have to be involved.

Q. I'm not sure if you answered the last sentence of this question. Are there a mandatory number of monitoring locations?

A. I don't believe that a mandatory number of monitoring locations would be appropriate. The District's current network has evolved over time. At times, there are -- there is a need to gather more information based on what previous information is telling you. So the District may want to include a new monitor for a particular reason. On the other hand, there are times when you have a monitor that is operational

and you have established a sufficient record and other information suggests that that monitor may be redundant with another monitor so trying to mandate the number and locations of these monitors might not be in the Agency's interest.

Q. So the answer is no?

A. Correct.

MR. ANDES: The proposal that has been submitted includes CDOM stations in each reach other than Bubbly Creek, am I correct?

THE WITNESS: And the Chicago River.

MR. ANDES: And you would expect that you would continue to need some CDOM stations in each of these reaches, am I right?

THE WITNESS: Yes.

BY MS. WILLIAMS:

Q. Where in the proposal does it have that?

A. For example, now the District -- the District has monitoring out in the system now and that was included in a letter to the Agency and in my testimony I described that if the District wanted to make modifications to that program, including discontinuing a station or perhaps

adding a new station, they would notify Illinois EPA at least 60 days in advance of that change to give the Agency opportunity to comment or object.

Q. And if the Agency objects, they can't implement the change, correct?

A. I couldn't hear you.

Q. If the Agency objects, they can't implement the change, correct?

A. That would be my understanding.

Q. Question 22, is the rain gauge network you describe in your testimony a mandatory component of the wet weather limited use proposal?

A. The District would need to continue to operate a rain gauge network as they have been doing for other purposes. I don't think it would be appropriate for someone to mandate where rain gauges should be located. As long as they, the District, had gauges that could be considered representative for interpreting the data at each continuous dissolved oxygen monitoring station, I believe this is suspicion. The District could, however, notify the Agency about changes to its rainfall monitoring program.

Q. How would that initial determination

of representativeness be made?

A. In evaluating the continuous dissolved oxygen monitoring data and in crafting this wet weather limited use proposal, the current rain gauge network that the District operates, which is much more extensive than that provided by the National Weather Service, is sufficient in my opinion for interpreting the dissolved oxygen data.

MS. WILLIAMS: Can you repeat that?

(Whereupon, the record was read as requested.)

BY MS. WILLIAMS:

Q. So when I asked how representativeness would be determined, it's in your judgment that it is representative, is that the answer?

A. Yes.

Q. Why couldn't we just use any rain data that's available? If it's raining, it's raining, right? Weather Service has data. I'm sure there are other organizations that take data. Why would only the District's rain gauges be used to trigger the wet weather events?

A. The District's rain gauge network they rely upon that to operate the Chicago Area Waterway System and that includes their pump station. That's includes, you know, drawing down the levels in the waterways in the event of impending storms and they purposely established a network that would provide them with good spatial coverage across the watershed that affects the waterways. If there was detailed, say, radar data that were available or other detailed data that were available that represented rainfall conditions in the segments where a particular CDOM were located, I assume that that could also be used, but the purpose is to find the rain gauge, gauges that are providing data that show how the wet weather sources in that particular segment are affecting the dissolved oxygen. So you would need -- if the District's rain gauge data has been evaluated and shown to be representative, you would need to look at any other rainfall data and make sure it's of sufficient quality and representativeness as well before it could be considered. Because this is such a large geographic area, if you were to rely on, say, rain

gauge data in the North Shore to evaluate dissolved oxygen conditions that are occurring in the Calumet River, that would be, in my opinion, highly inappropriate.

Q. I'm not sure this was clear from your testimony, but my reading of the language now in the proposal is that changes to the rain gauge network would be handled the same way as changes to the dissolved oxygen monitoring network, correct?

A. The rain gauges as I said before that the District operates serve a multitude of functions and functions that occur before using those data to interpret the wet weather limited use. Therefore, the District could notify the Agency, but I personally don't believe that the Agency should have as much control over decisions related to the rain gauge network because it relates to many other important purposes for the waterways. The District, however, has operated the current rain gauge network for quite some time and it's my understanding it does not intend to modify that network.

Q. Okay. I'll just flag for your

counsel it appears that language treats them both the same.

MR. ANDES: Can you point to which particular language you're speaking of?

MS. WILLIAMS: Sure. 302.406(a).

BY MS. WILLIAMS:

Q. Let's move onto question 27.

MS. LIU: Ms. Williams, may I follow up on your question 26, please?

MS. WILLIAMS: Yes. Absolutely.

MS. LIU: Ms. Nemura, the District's proposed provision at Section 303.236(b) sets forth that, quote, the wet weather limited use designations shall be triggered in a given waterway segment by precipitation of 0.25 inches per day or more in the drainage basin to that segment, end quote. Along with the discussions that we were having earlier, could you please clarify whether or how the District has delineated the drainage basin for the various segments? Is that something that needs to be in the record at this point?

THE WITNESS: In my testimony, in Table 3 on page nine, we have identified for the

individual Chicago Area Waterway segments which rain gauges are appropriate for evaluating the wet weather limited use. The District could provide information perhaps on the specific -- I don't want to get too technical, but Thiessen polygons associated with those individual rain gauges.

On the other hand, it could also be indicated that these specific rain gauges should be used for these -- located at these locations should be used for evaluating the data in these particular segments.

BY MS. WILLIAMS:

Q. What kind of polygons did you say?

THE WITNESS: Thiessen, T-H-I-E-S-S-E-N.

MS. DEXTER: Debbie, do you mind if I ask a follow up?

MS. WILLIAMS: No.

MS. DEXTER: Jessica Dexter for the Environment Law and Policy Center. When you have data that comes from multiple rain gauges, how do you decide which controls or do you combine the data? Do you take the highest one out of the two or five that you see? How do you decide which one

triggers the standard?

THE WITNESS: Right. We look to the data associated with each rain gauge in a segment and we use the maximum.

MS. DEXTER: Out of any of the ranges?

THE WITNESS: Out of any of the ranges.

MS. DEXTER: Thank you.

MR. ANDES: If we can go back to one issue just to clarify for a moment that Ms. Williams brought up. On the issue of changes to the rain gauge, it's correct that the proposed language before 302.406(a) indicates that Agency approval would be needed as to the rain gauge network changes as well. The District doesn't believe that that is absolutely necessary given the other purposes rain gauges are installed for, but is willing to agree to subject those changes to Agency proposal and that's why the language in the proposal reflects that.

MS. WILLIAMS: Thank you.

BY MS. WILLIAMS:

Q. Let's move onto question 27. What

percentage of time are the CDOM's not operational? What percentage of the data does not meet MWRDGC's Quality Assurance Quality Control guidelines? How will the Agency determine that MWRDGC is not excluding data that demonstrates a DO violation?

A. The data for calculating the period of time in 2006 that the continuous dissolved oxygen monitors are not operational or data rejected are in Table 7 of my testimony. In general, the continuous dissolved oxygen monitors provided valid data about 96 percent of the calendar year.

I did not evaluate what percentage of the data does not meet QAQC guidelines, Quality Assurance Quality Control. The District does that calculation and all of the dissolved oxygen data I used met the QAQC guidelines. The District has QAQC guidelines that they follow because these instruments are subject to drift and fouling. It is not uncommon that some of the readings need to be excluded.

This is done before comparing the data to water quality standards. I am sure the District could provide the excluded data if

the Agency or others want to review it.

Q. What are the District's QAQC guidelines?

A. They are identified in the continuous dissolved oxygen monitoring annual reports.

Q. How do they compare to other organizations that use continuous data such as Illinois EPA or USGS?

A. In general?

Q. Yes, in general.

A. In general, they are consistent.

Q. There are some differences, I assume, then by saying they're consistent, but they're not the same or do they follow one or the other?

A. I don't have the specific details. The QAQC guidelines have to do with the specific instruments that are used. They have to do with how frequently the probes are changed in and out and, you know, the District has extensive experience working with these monitors over a decade and the frequency with which they switch these monitors every couple weeks is fairly

rigorous and I'm sure they would be happy to provide those procedures, you know, in detail.

MS. TIPSORD: I just want to clarify. You talked about the continuous dissolved oxygen monitoring report. Is that, for example, August 2009, the Exhibit 468?

THE WITNESS: Yes.

BY MS. WILLIAMS:

Q. My technical advisors tell me your answer was focused on the QAQC of the use of the monitors, how you take the samples, how you monitor. What about the QAQC for the data once it's been downloaded and knowing whether you're going to be able to use it or not, what procedures do they use for that?

A. They have procedures that they follow when they evaluate the raw preliminary data and then they will either choose to throw that data out or to include it in the specific details. I would have to defer to the District.

Q. Do you know where they got their QAQC?

MR. ANDES: You could ask Ms. Wasik. She could probably answer that.

MS. WILLIAMS: Do you want me to do that?

MR. ANDES: Sure.

MS. WASIK: Hello. My name is Jennifer Wasik. I'm with the Water Reclamation District of Greater Chicago. As Adrienne mentioned, the annual report as well as our QAQC details the specifics as to how data might be rejected. Generally, it has to do with comparing the Sun data to a wet test that is run on the sample that's collected when the monitor is retrieved and if that exceeds a certain amount then we would -- I think it's 2.0 mg/L, it exceeded that amount. Then, we'd reject that period of data. Another criteria is if the Sun that we had in the waterway was retrieved and then was reading incorrectly from a water tank in our lab, we could reject the data based on that fact if the Sun was running irregularly and the final criteria for data rejection would be if the monitor that's redeployed is reading greater than 2.0 mg/L defense in DO from the -- from the previous monitor.

So we actually remove the

monitor that is in the waterway and replace it with another one so the last reading from the one that we retrieve is different from the first reading from the one we put in, that is a red flag for us as well. The only other reason that we might reject data and this would be covered in one of those, but if we suspect a biofouling like algae growth or something like that on the probe we would retrieve it or if the probe was covered in sediment, for instance, after a wet weather flow that might have buried the monitor housing and some of the deep sedimented areas, but the very specific numbers and that sort of thing is as Adrienne said is available for your review in the exhibit that's attached to her testimony.

MS. WILLIAMS: But that doesn't have the quality? Does it have the QAQC provisions in there?

MS. WASIK: Yes.

MS. TIPSORD: I believe if you go to page three. For the record, Ms. Wasik was sworn in at our last hearing and since we've been discussing her testimony today she is still sworn in for purposes of this hearing.

MS. WILLIAMS: Just while we have Jennifer real quick one really quick thing I was curious about from the table that we've been referring to.

MR. ANDES: Which table is that? I'm sorry.

MS. WILLIAMS: Table 7. Is there something wrong at the Route 83 station?

MS. WASIK: Which table is this?

MS. WILLIAMS: Table 7 comparison of CDOM data for 2006.

MS. WASIK: In my testimony?

MS. TIPSORD: On page 15 of the pre-filed testimony.

MS. WILLIAMS: That table shows that station had 6,899 total hours which is quite a bit less than any of the others.

MS. WASIK: This is Route 83 on the Chicago Sanitary and Ship Canal?

MS. WILLIAMS: I think so, but it's not totally clear to me. It is.

MS. WASIK: This is one of the Suns that I believe is from January of 2011 --

THE COURT REPORTER: Louder, please,

from the very beginning.

MS. WASIK: Route 83 on the Chicago Sanitary and Ship Canal is subject to a lot of biofouling because of the channel walls and the lack of bridges in that area we were not able to mount a Sun housing on the channel. So we had a different method which was that it was attached to a chain and the chain -- stainless steel chain was attached to both sides of the channel. We had a lot of problems with this particular mounting technique because it brings the water quality monitors closer to the sediment and when there's resuspension of the sediments there are often -- it would bury the water quality monitor. So for that reason and also for the fact that we had some personnel issues retrieving the chain water quality monitors and some injuries, we had to eliminate that station.

MS. WILLIAMS: Thank you.

BY MS. WILLIAMS:

Q. Question 28, what is the terminus of the Chicago Sanitary and Ship Canal as it was used in the WWLU proposal?

A. The confluence with the Des Plaines

River near River Mile 290.

Q. A, what use designations and water quality standards should the Board adopt for the Lower Des Plaines River?

A. I can't speak to what water quality standards the Board should adopt for the Lower Des Plaines because I have not studied that system.

Q. And I just want to be clear for the record that that includes both the Upper Dresden Island Pool and the Brandon Pool, correct?

A. Yes.

Q. Question 29. On page one of attachment one to your pre-filed testimony, you state that, quote, dissolved oxygen data collected from 2001 to 2008 from eight monitoring locations, end quote, were used in your analysis. Why did you limit your analysis to eight stations? How did you select the eight stations?

A. The District had done a lot of preliminary analysis and selected eight stations, one per reach, as the representative stations for analysis. Typically, the station that receives the most negative impact on dissolved oxygen was selected if the reach had more than one station.

These are the stations that were used in developing the proposed wet weather limited use that is discussed in attachment one.

In my testimony, I applied the wet weather limited use to all of the 16 continuous dissolved oxygen monitoring stations so I did not limit my analysis to just eight stations.

Q. Can you take a look at Table 4 from your testimony on page ten? I'm trying to understand why that table lists ten stations.

A. Because these are the stations out of -- these are the stations out of the 16 that relate to the category one and category two waters.

Q. So the other six are located in category three quarters, is that correct?

A. Can I retract that?

Q. Sure.

A. For example, in Table 7, on page 15, there are 16 monitors and as Jennifer stated some of those monitors have been eliminated so we're down to step monitors that represent the category one/category two waters.

Q. So why do we say that we use eight?

A. In attachment one of my testimony, Table 1 on page three there are eight monitors listed representing a subset of the ten and when the District did their preliminary very detailed analysis of potential triggers that are listed in Table 2, they used those eight locations.

Q. Are you able to just quickly tell us which two in the list of ten are not in the eight?

A. Ten are not. Clark Avenue on the Chicago River has been discontinued. The attachment one did not include --

Q. Wait. I'm assuming there are six that have been discontinued, correct?

A. No.

Q. We have --

A. The easiest way to understand it is Table 1 of attachment one was used to evaluate what types of triggers might be suitable.

Q. Go ahead.

A. There were eight that were listed there. One of those eight, Clark Avenue, has been discontinued. After we determined what the appropriate trigger might be, I went back to all

of the 2001 to 2008 continuous dissolved oxygen monitoring stations that had been in operation and I evaluated all of those for the category one and category two waters. So, in 2006, on Table 7 of page 15 of my testimony there were 16 monitors for the category one and category two waters that were operational in 2006. Table 4 on page ten of my testimony says based on the District's current network of CDOM stations which ones fall in which segments and that's what is shown in Table 4.

Q. When you looked -- in the initial step of the process, when you looked at the data from the eight from the different stations, you didn't look at any stations on South Fork of the South Branch of the Chicago River, correct?

A. No.

Q. Question 31 --

MS. TIPSORD: You know what, Ms. Williams. We've been at this a couple of hours and it is lunchtime. I know we're getting close to being done with you, but let's go ahead and take an hour for lunch and we'll come back and finish with the Agency.

(Whereupon, a break was taken after which the following proceedings were had.)

MS. TIPSORD: Let's go back on the record.

BY MS. WILLIAMS:

Q. I'll pick up with question 31. On page five of attachment one, you indicate that rainfall events of between 0.25 and 0.49 inches pump station CSO discharges occurred 21 percent of the time and gravity CSO discharges occurred 16 percent of the time.

If CSO discharges did not occur during a large majority of the rainfall events of less than half an inch, why is 0.25 inches an appropriate trigger for a wet weather limited use designation?

A. CSO's are not the only source of dissolved oxygen impacting wet weather. There is also urban runoff, ungauged CSO's, storm sewer discharges and highway runoff. All of these sources combined with the CSO discharges that occur with rain less than one and a half inch to impact the dissolved oxygen. Therefore, a wet

weather limited use is needed for rainfall events less than one half inch. The District evaluated triggers less than 0.25 inches and chose to use the upper value of the triggers that were considered which were 0.05, 0.1 and 0.25 inches.

Other factors that need to be considered when thinking about frequency of these discharges are uneven rainfall distribution, ground conditions before precipitation and impact from non-point sources in the tributary. The District's analysis indicated that 0.25 inches of daily, cumulative rainfall generally brings elevated flow to the water reclamation plants, causes discharge from the combined sewer system or causes urban runoff.

Q. What percentage of the wet weather events in the 0.25 to 0.49 range results in violations of the proposed DO water quality standards?

A. Of the Agency's proposed standard?

Q. If you know or if you can answer the same question with regard to the District's proposal, I'll accept either answer.

A. I don't have that statistic.

Q. Do you know if it's less than all the time I assume then? Is it something less than every 0.25 rainfall event does not create low DO conditions, is that correct?

A. I can't answer that question.

Q. You don't know. Okay. So it could or could not? Either one?

A. I don't know.

Q. Question 32, in Table 4, on page ten, the following note is included at the bottom of the table. Quote, if a CDOM monitor was not operational for a period of time, those hours would not be included in the wet weather limited use analysis, end quote. Explain what not included in the analysis means in this context?

A. If data were missing for a particular station for a few days, those days would not be included in the calculations. Calculations would still be performed based on the other days where the station was operational.

Q. So I guess I just still don't understand the answer. Did you -- let's say -- okay. Let me just ask a follow up to C. If data from the dates preceding the rain event was not

available, what was the default conclusion? Would you go to the next day before that?

A. Generally, except for periods where there might be biofouling or other reasons why the District believed a monitor to be unreliable or the readings from the monitor to be unreliable, there generally were measurements on the day before the wet weather events that were valid and we used those.

Q. You used them. Okay. If data was not available for the hour immediately preceding a rainfall event, would you go to the data from the previous hour?

A. Yes.

Q. What if data was not available on the day a trigger event was supposed to end? That might not be right. So you have a trigger and maybe the trigger means that the wet weather use can continue for four days, two days, four days, six days, if it's on -- at the point after two days when it's supposed to end, what would happen if there was no data there?

A. You would have no value that you could compare to the criterion. So it would be

counted as a dry weather -- if what I'm understanding your question to be, you have a trigger event. You have a dissolved oxygen reading the day before the trigger and the dry weather DO on that day met the dry weather criterion. So you have a candidate wet whether limited use. So for that trigger day and the following two days, you would look at those DO criterion or DO values and you would say "Did it meet the regular DO criterion?" and if it did, it was a wet weather limited use candidate, but you didn't need to exercise the use. If you had some hours during that period where it was below the dry weather criterion, then you needed to use the wet weather limited use.

So the wet weather period has ended. So now it's back into the dry weather and is your question what if you don't have data those days? Then, you just wouldn't have a value to assess against the dry weather criterion.

Q. What if you do the analysis -- when you just described the analysis, you had the trigger and you determined based on the proceeding DO that it's a potential candidate, why does it

matter to look at what the DO actually is during the wet weather period? I mean, once you've established that you're eligible, what is the significance of analyzing the period itself?

A. Well, by analyzing -- you have data for the period that the CDOM station is operable and as scientists and engineers and members of the public, you would want to know what is the water quality and -- so, in my mind, it's helpful to present a complete analysis of all the data.

The wet weather limited use is there because we know because of the very complex situations in the waterways that sometimes you might be eligible to apply the wet weather limited use, but the question would be do I really need it and the need point -- the need part comes from the side of the Clean Water Act enforcement side, which is if you have violations of the criteria the District is then subject to potential permit violations because they have to discharge from the pump stations and the city has to discharge from the CSO's. So it just becomes a question of compliance reporting.

Q. Report --

MR. ANDES: Aren't you actually -- by saying this, the use wouldn't apply on the days where the DO is above the criterion, aren't you actually narrowing the applicability of the limited use?

THE WITNESS: Yes.

MR. ANDES: You're saying you only need it when it's necessary because of low DO, but if your DO is okay, you don't use it?

THE WITNESS: Yes.

BY MS. WILLIAMS:

Q. It seems like it's adding a layer of complexity for purposes of assessing attainment to go through all these steps is what I'm trying to understand. So I'm trying to understand from the point of view of someone trying to assess whether the wet weather limited use is attained, how would they go about doing that?

A. Well, I understand the complexity and that relates to a later question that the Agency asks me.

Q. I think it was earlier. I skipped it if you wanted to read it.

A. It would be simpler to say, okay,

ten percent of the time the DO don't have to meet the criterion in this situation, in this system, at this location, but because of the complexity of the impacts of wet weather, the question becomes -- let me back up.

During dry weather, there's general agreement that if there are technologies that are available such as aerated flow augmentations or supplemental aeration, that the District should continue to apply those technologies to improve the dissolved oxygen during dry weather when a chronic low DO problem would be problematic for the resident fish population.

During wet weather where you have these periodic slugs of low DO that you can't predict how low the DO is going to be, you can't predict how long the DO is going to be, but you know at various size rainfall events generally it seems that between two to six days is reasonable from a compliance perspective. That's what we're trying to get at and it appears complicated, but it's actually more protective than if you were to say, okay, ten percent of the time at this

location you can violate the DO criteria because that would allow you to, perhaps, have DO violations during dry weather versus wet weather and what we're trying to do is say we know the uses during wet weather at that location are going to be different. The fish are going to either avoid or tolerate the low DO levels that occur during wet weather.

So what we're trying to say is the District could be eligible to apply that wet weather limited use, you know, X percentage of the year, but we want to narrow it down when -- and report when do they actually need to use that. So in subsequent reports like right now in my testimony in Table 7 the column this says wet hours below the water quality criterion wet weather limited use excluded in 2006 it ranged from 0 to 2.4 percent.

Q. That's a lot lower than 10?

A. Right.

Q. Couldn't you set a number, though, that would more accurately model something like that?

A. Well, if you look at Table 6 which

shows the range from 2001 to 2008, you know, the maximum was as high as 19 percent. Now, that was, you know, in much earlier years, but it allows you to look at and say how -- is the District operating a system the way that they should be and are we minimizing the periods of time where the wet weather is -- the wet weather limited use is needed because if, for example, in these annual reports at a station you were to see that the wet weather limited use was needed 50 percent of the time you might go "Let's look at that a little closer and see why that is."

Q. It's correct, though, isn't it, that the wet weather use would potentially be available 50 percent of the time based on when we look at the column wet hours above -- wait a minute. Maybe I should ask the question.

About what percentage of total hours would be eligible, would meet the trigger and be classified within the rainfall events in a typical year?

A. And I realize I was reading the wrong column. In Table 7, the column I was referring to should have been wet hours below the

water quality criterion wet weather limited use data and the range there is 0 to 6 percent.

Q. So is the column next to it the hours it wasn't needed, is that the hours I'm describing?

A. No, the wet hours below the water quality criterion where the wet weather limited use is excluded, those would essentially be considered violations.

Q. What about --

A. Those are days where the dissolved oxygen before the wet weather event happens. It was below the dry weather criterion and that's where you would want to, perhaps, have had more supplemental aeration or flow augmentation to get the dry weather DO up so you could take advantage if that wet weather limited use would apply.

Q. So why don't you explain the column wet hours above the WQC? What is that column?

A. Those are just hours -- those are hours that occurred during a wet weather period, but the dissolved oxygen was above the dry weather criteria.

Q. So for about half of the hours --

about half of the hours would fall into this category of you've had a wet weather event greater than half an inch?

A. 0.25 inches.

Q. So about half the hours would fall into the category of greater than 0.25 inches of rain have occurred or occurred -- or two to six days following that rain?

A. Right, and that's going to vary year to year depending on whether you had below or above normal precipitation because wet weather is complex and cannot meet the goal.

Q. And those occur mostly in the summer then based on your testimony? You wouldn't have it as much in the winter?

A. No, they occur year around.

Q. But snowfall is not considered a wet weather trigger event, correct?

A. The District's rain gauges do not report -- you can't anticipate when snowfall occurs. It lays on the ground until it warms up enough for it to melt and runoff into the storm sewers or the combined sewers. So by using the rain gauge data, you can't ascertain those snow

melt events.

Q. Right. So how does that -- are days with snowfall included in this wet hours above the WQC or would that only be rainfall and days following rainfall?

A. It would be rainfall. I mean, the gauges are heated. So whatever snow falls in that gauged area gets recorded, but --

Q. What box does it fall in? So if it snows and the gauge is heated and you can tell that you've had more than a quarter inch of precipitation, does that begin a wet weather day?

A. It could I guess, but generally the DO in the winter is going to be -- so these wet hours above the water quality criteria if you wanted you could analyze those and say what percentage of those were due to the melted snow that was measured by the rain gauge.

MR. ETTINGER: I'm a little confused. Albert Ettinger again. Your rule triggers on days, not hours, right?

THE WITNESS: The rule --

MR. ETTINGER: I mean, if it rains an inch in a day, I've got six succeeding days in

which I'm off?

THE WITNESS: Yes.

MR. ETTINGER: Okay. So aren't we kind of comparing the wrong things when we're comparing hours in your chart seven with days?

THE WITNESS: The reason we picked hours is because the minimum DO in the criterion is an instantaneous dissolved oxygen and the only way to compare the CDOM data against such a criterion is to use the instantaneous measurements which happen to be on an hourly basis.

MR. ETTINGER: That's what I'm saying. We can't really use your chart seven to estimate what the percentage of time will be subject to the wet weather standard, can we?

THE WITNESS: No -- well, you can if you say we have 24 hourly measurements in a day. During the wet weather limited use period, all 24 hours are eligible for the wet weather limited use criterion or wet weather limited use provision. So we're going to look at the DO values during that wet weather period and let's say it's a quarter inch so we have three days so that's 72 hourly measurements of DO during that wet weather

period. All we're doing is saying you're eligible for the wet weather limited use. Let's just report of those 72 hours how many were greater than 4.0 or 5.0 mg/L and how many were below 4.0 or 5.0 mg/L and, if you wanted, the District could spit out statistics, you know, on what levels of DO were there.

MR. ETTINGER: The fact that you've got this allowance doesn't mean you have to use it?

THE WITNESS: Correct.

MR. ETTINGER: So it may be that, in fact, because you -- I like one as a number, it's easy, one and six. So I have one inch of rain and I have six days. It may, in fact, be that I'm only going to violate -- or it may happen that on a particular station it will come to pass that I will only violate one or two of those days, is that possible?

THE WITNESS: Then your DO would be less than 4.0 or 5.0.

MR. ETTINGER: Yes, that the DO would not go down that --

THE WITNESS: Correct.

MR. ETTINGER: It turns out you didn't need to have it for the full six days.

THE WITNESS: Correct.

MR. ETTINGER: So Table 7 is giving us an estimate as to how much time -- I'm sorry. How much time you will need, but it's not giving us an estimate as to how much time you'll get in terms of an allowance from the dissolved oxygen standard?

THE WITNESS: We could provide those statistics.

MR. ETTINGER: The way to do that would be just to look at weather data, right?

THE WITNESS: Correct.

MR. ETTINGER: Because any day in which we've got an inch of rain we know that the following six days were Scott-free.

THE WITNESS: Yes.

MR. ETTINGER: Okay.

MR. ANDES: You didn't say yes to Scott-free?

THE WITNESS: No.

MR. ETTINGER: Okay. Maybe it's Irish-free.

MR. ANDES: Isn't the issue not to be imputing any group if you can clarify what that means is that during those six days you would then review the data to determine which hours were below the DO criteria and, therefore, needed application of the limited use?

THE WITNESS: Correct.

MR. ETTINGER: Obviously, if you don't need it, then it didn't make any difference, but I don't think the Water Reclamation District is this clever or wanted to be this clever, but hypothetically I suppose if you had your six days you could release all your stored BOD in order to take use of the six days, but I'm not going to accuse them of that, but the point is you've got six days whether you use it or not.

THE WITNESS: The way the District operates their system, in my opinion, this wet weather limited use which is crafted around how they've been, you know, operating the system over the last seven to eight years and even before that it doesn't allow them somehow to get away with anything by, you know, if theoretically they could somehow change how they operate. They're still --

they still have to look at, you know, in terms of how they operate their CSO pump stations, which is if the plants can take additional wet weather flow they're supposed to send it to the plant as opposed to letting it go out the pump station.

MR. ETTINGER: Is this based upon your study of the NPDES permits? If you changed the standards, wouldn't we be able to change the permits so they're complying with the revised water quality standards?

THE WITNESS: They wouldn't need to revise their operating procedures when -- if this wet weather limited use was proposed because the operation of the CSO facilities is governed under the CSO control policy which requires that the District comply with the nine minimum controls which requires that they maximize the treatment of wet weather flow at the water reclamation plants and hence the terminology maximum proximal flow.

MR. ETTINGER: And you've studied how -- you've studied MWRD NPDES permits and you know those terms on the nine minimum controls are interpreted that way in this permit?

THE WITNESS: I have reviewed the

District's permit. I have provided training for US EPA on the CSO policy and EPA's guidance document which discuss how the policy should be implemented and it's my understanding that by adopting this wet weather limited use that the District would not change how they operate things because they could -- that would raise questions as to whether they are complying with the specification of the nine minimum controls.

MR. ETTINGER: Are you aware of the District ever taking a position in permit negotiations that because of the TARP system it did not need to comply with other portions of the nine minimum controls?

THE WITNESS: I'm not aware of that.

MR. ETTINGER: And that would be a silly position in your view.

THE WITNESS: I'm not aware of what they said or haven't said.

MR. ETTINGER: Thank you.

MS. DEXTER: Can I ask one follow up on this topic? When you were analyzing this data for Table 7 or otherwise, did you assess how often the District would have needed to use all of those

days with the two or four or six days after a wet weather event? If that question makes sense. For instance, if we had a one inch rainfall, did you look at it to see how often they needed six days after a one inch or more rainfall?

THE WITNESS: I didn't specifically look at that, but that could be provided.

MS. DEXTER: That would be nice.

BY MS. WILLIAMS:

Q. Let me ask a follow up of Jessica's follow up. So it rained an inch today and tomorrow we go out and the DO is below the District's proposed standard, then the next day we go out and it's above the standard, then the next day we go out and it's below the standard again, how would that be analyzed under the District's proposal?

A. You would treat the one day -- all the days that you just mentioned and some subsequent days as a wet weather limited use candidate and then you would evaluate the hours across those six days and say what percentage of the hours were below the dry weather criterion and what percentage of hours were above the criterion

or how many hourly values were below the criterion and how many hourly values were above the criterion and then the hours that were below the criterion you would say those are the hours that I needed the wet weather limited use provision for.

Q. So even if the system recovers following a wet weather event if the DO then again dips below in that six day period it can be classified as a wet weather limited use day?

A. Yes. And that's not surprising given, you know, the nature of these events.

MR. ANDES: So you could see an event where DO would come down and go back up and then come down again?

THE WITNESS: Yes.

BY MS. WILLIAMS:

Q. How do you know that the standard is not attainable when you see an event like that?

A. In general, the data don't follow that particular pattern that you described. It's possible, but in general that's not the pattern we see.

Q. So, generally, it goes down and it comes back up? It doesn't go as Fred described up

and down and up and down?

A. Yes.

Q. The last question I have is a quick clarification. On the last page of your answers, you identify an attachment to figure one. I don't know -- did everyone else have that? I don't think I had that attachment. If I'm the only one, I apologize.

MS. TIPSORD: Actually, I don't see it with the stuff that I printed off from the web either.

MR. ANDES: Well, we can certainly introduce it. I have it in my copy.

THE WITNESS: I had it in what you filed as well.

MS. TIPSORD: Yes, but I printed right off from what the clerk's office had.

MS. WILLIAMS: And I printed from off the disc.

MR. ANDES: Okay.

MS. TIPSORD: It appears to have not made it into the electronic version. Off the record.

(Whereupon, a discussion was had off the record.)

MR. ANDES: It's titled Figure 1 Procedures for Calculating Compliance with Dissolved Oxygen Standards in the CAWS.

MS. WILLIAMS: Can I see it? Is that okay, Marie?

MS. TIPSORD: Mm-hmm.

MR. ANDES: Ms. Nemura can certainly walk that through.

MS. WILLIAMS: Is this in reference to question 16? Is that what this is?

MR. ANDES: It's in reference to a later question.

THE WITNESS: Yes.

BY MS. WILLIAMS:

Q. This is your exhibit to show that it's not too complicated, right?

A. Yes.

MS. WILLIAMS: That's all I have. Thank you.

MS. TIPSORD: If there's no objection, we will mark this as Figure 1 Procedures for Calculating Compliance with

Dissolved Oxygen Standards in the CAWS as Exhibit 469. Seeing none, it's Exhibit 469.

(Document marked as Hearing Exhibit No. 469 for identification.)

MS. WILLIAMS: Marie, would you mind asking John to post that or if Fred wants to get it to us?

MR. ANDES: We can send it to you. It's also worth noting that the answer to number 16 actually -- the answer to 16 actually lays out the same six steps. So it's just showing it in a more visual format, but the answer to 16 does layout all six steps that were involved.

MS. TIPSORD: But John can scan these easily.

MS. WILLIAMS: Thank you.

(Whereupon, a break was taken after which the following proceedings were had.)

E X A M I N A T I O N

BY MR. ETTINGER

Q. Let's start with three. On page two of your testimony, you state that it is not

possible to eliminate or fully treat these wet weather sources in the foreseeable future. Is it possible to eliminate or treat them partially?

MR. ETTINGER: Do I have to read the questions with the same bad grammar that they were written.

MS. TIPSORD: Since she answered them with the same bad -- no. Sorry.

BY THE WITNESS:

A. Once the Tunnel And Reservoir Plan, TARP, is completed, there will still be some CSO discharges. As to treatment for dissolved oxygen, it may be theoretically possible to provide some sort of additional treatment at some locations, but there would be constraints on land availability. Conventional treatment is not appropriate for deleted wet weather discharges and I'm not sure there are feasible alternatives for the high rate CSO discharges. The same is probably true for other wet weather discharges.

BY MR. ETTINGER:

Q. Okay. It may be theoretically possible to provide some sort of additional treatment at some locations. Are you aware of

places where people have treated CSO's?

A. For dissolved oxygen?

Q. Yes. As treatment to reduce the effect on dissolved oxygen?

A. Yes, and that typically involves tunnels to get the wet weather flow to the treatment plant.

Q. Well, other than what is typically done, is anything else ever done to improve or to treat CSO's to prevent sags in the dissolved oxygen level?

A. I'm not aware of a high rate -- CSO discharges are high rate discharges meaning conventional treatment methods where you can get rid of the BOD in the discharge. I'm not aware of treatment technologies that work well for dissolved oxygen.

Q. In addition to -- by deep tunnels, are you including any form of water storage?

A. Yes, store and convey would be the typical approach.

Q. Okay. So we wouldn't necessarily have to have a deep tunnel, we could have a lagoon or something else that would store the water until

we could send it to the sewage treatment plant?

A. Theoretically, yes.

Q. Okay. So if a community came to you and said "We have a problem with CSO's causing dissolved oxygen sags," you wouldn't just say "Build a deep tunnel or quit," right?

A. Well, I'm not an architectural -- I don't work for an AE firm so they wouldn't ask me that question.

MS. ALEXANDER: Yes. This is Ann Alexander for the Natural Resources Defense Council.

Are you familiar with the concept of green infrastructure?

THE WITNESS: I am.

MS. ALEXANDER: Did you consider in your analysis the possibility that green infrastructure systems could further reduce CSO discharges in this system?

THE WITNESS: Green infrastructure may have a role in further reducing CSO discharges.

MS. ALEXANDER: Do you have a view as to whether or not use of green infrastructure

in sufficient quantities could substantially reduce any CSO discharges that would remain following the completion of TARP?

THE WITNESS: It would surprise me.

MS. ALEXANDER: Why would it surprise you?

THE WITNESS: Green infrastructure is most successful in areas that have relatively large tracks of land that would be changed from their impervious nature to a more pervious nature or there are sufficiently sandy soils that would allow you to infiltrate a lot of storm water that you captured.

We do have clients in Washington DC, for example, where we did an extensive analysis of the potential for green infrastructure to reduce CSO discharges and from CSO basin to CSO basin it ranged from maybe a 5 percent reduction in CSO to a little over 20 percent, which is helpful, but does not get you all the way there towards substantially reducing the CSO.

MS. ALEXANDER: Are you familiar with any analysis that has been done specifically in the Chicago region regarding the potential of

CSO to reduce overflows and storm water discharges?

MR. ETTINGER: I think you meant green infrastructure to reduce?

THE WITNESS: Can you repeat your question?

MS. ALEXANDER: Are you familiar with any analysis that has been done specifically for the Chicago region concerning the potential of green infrastructure to reduce CSO discharges and storm water?

THE WITNESS: Only from what has been presented at various conferences.

MS. ALEXANDER: Can you name any specifics?

THE WITNESS: There was a wet weather partnership conference in Chicago two or three years ago where there was some information that was provided.

MS. ALEXANDER: Okay. Thank you.

BY MR. ETTINGER:

Q. The last sentence in your answer here confuses me. You say "I'm not sure there are feasible treatment alternatives for the high rate

CSO discharges. The same is probably true for other wet weather discharges." What does the other refer to there?

A. The other refers to urban -- other urban storm water tributary discharges which reflect the cumulative impact of suburb and some urban storm water discharges highway runoff.

Q. Are you saying that there's no feasible alternatives for treating any of those things?

A. I'm saying that feasible depends on whether controls can actually be implemented and given my experience in evaluating the sources and the impacts of wet weather discharges in general all of these require very long-term, highly capital intensive solutions that require changes in zoning and regulations that can take years to even get those in place and in the clients --

Q. Are you saying our new mayor is so bad that he is not going to be able to make any zoning changes in the City of Chicago?

A. I didn't say that. I hope you didn't hear me say that.

Q. I'm just wondering. I'm surprised

to hear a change in zoning would be seen as such an insuperable obstacle to doing something that we would say that it is unfeasible to do it?

A. Nothing is infeasible, but it does require large -- you know, large programs, a shift from, you know, having all these highly impervious areas around and even if the mayor were successful in implementing the best zoning regulations in the country, I question whether it would solve the problems in the Chicago Area Waterways.

The beauty of the District's proposal with this wet weather limited use is if you can get those changes in place, you can say we've been able to change how we do things. We've been able to fully implement green infrastructure to every time redevelopment of a parcel occurs have it be, you know, infiltrating or capturing and storing the first one to two inches of rain or whatever. You could then reassess whether the wet weather limited use is needed.

MR. ANDES: So let me understand you on that. So if measures are taken that reduce the number of hours and days where DO is under the -- under the criteria, then the wet weather limited

use would be needed less and would then be triggered less?

THE WITNESS: Yes.

MR. ANDES: But you believe that it would still be necessary in some circumstances?

THE WITNESS: Yes.

MR. ANDES: Now, let me follow up on one other issue. We talked about feasible treatment alternatives. What treatment alternative would you generally use at, say, a waste water treatment plant to address dissolved oxygen issues?

THE WITNESS: You would have primary clarification. You would have enhanced nitrification and you would -- if that was insufficient, you could provide additional filters or some sort of biological conversion.

MR. ANDES: Is biological treatment generally a part of what you have at a waste water treatment plant?

THE WITNESS: Yes.

MR. ANDES: Would you be able to do that kind of system that you just described in individual CSO outfalls around the City of

Chicago?

THE WITNESS: No.

MR. ANDES: Why not?

THE WITNESS: Because you need space and you need sufficient space to allow time for the biological process to work.

MR. ANDES: Are there also issues in terms of treating dilute streams versus the streams you would ordinarily have at a waste water treatment plant?

THE WITNESS: Yes. The microbes that are able to breakdown the organic matter that contributes to the oxygen demand require a certain amount of food as in ways to be able to function.

MR. ANDES: Do you have that when you're dealing with dilute wet weather streams?

THE WITNESS: No.

MR. ANDES: Thank you.

MS. TIPSORD: Ms. Myers-Glen?

MS. MEYERS-GLEN: I was just --

MS. TIPSORD: Identify yourself for the record, please.

MS. MEYERS-GLEN: My name is Stacy Meyers-Glen and I'm with Openlands. As far as the

effectiveness of green infrastructure, are you aware of MWRD's efforts --

MS. TIPSORD: We lost you. There was noise in the background.

MS. MEYERS-GLEN: The Cook County Watershed Management Ordinance is an effort by MWRD to update their storm water standards for the first time in 30 years. Are you aware of the volume controls that they're proposing to implement, hopefully will be passing soon, to capture the first inch of rainfall using green infrastructure?

THE WITNESS: Not in detail.

MS. MEYERS-GLEN: And you mentioned roadway runoff, right? Are you aware that the Illinois State Toll Highway Authority has a push right now to incorporate green infrastructure practices all along the highways to start capturing runoff?

THE WITNESS: No.

MS. MEYERS-GLEN: Okay.

THE WITNESS: But those initiatives don't change my general opinion that it will take -- that there will still be events where you

will have wet weather runoff that will impact different segments of the CAWS.

MS. MEYERS-GLEN: But you're not aware of exactly what percentage of runoff these will help to capture, right?

THE WITNESS: Correct.

MR. ANDES: Is it also true that if these measures over time are successful in reducing the amount of wet weather flow going into the CAWS, it would then mean you would have to use the wet weather limited use less?

THE WITNESS: Yes.

MR. ANDES: Thank you.

BY MR. ETTINGER:

Q. See, my questions promote a lot more discussion than other peoples. So it's very helpful. What do you think is going to drive -- let's go back. Is the Water Reclamation District the only party that is responsible for wet weather discharge to the Chicago Area Waterway System?

A. No. The MS4 entities are responsible for urbanized storm water runoff management and the highways obviously, the Department's of Transportation are responsible for

their storm water management.

Q. Probably some industries have direct runoff into the water, too?

A. Correct.

Q. And this rule would work to the benefit of all of those entities by making all of their discharges immune from attack for causing violations of the water quality standards, too, would they not?

A. No, they would not make them immune.

Q. Why not?

A. Because there are other provisions of storm water management that have to be met regardless of the dissolved oxygen in the Chicago Area Waterways.

Q. So basically you're relying on the technology base controls on storm water to protect us from any increases or operations by other entities that might affect dissolved oxygen in the Chicago Area Waterways?

A. There are other water quality based requirements for storm water discharges and --

Q. Most of them are in litigation?

MR. ANDES: Aren't you going to win

those?

MR. ETTINGER: Talk to MWRDGC.

BY THE WITNESS:

A. The other way to look at this is you need to put the prospective -- those other sources --

MS. TIPSORD: Ms. Nemura, I apologize. Would you guys -- you're right in the court reporter's ear. It's a little distracting. I'm sorry. Go ahead.

BY THE WITNESS:

A. You have to put those other discharges into perspective with the relative magnitude of their impact on dissolved oxygen or other water quality impacts and it's also true that in developing permit limits for those other types of highly variable discharges that the permit writer when he or she sits down to write a permit has to consider the variability in those types of discharges. So coming up with water quality based effluent limits for those storm water discharges can become a very complex exercise.

MR. ANDES: Let me clarify. In the

District's proposal, the last two MS4's, for example, isn't there a provision indicating that they will have to comply with all other requirements to ensure that they can use the wet weather limited use provision?

THE WITNESS: Yes.

MR. ANDES: That will include maximum extent practicable requirements under the MS4 program and any other conditions imposed in the storm water regulations?

THE WITNESS: Yes.

MR. ANDES: Is EPA proposing to make those regulations more stringent?

THE WITNESS: Yes.

MR. ANDES: So all those conditions would continue to apply?

THE WITNESS: Yes.

BY MR. ETTINGER:

Q. All the technology based conditions would continue to apply including the nine minimum controls which would be fully applicable to the Water Reclamation District whether or not it's building a TARP system?

A. Whatever is required under the

permit would still be in effect.

Q. But do you know what's required under the permit? Are they required to do all of the things that are required generally under nine minimum controls of other cities?

A. Yes, and they are also required to do more than what is required under the nine minimum controls in terms of operating the continuous dissolved oxygen monitoring network and providing reporting.

Q. And you would recommend that all of those main things be maintained in their permits in the future?

A. Yes.

Q. Is there -- four, are there benefits to elimination or treating CSO's in addition to reducing the effect of CSO's on dissolved oxygen levels?

A. Possibly, but treatment of CSO's to reduce the biochemical oxygen demand would not necessarily reduce bacteria.

Q. What sorts of pollutants can come out of CSO's?

A. Total suspended solids, metals.

MR. ANDES: Bacteria?

BY THE WITNESS:

A. Bacteria.

BY MR. ETTINGER:

Q. Endocrine disrupters?

MR. ANDES: Do you want to define what you're talking about with that term?

MR. ETTINGER: I think she knows.

MR. ANDES: For the record, let's just be clear. Before she answers the question, her understanding of that phrase may be different than yours.

BY MR. ETTINGER:

Q. Do you know what the endocrine disrupting chemicals are?

A. I do.

Q. What are they?

A. They are a suite of contaminants that can mimic the body's hormone systems and cause problems for aquatic life and other animals.

Q. Are endocrine disrupting chemicals sometimes present in CSO's?

A. Whether they are present in sufficient quantity to create a water quality

based effect I don't have information to suggest that is the case nor do I have information on what is affecting if there is potential to believe that endocrine disrupters are a problem for the Chicago Area Waterways.

There are areas in the country where researchers have observed potential effects of endocrine disrupters and they're studying the problem.

Q. And I don't know if I missed too much, but are you familiar with any efforts by US EPA to study endocrine disrupters in the Chicago Area Waterway System?

A. I don't know.

Q. Getting back to these feasible measures to address CSO's. Mr. Andes asked you a number of questions regarding biological treatment and the infeasibility of using biological treatment to treat CSO. Do you recall that?

A. Yes.

Q. That's often referred to as secondary treatment, right?

A. Yes.

Q. Are you aware of various forms of

primary treatment or are you aware of primary treatment being used as the CSO's?

A. You can have enhanced primary clarification. You know, high rate primary clarification, but the ability for it to address the soluble BOD is limited.

Q. It's limited, but will it do anything?

A. For some storm events, at some locations it may. It generally has been shown that it's difficult to have it effectively used as a way to treat a CSO discharge. The preferable way to treat a CSO discharge for BOD is to store and convey it to the treatment plant.

Q. You are aware, though, of systems in which they have an effect of settling pond at the end of a CSO that will settle out some portion of the first flush before it gets discharged?

A. At the end of an individual CSO?

Q. Yes. Some sort of discharging discharge point treatment?

MR. ANDES: With a settling pond?

BY THE WITNESS:

A. I don't know too many of those.

BY MR. ETTINGER:

Q. It's actually the primary treatment used by coal mines.

MR. ANDES: So the coal mines are a good example?

MR. ETTINGER: They'll tell you it's better than nothing and that's the question here.

BY MR. ETTINGER:

Q. Is it feasible to do things other than nothing?

MR. ANDES: Can I ask would you usually find for CSO's in the Chicago area you would have enough room as compared to a coal mining operation to locate settling ponds?

THE WITNESS: I don't know how that would work.

BY MR. ETTINGER:

Q. Do you know what the census figures are in the Chicago area as the change of population in the City of Chicago over the last ten years?

MR. ANDES: That leaves room for more settling ponds?

MR. ETTINGER: Probably.

BY MR. ETTINGER:

Q. Are you aware of the census figures?

A. No.

Q. I'm going to skip five. What is your understanding of when the TARP will be completed?

A. I believe that based on the most recent information (Exhibit 565 that the Board filed on January 3rd, 2011) TARP is currently scheduled to be completed in 2029.

Q. Are you aware of any legal requirements that it be scheduled in 2029?

A. No.

Q. You --

MR. ANDES: You don't know one way or the other?

THE WITNESS: No.

MS. TIPSORD: I need to ask a point of clarification. You refer to Exhibit 565. We don't have 565 exhibits yet.

THE WITNESS: My apologies.

MS. TIPSORD: Public Comment 565.

MR. ANDES: Yes.

THE WITNESS: Yes. I'm sorry.

MS. TIPSORD: Thank you.

BY MR. ETTINGER:

Q. We'll skip to eight because although it's a little redundant, but I just want to make clear. Do you believe MWRD will complete the TARP if all regulatory requirements that it do so are eliminated?

A. I am not aware of any proposals to eliminate the regulatory requirements to complete TARP.

Q. Do you believe there are regulatory requirements to complete TARP?

A. Yes.

Q. And where do you think those are located?

A. I believe those are located in the District's permit.

Q. In its current permit? In its current permit, they're required?

A. Yes.

Q. That permit would be reviewed in five years?

A. It could be reviewed at any time.

Q. Correct. And would there be a need

to build a TARP if there was no dissolved oxygen level scheduled?

A. I don't know the answer to that question.

Q. Would there be a little requirement that TARP be completed, but for the fact under the current situation the discharges by the Metropolitan Water District are causing violations of the dissolved oxygen standards?

A. I'm not aware of the District's situation in terms of negotiations with the EPA.

MR. ANDES: Is TARP also being built to your understanding for other reasons such as flood control?

THE WITNESS: Yes.

BY MR. ETTINGER:

Q. Is it legally required to build the TARP for flood control?

A. I'm not aware.

Q. Is there any set schedule now driving the completion of TARP as a matter of law?

A. I'm not aware.

Q. So if we take away legal requirements which now drive the District to

complete TARP, why do you think it will happen?

A. There's a lot of inertia.

Q. That's sort of been true.

MR. ANDES: Is there also anything to do with flood control?

THE WITNESS: Yes.

MR. ANDES: Is it required under their permit for reasons having nothing to do with dissolved oxygen control?

THE WITNESS: I can't answer that.

MR. ANDES: Okay.

BY MR. ETTINGER:

Q. I'm going to skip to ten.

MR. ANDES: One other question. Is it your understanding that it is part of the District's method of complying with the CSO policy?

THE WITNESS: Yes.

MR. ANDES: Which is incorporated in the Clean Water Act as a requirement?

THE WITNESS: Yes.

MR. ANDES: Does the CSO policy have anything to do with the dissolved oxygen or does it have --

THE WITNESS: Potentially.

MR. ANDES: It deals primarily with what parameter?

THE WITNESS: It deals primarily with the capture and treatment of CSO.

MR. ANDES: Does that address primarily bacterial issues?

THE WITNESS: Yes.

MR. ANDES: So that's the basis for the requirements at the current time.

THE WITNESS: Yes.

MR. ANDES: Is there any proposal to eliminate the CSO policy?

THE WITNESS: No. In fact, it's incorporated into the Clean Water Act.

MR. ANDES: Okay.

MS. WILLIAMS: Can I follow up real quick? Are you saying -- based on how you answered Fred's questions I wanted to follow up because I was a little surprised. If you worked with someone who had gone to the UAA to try to say there's no recreational activity occurring in a given waterbody, does that mean they don't have to follow the CSO long-term control plan, they don't

have recreational activity occurring?

THE WITNESS: The CSO control policy requires permittees with combined sewer overflows to fully implement the nine member controls.

They are then required to evaluate whether water quality standards can be violated and in doing that evaluation they can either go with the presumption approach, which is, say, 85 percent capture of the CSO to convince the Agency, specifically the Agency's permit writer, that by meeting that presumption approach, water quality standards will not be violated.

MR. ANDES: If I can interrupt you for a moment. Is that all part of developing a long-term control plan?

THE WITNESS: Yes. The evaluation of picking a presumption or a demonstration approach is in terms of developing a long-term control plan.

MS. WILLIAMS: Do you want to finish after the presumptive approach?

THE WITNESS: Yes. Or they can choose a demonstration approach where they collect water quality data. They do water quality

modeling to evaluate these specific levels of control that they could then demonstrate that water quality standards would be met or they can choose like for different segments of a waterway they could choose either the presumption or the demonstration approach and it's my understanding that when the District is evaluated even before the CSO policy was adopted by law into the Clean Water Act, the District evaluated what an appropriate level of CSO would be for the City of Chicago and that the Tunnel And Reservoir Plan, which is a phased approach, was the best way to control the CSO's in this particular system.

MS. WILLIAMS: And the presumption was that water quality standards would be met? All of them, right, not just bacteria, is that correct?

THE WITNESS: Right, and that was before the UAA was done.

MS. WILLIAMS: And now as we sit here today, you feel that they won't, water quality standards for DO will not be met by completion of TARP?

THE WITNESS: I'm saying that

because TARP will not adequately control all CSO discharges and these other wet weather sources which the data have shown can effect DO in the system even if CSO's are not discharging that it is appropriate if you're going to adopt what you believe to be the highest attainable use of this system that a wet weather limited use would be needed.

MS. WILLIAMS: Thank you.

BY MR. ETTINGER:

Q. Are you aware of any mandatory schedule for the completion of TARP under these nine minimum controls?

A. I'm not aware.

Q. Ten, have you seen data that is adequate to see daily changes in DO levels at -- I'm going to drop ten. That was poorly written, but you wrote something else. Have you looked at any data that allowed us to trace diurnal swings in dissolved oxygen levels within any part of the CAWS?

A. I have not specifically evaluated the data from a perspective of what you just said.

Q. Have you -- you are familiar with

the phenomena in some systems where you'll -- comparatively high dissolved oxygen levels are in daylight hours and comparatively low oxygen during the dark hours because of photosynthetic activity which is what you referred to here?

A. And respiration, yes.

Q. Okay. Would this proposal affect low DO levels caused by that activity?

A. What do you mean by affect?

Q. Would it change the legal implications of any violations of the dissolved oxygen level caused by photosynthetic activity as opposed to CSO?

A. This proposal would not affect conditions where you would have photosynthetic activity in periods outside of wet weather. So that would be -- that would include summertime when maybe you have a longer duration between wet weather events. If there were photosynthetic activity that would cause the DO to be violated during those conditions, then this would not affect that.

Q. Have you ever studied by looking at weather data how many days of the year for any

given year would have been subject to your wet weather standard?

A. Well, the wet weather limited use in general depending on the rainfall conditions could be as much as, say, 50 percent of the time and during drier years it would be less, but the important part is that the periods when you would actually need the wet weather limited use is less than that.

Q. That's true, but that wasn't my question. My question was have you looked at a typical year, say, 2009 and seen how many days based on the rainfall reports in that year would have been subject to the wet weather standard?

A. In Table 7 of my testimony, the count of wet hours is the period of time that you could potentially apply the wet weather limited use.

Q. That's not my question. That tells me the number of hours. I'm talking about the number of days. Theoretically, if it rained an inch every six days, the entire year would be subject to the wet weather standard, right?

A. Theoretically.

Q. Theoretically. Now, it doesn't do that fortunately here. So the question I'm asking is have you ever looked for any year and seen how many days were knocked out based on the rain charts for that year that we have from the past?

A. The days aren't being knocked out. They're just candidate days and I have looked at that and that data could be provided.

Q. You said you have looked at it?

A. Yes.

Q. Do you have any ballpark estimates for any year, 20 percent of the days, 2 percent of the days?

A. Yes. The table here that shows roughly 50 percent of the days is about right or the hours.

Q. Fifty percent --

A. Divide the hours by 24 and it's rule of thumb pretty close.

MR. ANDES: When you say 50 percent, you're referring to what number?

THE WITNESS: The count of hours. We have a total count of wet hours. Divide that by 24 and you get approximately the number of

days.

MR. ANDES: But that's wet hours. The number of hours -- percentage of hours where you determine the wet weather limited use is actually needed is far lower, correct?

THE WITNESS: Yes.

MR. ANDES: That was in what range?

THE WITNESS: That was maybe 6 percent of the 50 percent.

MR. ANDES: At the highest?

THE WITNESS: At the highest.

BY MR. ETTINGER:

Q. This is all very interesting, but you're not answering my question. I'm not asking what percentage of the hours you would use. I'm asking how big is the suit, not how much do you fit into it. Do you see what I'm saying?

So it doesn't even -- answering my question doesn't require looking at the dissolved oxygen numbers at all. It just requires looking at the rain gauges and your regular or proposed regulation and we've agreed that hypothetically if it rained an inch every six days the entire year would be off. Now, it might be,

in fact, that you'll never use any of that. We'll have high DO levels that entire year. Who knows. But I'm just saying have you ever looked at the weather data versus your standard and seen how many days would be subject to the wet weather standard in that year?

A. And I apologize, but I thought I had answered that question by telling you that we took the rain gauge data. We looked at the wet weather trigger that has been proposed which includes the two, four, six days and in Table 7 I provide the number of hours where the wet weather limited use period is not even considered and the number of hours where the wet weather limited use period is considered.

MR. ANDES: So you were using days in that calculation to determine if it was in the right number of days after a wet weather event?

THE WITNESS: Correct.

MR. ANDES: But you were determining compliance by the particular hour in its DO date?

THE WITNESS: Correct.

MR. ANDES: So --

THE WITNESS: So it's roughly, for

2006, you know, as much as 50 percent of the time if not more.

BY MR. ETTINGER:

Q. So whatever half of 365 is, is the number of days that were potentially subject to no dissolved oxygen standard? It turns out you didn't need it all, but -- what is half of 365? 190 days you could have had dissolved oxygen standards of zero in the entire system under this rule and it would have been legal?

A. I don't see where you're drawing that conclusion.

Q. I'm applying 50 percent to 365. My math is not up to that, but I'm told half of 365 --

MS. MOORE: 182.

BY MR. ETTINGER:

Q. 182. I rely on a very reliable source. 182. If 50 percent of the days are subject to the standard, then 182 days you could have had no dissolved oxygen in the system and it would have been legal under the proposed rule?

A. How could you have that? Tell me what the District would do in terms of changing

what they do already that that situation would happen.

Q. I'm not asking whether it would happen. I'm asking for the meaning of the proposal, not what they're going to do. We all know the District is going to be just as virtuous as it can conceivably be, but that's not my question. My question is what they have to do as opposed to what they will do?

A. They have to comply with the operational requirement for the combined sewer overflow system that is in their permit. The MS4's have to comply with the operational requirements in their permits.

Q. Okay. We've been over that. Are you agreeing with me that under your rule 50 percent of the days in the year would be outside of the dissolved oxygen standard?

A. No.

Q. Okay. Why not?

A. Because the reporting mechanism that is required requires that the District go through a step-by-step process of looking at each hourly measurement and reporting which measurements

comply, which measurements don't comply and which measurements they theoretically could have had the criteria not comply, but let everyone know whether the actual criteria that would apply during dry weather were met during the wet weather period. So I do not agree that -- it would wantonly allow 50 percent of the time for there to be zero DO in the CAWS at every individual location where this wet weather limited use would apply.

Q. I'm not following you. Again, we're not asking what they would do. I'm just asking what the operation of your rule is. If the rule says I get off six days after one inch, are you saying under some conditions I don't get the full six days?

A. The rule does not say you get off for six days. The rule says you have to -- you have to operate your system the way they are operating it now.

Q. Okay. All I'm asking about -- I think I --

MR. ANDES: Can she answer the question?

BY MR. ETTINGER:

Q. I'm just asking about the dissolved oxygen standard. I'm asking Ms. Williams' question two. She said what happens if it recovered and then went back?

MR. ANDES: She has already answered the question six or seven times.

MS. TIPSORD: I have to tell you, Fred. I'm sorry. I'm confused myself. So let's let Albert try it one more time. I'm confused by this answer.

BY MR. ETTINGER:

Q. I'm just asking for the operation of the rule. Please forget about all the good things that we know the water reclamation would like to do, forget about all the other rules out there that might regulate it, I'm just asking about the operation of this rule on the dissolved oxygen standard.

By the operation of this rule, by a dissolved oxygen standard, you get six days off from the dissolved oxygen standard for one inch of rain, is that correct?

A. You potentially could apply if let's

say for that event the DO went to zero for six days then that would be legal.

Q. I think I'll leave it there.

MR. ANDES: That's a yes.

BY MR. ETTINGER:

Q. I think we're there. I think I understand. Eleven, do you disagree with Mr. Zenz's testimony regarding the possibility of meeting DO standards through use of aeration equipment?

A. Dr. Zenz relied on model simulations to develop his cost estimate about technologies needed to comply with proposed dissolved oxygen standards. I would say the model simulation were based on two periods that were selected to be representative and because of the nature of wet weather events there will be years with different conditions. I would not take definitive conclusions that if the technologies that were simulated were implemented that you could achieve full compliance with water quality standards in all hydrologic periods.

Q. Could you come closer?

A. Possibly.

Q. Could it be that there are some segments of the CAWS in which we could meet water quality standards using some of the equipment that was analyzed by Dr. Zenz?

MR. ANDES: Are you talking about a hundred percent of the time?

MR. ETTINGER: I'll leave my question as it is. If you want to ask the hundred percent question later, you can.

BY THE WITNESS:

A. There may be some locations where you could meet the DO criteria during the simulated periods, but as I said, the wet conditions in the CAWS are complex and vary year to year and, but there are also some locations where when you apply more technology you can't get the dissolved oxygen to improve during wet weather.

BY MR. ETTINGER:

Q. Have you analyzed where those locations might be?

A. I had evaluated those as part of the team when we were looking at how you do this. The last simulations were conducted by Dr. Melching

and I did review that report.

Q. Are you saying that if the Zenz methods are not capable of getting a hundred percent compliance all of the time that we should decide it will be infeasible for them to be used any place part of the time?

A. I don't believe that the District is proposing that that those technologies not be used at all. In fact, in his cost estimates in materials of complying with the District's proposal, there would be a substantial investment in additional technologies.

Q. Would it be unfeasible to make a bigger investment and better comply with the dissolved oxygen standard in some of these segments?

A. What do you mean by better comply?

Q. Come closer to meeting the standards that were proposed by IEPA than is proposed here?

A. And you would do that even though you don't expect that to have any beneficial use?

Q. No, I do expect it to have beneficial use, but my question to you is on the engineering, not on the biology. I'm asking you

do you think that we can't do any of the things increased -- in terms of increasing the dissolved oxygen levels that Dr. Zenz said were possible if the District wanted to make the investment?

A. In Dr. Zenz's testimony, he used the results of two simulations and the one result was what would it take technology wise to meet the Agency's proposed DO criteria a hundred percent of the time. There were still some locations where they couldn't exactly get to a hundred percent of the time and the cost was significantly higher than the cost of meeting the District's proposal which would include a wet weather limited use.

Q. So doing something always cost more than nothing, but the question is --

A. The $65 million versus $670 million and the benefit that you would get from that additional expenditure where the habitat evaluation and improvement study showed that unless you could fix the habitat, there would be an imperceptible change in fish population.

Q. We've heard Mr. Bell's testimony. My question is, do you on the engineering, are you saying that we could not build some of the things

that Dr. Zenz did? It would be infeasible to do so?

A. I wasn't asked to provide an opinion on that.

Q. Twelve, why is it appropriate to establish a wet weather designation based on the existing system if the TARP is going to lessen or eliminate any of the CSO's?

A. This is because CSO's are not the only source of negative impact from wet weather. Other sources such as urban storm water runoff, highway runoff and overland runoff to the tributaries are not going away even after TARP is completed.

The standards under discussion are for current and future conditions. It does not make sense to set a standard based on something that you know won't be attained in the near future and probably won't be attained even after TARP is fully implemented because there will still be some CSO dischargers and other wet other sources.

Q. Do you believe that there is nothing that can be done about urban storm water runoff?

A. I didn't say that.

Q. Is it infeasible to do something about urban storm water runoff?

A. I didn't say that.

Q. I gather then you think it is feasible to do something about urban storm water runoff?

A. Doing something about urban storm water and meeting proposed dissolved oxygen criteria in the CAWS at every single location a hundred percent of the time is a different question.

Q. Is it your proposal that we should always write standards so they can always be met a hundred percent of the time at every location?

A. It's my opinion that if you are going to go through the -- if you're going to spend the time and the resources on a use attainability analyses, that you should use all of the information to establish the highest attainable use and it's my opinion that based on all of the data we have that there are still going to be periods throughout the CAWS where the dissolved oxygen is going to go below 4.0 or 5.0

mg/L during wet weather and that a wet weather limited use is, therefore, an appropriate way to establish the highest attainable use.

MR. ANDES: Is it your testimony that for the next 18 years until TARP is done, there will still be a significant need to use that wet weather limited use?

THE WITNESS: Yes.

MR. ANDES: And after that time period, would you assume that this provision would continue to be reevaluated to determine whether it is less necessary to use as we go forward into 20, 25 and 30 years from now?

THE WITNESS: Yes.

BY MR. ETTINGER:

Q. Is it your understanding that the TARP affects all of the CSO's in the Chicago area equally?

A. I don't know.

Q. Are there some segments that will be benefitted more from TARP than others?

A. I don't know.

Q. Have you studied how many CSO's there are operated by the Water Reclamation

District?

A. I have reviewed reports that document the number of CSO's that discharge to each segment. I haven't spent the time to try to determine the difference between those operated by the City of Chicago and the District.

Q. Have you studied as to any of them on an individual basis whether they could be lessened or eliminated through either green infrastructure or some other type technology?

A. No.

Q. Questions one and two here are a little messy. I think I have to ask them both, but my question is really to one just for the benefit of two. One, has any state approved criteria that allowed DO levels to fall below 1.25 mg/L?

MS. TIPSORD: This is question one under --

MR. ETTINGER: This is question one under Subdocket D.

BY THE WITNESS:

A. The Chesapeake Bay criteria includes a 1.0 mg/L minimum criterion for certain waters.

These criterion were developed by the Chesapeake Bay program and have been or are in the process of being adopted by State of Maryland, the District of Columbia and the Commonwealth of Virginia. I don't know of any specific instances where states have evaluated the periodic need for lower dissolved oxygen specifically for wet weather events. The Chicago Area Waterway System is the first system I know where this has been evaluated.

BY MR. ETTINGER:

Q. Do you know of any limitations on the wet weather provisions in the State of Maryland, regulations that you refer to here?

A. Can you repeat that question, please?

Q. Are you aware of limitations on how much they can use that standard in Maryland?

A. Which standard?

Q. The dissolved oxygen standard you refer to here?

A. Of 1.0 mg/L?

Q. A standard that would allow them to go below the ordinary standards.

A. By ordinary standard, do you mean

the 1.0 mg/L?

Q. No. I mean, in this case, 3.0.

A. I don't mean to frustrate you, but in the Chesapeake Bay they have looked at different portions of the bay in terms of habitat and they have a spawning habitat that has 6.0 or 7.0 mg/L and then they have a deep water channel criteria habitat or they have a deep water channel habitat where the 1.0 minimum applies. So I don't understand your question.

Q. You know what, I'm going to withdraw that question and just ask you what is your understanding of the conditions in which they may go below a level of 3.0 in Chesapeake Bay?

A. If they are in, say, this deep water habitat, they can go below 3.0.

Q. For how long?

A. There are the biological reference curves that they have associated with each of the minimum criteria and not having applied those reference curves with your specific question I can't answer.

Q. Would it surprise you to find out that the abilities to go below those levels is

limited by a percentage basis?

MR. ANDES: Are you going to introduce evidence of that?

MR. ETTINGER: Later.

MR. ANDES: So you're going to make her answer the question without introducing the evidence?

MR. ETTINGER: I'm asking her a question. If she doesn't know the answer to the question, she has a pretty simple response.

BY THE WITNESS:

A. Then, I can't answer your question.

BY MR. ETTINGER:

Q. Thank you. We go on. Has US EPA ever approved the state standard that allowed DO levels to fall below 1.25 mg/L?

A. Again, US EPA adopted the Chesapeake Bay criteria.

MR. ANDES: Those were adopted by US EPA?

THE WITNESS: Yes.

BY MR. ETTINGER:

Q. What document did they adopt it in?

A. It's the Chesapeake Bay criteria

documents.

Q. It says these criteria in your response to question one above it says "These criteria were developed by the Chesapeake Bay program and had been or are in the process of being adopted by the State of Maryland, the District of Columbia and the Commonwealth of Virginia"?

A. Yes.

Q. And you believe they have now all been all adopted by those states and those standards have been approved by US EPA?

A. I believe in Virginia they're still going through the process of getting them adopted, but US EPA is part of the Chesapeake Bay program and they have approved, I believe, the State of Maryland's and the District of Columbia's standard.

Q. So you believe we should be able to get a letter from US EPA approving these standards?

A. I would hope so.

MR. ANDES: Weren't they recommended by US EPA in the first place?

THE WITNESS: Yes.

BY MR. ETTINGER:

Q. Are you -- have you reviewed any letters US EPA wrote specifically with regard to this system?

A. Yes, I'm aware.

Q. Have you reviewed the letter from last January regarding dissolved oxygen standards in the CAWS?

A. I may have.

Q. Turning now to page seven -- I'm sorry. Question 7 on page 11. On page 13 of your proposal, it is stated that under the District's proposal one location will receive additional treatment. Why?

A. My statement was that this location, which is Main Street on the North Shore Channel, would receive additional treatment. This is because Marquette University's model simulation showed that flow augmentation would be needed at this location to achieve the District's proposed criteria.

Q. Why was that?

A. Because it has low dissolved oxygen

during dry weather periods and by introducing additional flow that includes additional dissolved oxygen that that would be a good technology to improve the dissolved oxygen levels in this segment.

Q. So this is necessary to default to meet the dry weather standard?

A. Yes.

Q. Finally, are you aware of the source of cyanide in the Metropolitan Water Reclamation District discharge?

A. No.

Q. Have you studied the need for changes in the cyanide standard in the CAWS?

A. No.

Q. Have you seen any reports by the Water Reclamation District as to why they want to change the cyanide standard?

A. No.

MR. ETTINGER: I'm done.

MR. ANDES: I'd like to follow up for a moment. If I can take you back to Table 7, Ms. Nemura, and what I'd like you to do is Table 7 of your testimony which lays out, am I correct, a

typical year and how the District's proposal would apply? And if you can walk us through that particularly with relation to --

MR. ETTINGER: Do we really have to go over this yet again, Fred?

MS. WILLIAMS: I'm going to object to the typical year.

MR. ANDES: A particular year. And if you can walk us through exactly how the District would calculate compliance in this particular year and determine how often it would use the wet weather limited use?

THE WITNESS: Can I have the chart? It was attached to the testimony. First, the District would gather all of the CDOM data and all of the rainfall data and they would put each hourly measurement of dissolved oxygen in either the dry weather value or a wet weather value and the wet weather value would be based on the wet weather limited use trigger that is proposed. Then, they would look at -- so that includes in the count of hours in the table you can see the total dry values and the total wet hourly values.

Then, they would evaluate the

dry weather values and determine the number of values that were above the water quality criterion and the number of values that were below the water quality criterion. They would then look at the number of wet weather values and determine if the dissolved oxygen preceding an individual wet weather event was less than the dry weather criterion they would not be able to potentially use the wet weather limited use. So that would be a wet weather limited use excluded value.

They would then look at in terms of those wet weather limited uses excluded values what were the number of hours where the dissolved oxygen was less than the dry weather criterion and that would be considered a wet value that was in violation of the proposed criteria. They would also look at the number of values that you couldn't apply for the wet weather limited use, but it was greater than the dry weather criterion as well as if you had the wet weather limited use and it was greater than the criterion you didn't need it. So the total of those two would be essentially the wet hours above the water quality criterion that is shown in the table.

MR. ANDES: Those numbers are around --

THE WITNESS: Around 50 -- 50, 55 percent of the time. And then, finally, you would look at the periods where you could apply the wet weather limited use and it was greater -- or it was less than the water quality criterion and those would be the hours where you would actually be applying for the wet weather limited use.

MR. ANDES: And the range of percentages for that particular year would be what?

THE WITNESS: Zero to six percent of the time.

MR. ANDES: In those segments, you would actually use the wet weather use more than six percent of the time?

THE WITNESS: Correct?

MR. ANDES: Thank you.

BY MR. ETTINGER:

Q. Would the District be agreeable to limiting its proposal so as to say it would not use the wet weather limited use more than six percent of the time?

MR. ANDES: I think one would have to assess whether that year is particular. I can certainly take that issue that you've raised back to the District and we can provide our views on that.

MR. ETTINGER: Thank you.

THE WITNESS: And if you look on Table 6.

MS. TIPSORD: Go ahead.

MR. ETTINGER: I'm sorry. I thought we were done. I wasn't expecting to get answers when there wasn't even a question on the table.

THE WITNESS: If you look on Table 6, with the exception of the North Shore Channel which would receive flow augmentations, the maximum percentage of time from 2001 to 2008 was 11 percent.

MR. ETTINGER: Can we break it down by segment and have a percentage on a segment by segment basis?

MR. ANDES: We'll take that under advisement also depending on what the particular DO standards are, of course. So there's particular assumptions made here as to what the DO

standards are, but could we derive a number that we might be able to agree to? That's certainly something we would consider and we'll get back to you on that.

MR. ETTINGER: Do you have any further answer to Fred's comment?

MS. TIPSORD: No, but I believe --

MS. DEXTER: I have four follow-up questions before everyone packs up and leaves. Really fast. Do you know -- Jessica Dexter, Environment Law and Policy Center. Do you know how far below the waste water treatment plants the nearest DO monitoring locations are roughly in miles?

THE WITNESS: Off the top of my head, depending on which plant you talk about it's maybe half a mile for the Northside plant, maybe three miles for the Stickney plant and maybe three quarters of a mile for the Calumet plant.

MS. DEXTER: My next question. In the proposal that was submitted, it's in Section 303.236(e), it describes -- prohibits toxic conditions in there. Can you explain what you mean or what is meant by toxic conditions? Is

that lethal conditions or are you talking about a chemical toxicity?

THE WITNESS: It's my understanding that that would be similar to the narrative for the category three waters.

MS. DEXTER: So, in other words, for example a fish kill that may have been caused by dissolved oxygen would be prohibited by that part, correct?

THE WITNESS: Correct.

MS. DEXTER: My next question is also interpreting a hypothetical based on rainfall data just to understand how you applied the standards. So let's say we have three consecutive days of rainfall. On the first day, the rainfall is 0.87 so it triggers the second category. On the second day, it rains 1.05 inches. So that triggers the third trigger, but on the third day it rains 0.25 which triggers the very first.

So which of those days controls how many days after that last day of rainfall?

THE WITNESS: The second day would extend out for the trigger day plus an additional six days.

MS. DEXTER: So it would be two days after plus six days after? The problem I'm seeing is so that last day of rainfall would only give two days, but the day before that would have given six days?

THE WITNESS: Yes.

MS. DEXTER: So did you pick the biggest one and count below there?

THE WITNESS: No. So for the first rainfall, you would have had the trigger day plus the two days -- I'm sorry.

MS. DEXTER: The first one would have been four days.

THE WITNESS: So for the first one, you would have had the trigger day plus four days. The second event you had the largest trigger day.

MS. DEXTER: Right.

THE WITNESS: So you would extend that out the additional two days to give you the trigger days plus the six days. Then, your third event if it fell within that it would be the second event that controlled that.

MS. DEXTER: I just wanted to make sure that's how it was interpreted. And my last

question is earlier today we had talked about reviewing the data further down in time to see if we should change something about the DO standards or the trigger events or that sort of thing. What would you see in that data that would trigger a change in the requirements of this proposal?

THE WITNESS: Let's say in a particular segment there had been a concerted effort to maximize the use of green infrastructure to clean up urban storm water, to see what the highway department could do to address that runoff, and you had these wet weather triggers and yet you didn't need the wet weather limited use at all. You might then want to do additional evaluation of how those controls were able to reduce the volume and frequency of those wet weather discharges and if you thought that that was significant you might then want to apply the District's water quality model to see if in model land, which can be helpful, that it seemed like, yes, this suite of controls seems to have addressed the problem.

You could then in the triennial review for the water quality standards say we

believe that the wet weather limited use for this segment is no longer needed.

MR. ANDES: You could also have a situation where, for example, you were using it ten times a year and now you would look at it and say I still need it, but now I only need it one time a year?

THE WITNESS: Yes.

MS. DEXTER: And what would change in the proposal, in the rule language to incorporate that?

MR. ANDES: That wouldn't change the regulation, would it? It would just change the number of times they used it, am I right?

THE WITNESS: Right. You would still have the 50 percent of the time you might legally be allowed to exercise the wet weather limited use, but the data would be out there that showed that you've been making progress at improving water quality. Whether or not that would warrant saying that, you know, there's an overall improvement in the resident aquatic fish population, you might want to have fish data to see if you know there was any change, but all the

data that we have suggested that the resident fish population would stay the same.

So you might keep the regulation in place the way it's written and just rely on the reporting to indicate that you're making progress and improving DO for improving DO's sake. If that makes any sense.

MS. DEXTER: It kind of does, but I don't see the point of doing a triennial review if the -- out of basis, you would say, no, we always need to have this ability to take it down to zero for half of the time even if we only use it one day a year, we shouldn't change the standard to do that?

THE WITNESS: Right. That's why I'm saying you should want these other studies to provide the cause which would be the successful reduction in the wet weather discharges so you would anticipate they would not -- they would prevent the wet weather sources from impacting the dissolved oxygen in the system.

MS. DEXTER: All right. That's all I have.

MS. TIPSORD: Ms. Alexander?

MS. ALEXANDER: Are you familiar with what measures are being used in the Washington DC area to control CSO discharges?

THE WITNESS: Yes.

MS. ALEXANDER: Can you explain a little about what those are?

THE WITNESS: They have a series of tunnels that are under construction and they also have some ways to sort of help the capture of CSO within the combined system so they can send more flow to the plants, including a series of inflatable dams and realtime controls that they operate to maximize the flow in the collection system.

They are also evaluating the potential for low impact development to address storm water problems on site through their river smart grant program that Limnotech is involved in and they are also -- if they can obtain some flexibility with the regulatory agencies, you know, looking at more widespread implementation at green infrastructure throughout the combined and separate sewer systems. And they are also in active negotiations with the federal agencies

located within the District of Columbia largely as a result of the Chesapeake Bay TMDL.

MS. ALEXANDER: Are you also familiar with the recent consent decree settlements in Cleveland and St. Louis and specifically the green infrastructure requirements contained within?

THE WITNESS: Yes. Limnotech is helping with a feasibility study for widespread implementation of green infrastructure in Cleveland. And in St. Louis we helped the Sewer District evaluate whether wide spread application of green infrastructure in half of its service area could be successful in improving the percent capture of combined sewage for that portion of the collection system and the results were encouraging that we recommended that they proceed with a green infrastructure program for their whole service area as a way to help reduce combined sewer overflows.

MS. ALEXANDER: Now, hopefully the last question. Do I recall correctly that you testified earlier today that the Chicago area in some manner is uniquely different in terms of its

ability to reduce CSO's?

THE WITNESS: In both Cleveland and St. Louis, they have essentially land redevelopment banks and they also have large portions of their highly urbanized pockets within both of those service areas that essentially are slated for some sort of redevelopment and in both cases the green infrastructure is being used as a way to enhance -- I shouldn't say in both cases.

In Cleveland, it's being used as a way to enhance the agreed level of control. In St. Louis, it's an integral component of the agreed level of control.

MR. ETTINGER: Could I just ask the thing you did for St. Louis, is it in some form of a report or something?

THE WITNESS: It is included in, I believe, Chapter 11 of their long-term control plan. It may not be available on the website because they did update their long-term control plan from 2009 if it's their February 2011 version.

MR. ANDES: Has there been any assessment of the extent to which contemplated

green infrastructure measures in Cleveland or St. Louis will result in reduction in DO issues?

THE WITNESS: No.

MR. ANDES: Was that any part of the long-term control plans for those communities?

THE WITNESS: No. In Cleveland, the concern was not over meeting dissolved oxygen criteria, it was over meeting bacteria criteria and even though the District showed through the water quality modeling results that Limnotech did for them that they could meet water quality standards for bacteria at four overflows per year US EPA took the position that because Cleveland could afford to do more in their opinion that they should go to a two overflow per year solution and during those negotiations the District agreed that they would evaluate whether they could go from four overflows per year to two overflows per year by implementing green infrastructure.

MR. ANDES: So that's not going to zero overflows?

THE WITNESS: Correct.

MR. ANDES: And that's two overflows a year per discharge point, right? That's not two

overflows throughout the whole system, that's two overflows times however many discharge points they have?

THE WITNESS: And that's a typical year which was defined as a certain condition.

MS. TIPSORD: Anything else? Thank you very much, Ms. Nemura, for coming back. We have some deadlines coming up in this rulemaking. For motions, June 29th responses. July 8th replies and, with that, we're adjourned. Thank you, everyone.

STATE OF ILLINOIS)
) SS.
COUNTY OF COOK)

I, Steven Brickey, Certified Shorthand Reporter, do hereby certify that I reported in shorthand the proceedings had at the trial aforesaid, and that the foregoing is a true, complete and correct transcript of the proceedings of said trial as appears from my stenographic notes so taken and transcribed under my personal direction.

Witness my official signature in and for Cook County, Illinois, on this 8th day of July, A.D., 2010.

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