ILLINOIS POLLUTION CONTROL BOARD
September 23,2008

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

TRANSCRIPT OF PROCEEDINGS held in the above-entitled cause before Hearing Officer Marie Tipsord, called by the Illinois Pollution Control Board, pursuant to notice, taken before Rebecca Graziano, CSR, within and for the County of Cook and State of Illinois, at the James R. Thompson Center, 100 West Randolph Street, Room 9-040, Chicago, Illinois, on the 23th Day of September, A.D., 2008, commencing at 1:00 p.m.

A P P E A R A N C E S

ILLINOIS POLLUTION CONTROL BOARD:

Ms. Marie Tipsord, Hearing Officer
Ms. Alisa Liu, P.E., Environmental Scientist
Mr. Anand Rao, Senior Environmental Scientist
Mr. Tanner Girard, Acting Chairman
Ms. Andrea Moore

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY:

Ms. Stefanie Diers
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Appeared on behalf of ELPC, Prairie Rivers Network, and Sierra Club,

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(312) 357-1313
BY: MR. FREDRIC ANDES

Appeared on behalf of the Metropolitan Water Reclamation District of Greater Chicago.

MS. TIPSORD: And Ms. Alexander, you indicated you thought you might have some additional questions for Dr. Blatchley.

MS. ALEXANDER: I do. Okay. I would like to turn, first, to the document we were presented with, which is a study entitled Effects of Disinfections on Wastewater Effluent Toxicity. That is Exhibit 98, and I just have a few questions about that. First question: As I understand it, the basis for the research, in part, was a study of the survivability of an organism referred to as a C dubia. I'm not even going to attempt to pronounce the C.

MR. BLATCHLEY: Ceriodaphnia?

MS. ALEXANDER: Yes, ceriodaphnia. Is that correct?

MR. BLATCHLEY: Yes, survival and reproduction.

MS. ALEXANDER: Survival and reproduction.

MS. TIPSORD: Could you please spell that for the record.

MS. ALEXANDER: Okay. That would be C-e-r-i-o-d-a-p-h-n-i-a. The ceriodaphnia dubia is

a type of water flea. Is that correct?

MR. BLATCHLEY: Yes.

MS. ALEXANDER: Okay. So in other words, no attempt was made to assess toxicity on the survivability of any type of mammal. Is that correct?

MR. BLATCHLEY: Certainly not.

MS. ALEXANDER: Okay. I would like to ask you -- essentially I want to get an overview of the conclusions of this research, so I'd like you to tell me whether my understanding of that overview is correct or not. First of all, am I correct that your ultimate conclusion in this study, which would be reflected in the summary and conclusion section on the second to last page, would be reflected in the statement that facilities which treat wastewater of domestic origin or from other readily biodegradeable sources generally do not illicit a substantial toxicological response before or after disinfection, regardless of the disinfectant employed. Is that correct?

MR. BLATCHLEY: Yes.

MS. ALEXANDER: Okay.

MR. BLATCHLEY: As a generalization,

yes.

MS. ALEXANDER: Okay. Would it be fair to say along those lines that, in fact, that your conclusions are a little bit, shall we say, all over the map, that they varied widely with regard to survivability?

MR. ANDES: I'm going to object to that "all over the map" characterization. What could you mean by very widely? Clarify, please.

MS. ALEXANDER: Okay. Let me clarify that. Would it be fair to say that your findings regarding the survivability of this organism were not consistent across the board, they varied from location to location?

MR. BLATCHLEY: And from time to time.

MS. ALEXANDER: Okay. And was it also your conclusion that not all facilities produce any toxicity effect as a result of disinfection?

MR. BLATCHLEY: That's correct.

MS. ALEXANDER: Okay.

MR. BLATCHLEY: At least that we measured.

MS. ALEXANDER: Okay. Was it also your conclusion that in some cases of survivability,

this organism, in fact, increased post-disinfection?

MR. BLATCHLEY: I believe that did happen, yes.

MS. ALEXANDER: Okay. Was it also your finding that when UV disinfection was used, more often than not survivability either stayed the same or increased?

MR. BLATCHLEY: I -- honestly, it's been a long time since I've read this paper myself, but I think the -- that sounds reasonable, at least the "didn't change" part.

MS. ALEXANDER: Okay.

MR. BLATCHLEY: I don't know about the -- I'm a little nervous about the increase in survivability, just because the error that's inherent in this test is such that I'm sure a trust is numbered, but yeah.

MR. ANDES: If I can follow up on that. As to the facilities that accept a substantial fraction of influence from industrial applications, am I right you found that all the disinfectants demonstrated the ability to alter types of response?

MR. BLATCHLEY: Yes, certainly.

MR. ANDES: And the Reclamation District's plans, is it your understanding that they also received a substantial amount of influence from industrial facilities?

MR. BLATCHLEY: Yes.

MS. ALEXANDER: One second.

MR. ANDES: While we're waiting, if I can also ask another follow up, going back to C dubia, is it accurate to say that the reason that's tested is because it's a particularly sensitive organism to toxic responses?

MR. BLATCHLEY: I believe so. And also there's been a lot of work done with that organism so that we have an understanding of a number of specific chemicals and how they provide response or how that organism responds to that chemical. So it's been studied a lot, and part of the reason for that is the reason that you stated.

MS. ALEXANDER: And you did not, in fact, study in this study effluent from the three Metropolitan Water Reclamation District plants at issue here. Is that correct?

MR. BLATCHLEY: I think that's correct, yes.

MS. ALEXANDER: Okay. So we do not know, then, whether any level of industrial discharge to that effluent would be in any way comparable to the level at the facilities you did study. Is that correct?

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

MR. BLATCHLEY: Right. I -- we don't.

MS. ALEXANDER: You don't know?

MR. BLATCHLEY: Right.

MS. ALEXANDER: Okay. Now one clarifying question, is the type of toxicity that you studied in the research reflected here different from disinfection byproducts? Is that a separate topic?

MR. BLATCHLEY: We made no attempt to identify the specific chemicals that were responsible for the toxicity. This was an overall whole effluent toxicity test. So there was -- again, there was no attempt to figure out what provided -- or what was responsible for the responses that we observed.

MS. ALEXANDER: Okay.

MR. BLATCHLEY: And --

MR. ANDES: Stop. That's fine.

MS. ALEXANDER: I would like to turn next to Exhibit 99, which is the document entitled Effects of Wastewater Disinfection on Human Health, which I'd like to clarify, this document is a longer version, am I correct, of the document that's Attachment 3 to your extended testimony, Exhibit 93?

MR. BLATCHLEY: You're talking about the --

MR. ANDES: Is it a longer version of this?

MR. BLATCHLEY: Yes, yes.

MS. ALEXANDER: Okay. Let me ask you: Initially, how was this research funded?

MR. BLATCHLEY: The Water Environment Research Foundation.

MS. ALEXANDER: Okay. Who funds the Water Environment Research Foundation?

MR. BLATCHLEY: I believe it's member utilities and perhaps -- I'm sorry I'm guessing, but I believe it's member utilities and perhaps consulting firms that participate, but I'm not sure.

MS. ALEXANDER: Do you know one way or the other whether the Water Reclamation District is

member utility?

MR. BLATCHLEY: I do not know.

MS. ALEXANDER: When was this research conducted? Over what period of time?

MR. BLATCHLEY: Well, the report was filed or published in 2005. I don't remember the exact dates, but I'm guessing it's somewhere around 2001 to 2003 or maybe 4.

MS. ALEXANDER: Okay.

MR. BLATCHLEY: I don't remember.

MS. ALEXANDER: When were you first retained to do work for the Water Reclamation District in connection with the Chicago Area Waterways?

MR. BLATCHLEY: This issue?

MS. ALEXANDER: Yes, this issue.

MR. BLATCHLEY: Six or eight months ago.

MS. ALEXANDER: Okay.

MR. BLATCHLEY: I think.

MS. ALEXANDER: One more question regarding the Water Environment Research Foundation. When you say member utilities, are you referring in part or in whole to wastewater treatment utilities?

MR. ANDES: You know, I'm pretty sure he doesn't have any independent knowledge of that. It's all on the WERF website.

MS. ALEXANDER: Okay. He used the term, and I'd like to understand what he meant by the term member utilities.

MR. BLATCHLEY: Again, I don't know the details of how they received their funding, but I believe it comes from utilities -- wastewater treatment facilities, yes.

MS. ALEXANDER: Okay.

MR. BLATCHLEY: But you could get an unambiguous answer from WERF directly.

MS. ALEXANDER: Yes. I understand that. I'd like it turn -- unfortunately this is an unnumbered document, but I will try to keep it as non-confusing as possible. The second page of this document, the paragraph that begins "Taken together," go down to the fourth line from the bottom, which states "When direct human contact or injection of municipal wastewater effluent is likely, disinfection appears to be necessary." Would you still stand by that statement?

MR. ANDES: I'm sorry. Where are we?

MS. ALEXANDER: Okay. Second page, right above where it says "key words," fourth line from the bottom, "When direct human contact."

MR. BLATCHLEY: Yeah. And the definition of direct human contact that I'm using there is one involving swimming. That's the intent there.

MS. ALEXANDER: I'm looking down at the paragraph that begins "Direct human contact." It appears to include ingestion and swimming separately. Is that correct?

MR. BLATCHLEY: Ingestion would be drinking water.

MS. ALEXANDER: Are there other situations in which one might ingest water?

MR. BLATCHLEY: Of course.

MS. ALEXANDER: Such as swimming?

MR. BLATCHLEY: Yes.

MS. ALEXANDER: And such as falling out of a boat and gulping some?

MR. BLATCHLEY: Yes.

MS. ALEXANDER: Okay.

MR. ANDES: Were you intending to refer to falling out of a boat and gulping some

here?

MR. BLATCHLEY: Absolutely not.

MR. ANDES: Thank you. If I can follow up on that for a minute, in terms of -- Dr. Blatchley, in terms of this study, I wonder if you could explain to us a little bit about why -- why -- what your understanding is as to why this study was performed. Is it your understanding, for example, that treatment plants around the country are experiencing this regrowth issue? Was that part of the motivation, or were there other reasons for the study being done, if you can explain that for us?

MR. BLATCHLEY: The motivation for the study was to consider the effects of wastewater disinfection on human health, was disinfection going to improve human health, or adversely effect human health, or have no effect at all. And so again, the central questions of the research that we attempted to address were number one, should we be disinfecting wastewater effluence, and under the assumption that the answer to that question is at least sometimes yes, then how.

MR. ANDES: And were you told what your results ought to be in any way by WERF or any

other party?

MR. BLATCHLEY: No.

MR. ANDES: Was the U.S. Geological Survey important in your study?

MR. BLATCHLEY: No.

MR. ANDES: No. I'm sorry Mr. Lyle (phonetic) is part of the U.S. Geological Survey?

MR. BLATCHLEY: Well, right. Well, actually he worked -- he works at the U.S. Geological Survey now. At the time of the study, he worked at Montana State University. So he moved to USGS after we completed the study, but they required a current address for him when --

MR. ANDES: Okay. So all of the authors were from five different academic institutions?

MR. BLATCHLEY: Yes.

MR. ANDES: Okay.

MS. ALEXANDER: All right. I would like to go to Page 3 of this document. I say Page 3, I mean the third page of the unnumbered document. The first full paragraph begins "Ultra violet UV radiation is widely recognized." Do you see that?

MR. BLATCHLEY: Yes.

MS. ALEXANDER: Okay. Second sentence, "For the conditions of operation required to accomplish inactivation of waterborne pathogens, UV disinfection prophecies generally yield little, if any, quantifiable DBP formation." DBP would refer to disinfection byproducts, correct?

MR. BLATCHLEY: Yes.

MS. ALEXANDER: Is this statement in any way inconsistent with the research reflected in Exhibit 98, Effects of Disinfection on Wastewater Effluent Toxicity?

MR. BLATCHLEY: No.

MS. ALEXANDER: Okay. And the reason for that would be you didn't know the causes, as you stated, for the increased toxicity in some cases?

MR. BLATCHLEY: No. The reason for that would be the term "generally." It is a generalization.

MS. ALEXANDER: Okay. Under what circumstances, if any, would UV disinfection yield any quantifiable disinfection byproduct formation?

MR. BLATCHLEY: You're just asking for an example?

MS. ALEXANDER: Well, here you've stated that it's a generalization. Can you offer any counterexamples and define when they would occur?

MR. BLATCHLEY: As a generalization, at any time there is a chemical that's present in the water that has the ability to absorb germicidal UV radiation, there's the potential for a photochemical reaction to take place. Given the wide number of chemicals that could be present in a municipal wastewater effluent, that leaves open an awful lot of chemistry. As an example of a situation where we know something about disinfection byproducts that are generated as a result of UV radiation, we're currently studying that application as it relates to swimming pools, and what we've observed in swimming pool settings is that there are some disinfection byproducts whose concentrations increase, in fact, increase remarkably as a result of UV radiation.

So again, the generalization holds. I'm not comfortable suggesting that you will never get disinfection byproducts and disinfection byproducts that we care about. But as a

generalization, what we observed -- what we and others have observed is that most times we observe less, and those products that are formed tend to be less toxic than those that are formed as a result of chlorination.

MR. ANDES: To follow up on that, and I know you're making a distinction between disinfection byproducts and toxicity because you don't know what the toxicity is due to, you did find in the other study, I believe Exhibit 95 on effluent toxicity, that in one facility in particular, Georgetown, Kentucky, UV did display the ability to increase toxicity?

MR. BLATCHLEY: Yes.

MR. ANDES: Now, you didn't analyze why.

MR. BLATCHLEY: Correct.

MR. ANDES: In terms of which byproducts might have been, but there certainly was a toxic response?

MR. BLATCHLEY: Yes.

MS. ALEXANDER: Okay. So outside of the swimming pool research that you mentioned, specifically with respect to DBPs, as opposed to

general whole effluent toxicity response, can you think of any other examples?

MR. BLATCHLEY: Well, again, I just described a situation that would allow for a lot of chemistry to take place. But with respect to specific chemicals, no, I don't have any information that addresses that.

MS. ALEXANDER: Okay. All right. What I'd like to do is turn to the page which is headed in italics "Risk assessment." This is again on Exhibit 99, which is 11 pages from the back of that document.

MR. BLATCHLEY: I'm getting there. Sorry. Okay.

MS. ALEXANDER: Okay. Are we there?

MR. BLATCHLEY: Yes.

MS. ALEXANDER: Okay. In the first paragraph, last sentence, the statement is made, "Several exposure pathways exist for waterborne pathogens, including shellfish consumption, skin contact, ingestion during recreation, direct contact, inhalation, and drinking water." Am I correct in understanding that in this particular risk assessment you looked only at ingestion?

MR. BLATCHLEY: First of all, the risk assessment text was written by Joan Rose, one of the coauthors. So I'm the lead author on this paper, but her responsibility for this paper was that section.

MS. ALEXANDER: Okay. But you -- you are, in fact, a coauthor with --

MR. BLATCHLEY: Yes.

MS. ALEXANDER: -- Ms. Rose on the entire document?

MR. BLATCHLEY: Right. And my understanding is that her approach to this risk assessment was based on ingestion.

MS. ALEXANDER: Okay so would I be correct in understanding that since only one of several exposure pathways was looked at, it is possible that the risk is actually higher than the risk assessed purely with respect to ingestion?

MR. BLATCHLEY: Again, you would need to talk to Dr. Rose to get the specific information on that.

MS. ALEXANDER: Okay. Turning to the second paragraph, and with the understanding that although you're the lead author on this paper, you

did not draft this section, as your name's on it, I would like to ask you a few additional questions about it. I'd like to look at the statement -- the second sentence in that second paragraph beginning "Epidemiological studies." The text reads, "Epidemiological studies are not conducive to showing a full scale of waterborne disease outbreaks. Epidemiological agents remain unidentified in half of the reported waterborne disease outbreaks in the United States. As few as ten percent of outbreaks have been documented."

With respect to that statement, do you think it's fair to say that outbreaks or the level of outbreaks are generally not a good indicator of overall risk?

MR. BLATCHLEY: You're asking an engineer to perform analysis of a risk assessment that I didn't do.

MS. ALEXANDER: Okay. And I will ask you anyway, just to establish on the record, do you know the basis for the assumption of 100 milliliters ingestion during the course of a single swimming event?

MR. BLATCHLEY: Not in detail, no.

MS. ALEXANDER: Do you know in general?

MR. BLATCHLEY: As I recall, based on conversations with Dr. Rose, this was -- I think this was her best guess as to what the likely ingestion would be. But again, I think a better approach would be to call her specifically and ask her.

MS. ALEXANDER: Okay.

MS. TIPSORD: Dr. Blatchley, would some of this -- would we be able to shed some light on some of these questions, too, when we get the information that's part of the report that we're going to get?

MR. BLATCHLEY: Yeah. There is certainly more detail in the report, and it may be that she defined the basis for that assumption in the report. I just don't remember.

MS. ALEXANDER: Okay. Just one second. I've got a couple more questions. I want to turn to the actual risk finding, which is two pages later. You'll see the page with a set of three bullet points in the middle. "Specific finding was the risks associated with swimming in

waters receiving municipal wastewater effluence range from ten to the minus three to ten to the minus six. Risks are two to one hundred times greater if the water is not disinfected, depending on the disinfection type, extent of disinfection exposure, and special effluent characteristics."

So do I understand correctly that essentially that the purpose of this risk assessment was to compare risks of swimming in wastewater effluent with and without disinfection?

MR. BLATCHLEY: I need to reread this section myself.

MR. ANDES: I think that if you go two pages back, the purpose is pretty clear, because it talks about a risk assessment that was conducted for the purpose of examining, comparing probability of illness associated with exposure to undisinfected wastewater effluence with those associated with wastewater effluence that have been subjected to UV radiation or chlorination.

MS. TIPSORD: Would you agree with that, Dr. Blatchley?

MR. BLATCHLEY: Yes.

MS. ALEXANDER: Okay. And just

looking at the statement immediately above that, this is above the three bullet points, second to the last sentence before the bullets, "It should be kept in mind that on any given day, the virus concentration could be as much as ten times higher than the mean value used for these risk calculations, therefore the risks of exposure as well could be an order of magnitude higher as well." Am I correct in understanding that this means an order of magnitude higher than the two to one hundred times greater risk that's identified in the first bullet?

MR. BLATCHLEY: That would be my interpretation.

MS. ALEXANDER: Okay.

MR. ANDES: I'm not sure that's -- the two to one hundred times greater is a comparison of two risks. I'm not sure if that changes --

MS. WILLIAMS: He answered the question.

MS. ALEXANDER: Are you testifying? He answered the question. I object to that.

MR. ANDES: Do you understand -- if I can follow up, do you understand that the ten times

greater refers to the mean value or refers to the risk comparison of two to one hundred times greater in the first bullet, and explain?

MR. BLATCHLEY: I believe it's the mean value.

MS. ALEXANDER: Meaning the mean value of the virus concentration, correct?

MR. BLATCHLEY: You've put me at a point of weakness, because again, you're asking me to testify about something that I didn't write.

MS. ALEXANDER: Okay. Did you discuss with Dr. Rose her conclusions before the study was published?

MR. BLATCHLEY: Four years ago, yes.

MS. ALEXANDER: Okay. Did you, in any manner, dispute or disagree with her conclusions?

MR. BLATCHLEY: I don't recall disputing them, no.

MS. ALEXANDER: Okay. All right. I think the statement speaks for itself. I believe that is -- that concludes my questions on these two documents and my questions for Dr. Blatchley.

MS. TIPSORD: Thank you. Are there any additional questions for Dr. Blatchley?

MR. ANDES: Yes. I have a few follow-ups. Dr. Blatchley, we've talked a little bit about different levels of disinfection, and we've talked about a level of, sort of, conventional disinfection, and then other levels that are higher or more extensive in activation. If you are -- if you were to take the disinfection level up from the conventional level -- first, let me ask you is the conventional level of 400 counts of fecal, are you saying that something more stringent is needed beyond that to protect recreational uses on the CAWS?

MR. BLATCHLEY: No. I'm not -- it's unclear to me what would be necessary to protect recreational uses on the CAWS. The risks associated with recreational uses are already low, and the implementation of disinfection, as I understand it according to the risk assessment that would be -- that has been performed, suggests that that risk would be only nominally improved.

MR. ANDES: Now if I did a more extensive level of disinfection, whether that's to the California level or something else, that would reduce pathogen levels in the effluent. Am I

correct?

MR. BLATCHLEY: Yes.

MR. ANDES: Okay.

MR. BLATCHLEY: We presume that that's the case, yes.

MR. ANDES: Okay. But if it were something, say, in the California level, am I right that produces them to non-detect?

MR. BLATCHLEY: For coliform bacteria, yes.

MR. ANDES: Okay. So some other level would be detectible levels of coliform?

MR. BLATCHLEY: Presumably, yes.

MR. ANDES: Okay. In the level that we're talking about, whether it's a California level or something less, would also involve more byproduct -- disinfection byproducts?

MR. BLATCHLEY: It would involve more disinfection byproducts. It would require more power, it would require more space, more of pretty much everything that goes along with the disinfection system.

MR. ANDES: And more CAWS?

MR. BLATCHLEY: Of course.

MR. ANDES: Thank you.
MS. WILLIAMS: I'd like to follow up. So you're saying there'd be more disinfection byproduct for a higher level of UV disinfection as well?
MR. BLATCHLEY: Sure.
MS. WILLIAMS: Or are you just testifying for chlorine?
MR. BLATCHLEY: Both.
MS. WILLIAMS: And can you explain how what you're basing your conclusion on that there would be more disinfection byproducts from UV at a higher level?
MR. BLATCHLEY: The extent of -- okay. So UV systems accomplish whatever they accomplish as a result of photochemical reactions, reactions that are driven by electromagnetic radiation. The more photons you put in, the more opportunity for reaction you provide. So if there are disinfection byproducts that are formed at a low dose --
MS. WILLIAMS: If there are some formed, correct?
MR. BLATCHLEY: Correct.
MS. WILLIAMS: If there aren't any,

then they wouldn't be any higher, would they?

MR. BLATCHLEY: Correct. But if there are some formed, then you provide the potential for those reactions to go further.

MS. WILLIAMS: But they're not formed in every case, are they?

MR. BLATCHLEY: We don't -- let me just be clear on that. The analytical methods that we've used in many cases have not detected disinfection byproducts, but not all cases, and those analytical methods are not comprehensive in terms of the chemistry that's involved. So there's some question marks that exist. But it's clear that under some circumstances, disinfection byproducts are formed as a result of UV radiation, and when that's true, if you increase the dose, you'll increase the amount of DPB formation.

MS. WILLIAMS: I think that answered my question.

MS. TIPSORD: Any further?

MS. WILLIAMS: No.

MS. ALEXANDER: I just have one followup question. You made a statement in response to the follow-ups that the risk of -- from

recreational use are low. Is that statement based on the microbial risk assessment conducted by the district?

MR. BLATCHLEY: The Geosyntec report?

MS. ALEXANDER: Geosyntec -- done for the district by Geosyntec.

MR. BLATCHLEY: Yes.

MS. TIPSORD: Which is Exhibit 71, I believe.

MS. ALEXANDER: Okay. Is it based on anything else?

MR. BLATCHLEY: No.

MS. ALEXANDER: Okay.

MS. TIPSORD: Thank you very much, Dr. Blatchley. We appreciate it. And with that, we'll move on to Dr. Dorevitch.

MS. TIPSORD: All right. And then if we could enter his testimony.

MR. ANDES: Surely. Since the exhibits to -- since the attachments to Dr. Dorevitch's testimony is a total of over 800 pages, I have a copy of his testimony with a disc.

MS. TIPSORD: All right.

MS. WILLIAMS: 856 I believe it was.

MR. ANDES: Thank you.

MS. TIPSORD: We will, once again, mark both the attachments and the pre-file testimony as one exhibit, Exhibit No. 100. Congratulations, Dr. Dorevitch. You're number 100. If there's no objection, seeing none, it's Exhibit 100. Ms. Alexander, I believe we start with your questions from the Natural Resources Defense Counsel for Dr. Dorevitch.

MS. ALEXANDER: Yes. Good afternoon, Dr. Dorevitch. My name is Ann Alexander from the Natural Resources Defense Counsel. I'll be asking you questions this afternoon. Going to pre-file question number one, when were you first contacted by the Metropolitan Water Reclamation District concerning conducting an epidemiological study concerning the Chicago Area Waterway System?

DR. DOREVITCH: January 2007.

MS. ALEXANDER: Have you -- were you in any manner involved in the microbial risk assessment study?

DR. DOREVITCH: No, I was not.

MS. ALEXANDER: Okay. Have you reviewed that study?

Ms. DOREVITCH: Yes, I have.
MS. ALEXANDER: Okay. Did you review it in draft, or only after its completion?
DR. DOREVITCH: I reviewed both --
MS. TIPSORD: Dr. Dorevitch, keep your voice up, please. I'm having a hard time hearing you.
DR. DOREVITCH: Oh, I'm sorry. I reviewed both draft and final versions.
MS. ALEXANDER: At what point did you review a draft?
DR. DOREVITCH: February 2007. I think their draft was dry weather only at that point.
MR. ANDES: Might that have been the interim report on dry weather?
DR. DOREVITCH: Yes.
MS. ALEXANDER: Now in your summary document, you refute -- you refer to an expert review panel for the epidemiological study. Is that correct?
DR. DOREVITCH: I'm not sure exactly what you mean. There were a couple of -- are you talking about the expert review panel that the

District commissioned to review the state of the science on water quality standards, or the peer review panel for the epi study that we're doing now?

MS. ALEXANDER: Okay. Let me ask about both of them actually. First of all, I'm referring to at the MWRDGC expert panel referenced on Page 9 of Exhibit 100 attachment -- this is your --

DR. DOREVITCH: Overview document.

MS. ALEXANDER: The study overview document that you provided.

MR. ANDES: What page?

MS. ALEXANDER: Which is -- this is Page 9 of that document. My question is: Who's on that panel?

DR. DOREVITCH: I believe it's Chuck Cause (phonetic), Chuck Gerba (phonetic), it may be Joan Rose. I don't remember who the members of that panel are.

MS. ALEXANDER: Okay.

DR. DOREVITCH: I believe there were four, and I think those are three of the four.

MS. ALEXANDER: Okay. And then who was on the peer review panel?

DR. DOREVITCH: For the CHEERS research study?

MS. ALEXANDER: For the CHEERS research study.

DR. DOREVITCH: The reviewers are Gary Toransos (phonetic), Dr. Gary Toransos, Dr. Joan Rose, Dr. Timothy Wade, Dr. Michael Beach. Dr. Wade is with the EPA, Dr. Beach is with the CBC, Dr. Rose is with Michigan State. Steven Shoub (phonetic) of the USEPA, Cecil Luhing (phonetic), Kurt Petrisey (phonetic) from the NEER study of the EPA and CBC, and I believe that's it. I may be missing one name.

MS. ALEXANDER: Okay. All right. Moving on to pre-filed question number two, how much longer, if at all, will you be enrolling participants in this study?

DR. DOREVITCH: We will be enrolling participants in this study. We'll be enrolling them until we reach the necessary sample size. I project that we'll finish this current 2008 season in about three weeks, having enrolled approximately 7,200 participants, and that we'll start up in the spring of '09, and finish participant enrollment in the -- about July of '09.

MR. ANDES: And your target level, I'm sorry, is?

DR. DOREVITCH: Is 9,330 participants eligible for telephone followup.

MS. ALEXANDER: Okay. But just so I understand, if for some reason you did not reach that goal number by the end of the 2009 season, would you continue to enroll participants in 2010 and push your completion date back?

DR. DOREVITCH: I think that's not realistic. We enroll over 1,000 people a month during good weather. In August we enrolled over 1,500 in a single month. So I'm not worried that we'll run out of participants in 2009.

MS. ALEXANDER: Now question three, the first part of the question, I believe, is asked and answered. I'm sorry. Can you run by the number of how many you have enrolled as of today?

DR. DOREVITCH: You know, I can't tell you exactly --

MS. ALEXANDER: Approximately?

DR. DOREVITCH: -- because we enrolled people yesterday.

MS. ALEXANDER: Okay.

DR. DOREVITCH: Approximately 6,900. It might be 6,890, 95, maybe a little over 6,900. I don't know exactly.

MS. TIPSORD: Off the record for just a second.

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

MS. ALEXANDER: Approximately -- how many of that approximately 6,900 number are in the CAWS recreational users group as opposed to the control groups?

DR. DOREVITCH: The -- we don't really use the term "control group," but probably about 40 percent of them are from the CAWS group, and 60 percent are from the other two groups.

MS. ALEXANDER: Okay.

MR. ANDES: Can you explain what the other two groups are?

DR. DOREVITCH: Sure. The other two groups are unexposed recreators, people who are outdoors doing some recreational activity at about the same place and the same time as the people who recruit into the water exposed groups. The other group is the -- what we call the general use water

group. These are folks doing activities that are done on the CAWS, but they are doing them at other locations, such as Lake Michigan, Skokie Lagoons, and other waters.

MS. ALEXANDER: Okay. I'm going to move on to pre-filed question four. This concerns the statement at Page 2 of your testimony that one of the goals of the CHEERS study is to determine whether rates of illness are higher among CAWS recreators as compared to recreators doing the same activities on waters that do not receive treated wastewater. Am I correct in understanding that this means you're comparing illness rates among people engaged in the same category activities, such as canoeing and kayaking?

DR. DOREVITCH: Those analyses will be done, yes.

MS. ALEXANDER: Okay. Now were any assumptions made in your study about the manner in which people engage in these activities?

DR. DOREVITCH: No.

MS. ALEXANDER: Okay. So would it be fair to say that the operating assumption, by default, would be that people engaged in these

activities in a roughly comparable manner regardless of which water body they were on? You didn't assume that people were, for instance, kayaking in a substantially different manner when they were on Lake Michigan as opposed to on the CAWS?

DR. DOREVITCH: No, that would be an assumption. We didn't -- I'm not assuming that at all.

MS. ALEXANDER: Right. Okay. Now in terms of water bodies that are being used as a control comparison, you mentioned the Skokie Lagoons. Is Lake Michigan another one?

DR. DOREVITCH: Correct.

MS. ALEXANDER: Okay. Is it possible, in your view, that people engaged in the types of recreational activities that you're looking at, in particular kayaking and canoeing, would have a greater level of body contact with the water in a clean water body than a contaminated one?

DR. DOREVITCH: It is possible.

MS. ALEXANDER: Okay. In other words, it's possible that a kayaker on Lake Michigan would be more willing to roll their kayak or engage in a water fight than one on the Chicago Area Waterway

System?

DR. DOREVITCH: It's possible.

MS. ALEXANDER: Okay.

MR. ANDES: If I can follow up, is there any -- do you know of any basis to believe that the behavior is any different on one water body versus another?

DR. DOREVITCH: No, I don't at this point, but we do ask people all kinds of questions that will allow us to determine if that's the case or not.

MS. ALEXANDER: Are you referring to the questions as to whether they fell into the water?

DR. DOREVITCH: That's -- that's one type -- yeah, that's one question. But there's a whole series of questions that essentially get at how wet did somebody get. We ask if they -- if a person got wet at all, and if they did, then there's a series of followup questions about, "Well, did your head get wet, did your hands get wet, did your face get wet, did you get water in your mouth, in your hands, in your feet," and then for each one of those there's a followup question about "Well, was

it a few drops, a splash, were you submerged," et cetera. So rather than assuming that people in all locations or in all recreational activities get equally wet, we have questions trying to get at that.

MS. ALEXANDER: In your results, will you be breaking out the risk to kayakers or canoers who got substantially wet, however you might define that, as opposed to the ones who stayed mostly dry? Are you essentially going to lump your results as a risk to people engaging in that particular activity?

DR. DOREVITCH: Well, we'll do many levels of analysis. The most crude would just be differences in rates of illness among groups. But to determine what the potential confounders are and the potential CAWS pathways are, we'd have to look at the individual factors that you're talking about, is it a specific recreational activity, is it a certain level of water exposure, is it water ingestion, et cetera. And if one of those factors is, in fact, a predictor of rates of illness, then that would be included in, sort of, the final models of predicting illness rates.

MS. ALEXANDER: Would it be fair to

say that in order to assess the risk of not merely of engaging in a particular activity, but of actually getting substantially wet engaging in that activity, you would have to have a statistically significant sample of both people getting significantly wet in the control water body as opposed to -- and in the CAWS as well?

DR. DOREVITCH: I'm sorry. Could you repeat the question?

MS. ALEXANDER: If one were to assess specifically the risk observed of not merely engaging in an activity such as kayaking, but engaging in an activity in a manner that got you substantially wet, would you need a statistically significant sample of both people who got significantly wet in the control water body and of people who got significantly wet in the experimental, the CAWS water body?

DR. DOREVITCH: You know, it kind of depends on what analysis you're talking about. There are analysis that have to do with difference between groups, and there are differences that have to do with in the rates of illness has a function of water quality. In the rates of illness as a

function of water quality, people in the CAWS group and the general use group would be pooled together, and there'd be, sort of, a wide spectrum of ranges of water quality.

For the differences between groups, to identify something like the extent of water contact, right, you would need more that would be one level of exposure. So some people have to have low, and some people have to have high. How many you need in each group would depend on the strength of the association. If it's a strong causal factor, you would need fewer people in each group. If it's a very subtle week effect, then it would take many, many more people to -- in those subsets to be able to identify an association between exposure levels within groups.

MS. ALEXANDER: Okay. Based on the answers that you received so far to your questionnaires, have you taken a look yet or attempted to quantify the number of people who became significantly wet, or for want of a better way to put it, fell in the water, got their head in?

DR. DOREVITCH: Not at that point, no.

MS. ALEXANDER: Okay. Pre-file

question five referring to Page 3 of your pre-file testimony, you state that you would be more inclined to support immediate disinfection of the CAWS if there were known disease outbreaks associated with CAWS recreation. Is it possible as a general matter for disease outbreaks to go undetected and/or unreported?

MR. ANDES: First of all, let me object to the characterization. It's not what he said on Page 3. He suggested public health action now. That's not immediate disinfection.

MS. ALEXANDER: Okay. What did you mean by public health action now?

DR. DOREVITCH: I didn't think of disinfection as immediate public health action. That sounds like something that takes years to put together. If, let's say, there were outbreaks of disease, significant acute public health risks, an example of an immediate public health action could be prohibiting recreational activity, prohibiting recreational activities at certain locations, prohibiting specific types of recreation, things like that. I didn't mean disinfection when I said immediate public health action, something that a

health department could, you know, move in and get done quickly.

MS. ALEXANDER: Okay. So when you state, then, that, you know, effectively that lack of observation of disease outbreaks on the CAWS associated with recreation is, you know, is that, you know, that's your reason for -- I'm tangled up in this -- that's the reason you don't support immediate public health action, you're not saying, then, that the lack of observed outbreaks on the CAWS is a reason not to disinfect, per se?

DR. DOREVITCH: Well, I'm not saying anything about disinfection there.

MS. ALEXANDER: Okay. Let me go back to my question, then. Is it possible for disease outbreaks to go undetected and/or unreported?

DR. DOREVITCH: Yes.

MS. ALEXANDER: Okay. Does this happen with some frequency, in your view?

DR. DOREVITCH: Yes.

MR. ANDES: A follow up, so how do we know when they're undetected and unreported?

DR. DOREVITCH: We don't know, but there are -- there's reason to think that the

current public health surveillance system is weak, and that it's only capturing a fraction of all outbreaks that occur, but what percent are captured and what percent are not captured is not known.

MS. ALEXANDER: And, in fact, would a disease outbreak be more likely to go undetected if it involved a type of pathogen that was infectious but frequently asymptomatic?

DR. DOREVITCH: Yes.

MS. ALEXANDER: Okay.

MR. ANDES: Do you have a particular pathogen in mind?

MS. ALEXANDER: Not at the moment. I could get back to you on that, and I'm sure our expert will get back to you on that.

MR. ANDES: Fine.

MS. ALEXANDER: And is it possible in your view that a pathogen could be dangerous to a small but distinct subgroup of recreational users, such as children or users with a high level of body contact, like boaters who fall in the water, without actually causing a disease outbreak, or say a technical disease outbreak?

DR. DOREVITCH: You're asking if it's

possible that a pathogen can cause an outbreak that goes undetected?

MR. ANDES: Or are you asking --

MS. ALEXANDER: No, I'm saying an undetected outbreak, not an undetected pathogen.

MR. ANDES: And as to those particular groups? Was that --

MS. ALEXANDER: Yeah. What I'm asking is: Is it possible that a pathogen of some sort could be dangerous to a small but distinct subgroup of recreational users, like children or people who fall in the water, without actually causing a detectable outbreak?

DR. DOREVITCH: Well, I'm not exactly sure what detectable means, but it's possible for an outbreak like that to occur and not be detected.

MS. ALEXANDER: Okay.

DR. DOREVITCH: Yeah.

MR. GIRARD: Could I ask a quick followup, Dr. Dorevitch?

DR. DOREVITCH: Yeah.

MR. GIRARD: How do you define outbreak?

DR. DOREVITCH: In the context of

waterborne diseases, the centers for disease control and the USEPA maintain a database called the waterborne disease outbreak surveillance system, and the definition there is an outbreak is two or more cases that are linked together in terms of the location, the type of illness, and the time that they occur. So two people can be an outbreak?

MR. GIRARD: And that's the definition you're using when you use the term outbreak?

DR. DOREVITCH: Well, I think I've used outbreak and epidemic probably more than once, and I think in one context I was talking specifically about that surveillance system, but more broadly, an outbreak has a pretty general definition. It's a greater number of cases than expected, and it isn't more rigorous than that in terms of it has to be ten times more than expected or twice the number expected. So I'm using it in both senses that on the CAWS or other local waters, it's entirely possible that outbreaks occur, whether it's the two-case definition or greater than expected. But these have not been recognized by state, local, or federal public health surveillance agencies.

MR. GIRARD: So in general, we've got two definitions here going on. I mean, we've got the specific one from the CBC, and then we've also got -- I think you said the very general definition of what an outbreak is.

DR. DOREVITCH: Yes.

MR. GIRARD: Thank you.

MS. TIPSORD: Mr. Harley, you had a followup?

MR. HARLEY: Calling your attention to Exhibit 99, which was introduced into evidence by the Water Reclamation District, it's the effects of wastewater disinfection on human health, of which Dr. Blatchley was one of the authors. There's a statement in that report 11 pages from the end in the risk assessment section that we were discussing before the break. It states --

MR. ANDES: Let me just grab that, okay?

MR. HARLEY: Sure. Looking in the second full paragraph, about halfway through that paragraph, it states as few as ten percent of outbreaks have been documented, and putting that into context of the previous sentence, we're talking

about reported waterborne outbreaks in the United States. Would you agree with that statement?

DR. DOREVITCH: That's possible.

MR. HARLEY: Is that consistent --

DR. DOREVITCH: It may be ten percent. I don't think it's really known. I don't really think -- you know, it's sort of -- we don't know what the denominator is. We know how many outbreaks are captured by the surveillance system on -- for 2005, 2006, there were, I think, 78 outbreaks reported nationally in terms of recreational water. We don't know if that -- if it were 78 out of 780, it's ten percent. But we don't really know if it's 780 or 280 or 1,000.

MR. HARLEY: The following sentence refers specifically to gastrointestinal illnesses. It says "Gastrointestinal illnesses are largely unreported due to the lesser severity of illness in healthy individuals." Would you agree with that statement?

DR. DOREVITCH: I'm not exactly sure what the context is, but it's true that the majority of cases of gastrointestinal illness do not result in notification of public health authorities.

MR. HARLEY: Are you familiar with the Geosyntec risk assessment? I believe you testified that you are.

DR. DOREVITCH: Yeah. I've seen that, yes.

MR. HARLEY: And you're familiar, though, with the fact that in that report the focus is gastrointestinal illness?

DR. DOREVITCH: Yes.

MR. HARLEY: Thank you.

MR. ANDES: If I can follow up on a couple things. One is if you can help us understand, a risk assessment, am I right, is not intended to reflect, sort of, actual exposure. In fact, the epidemiologic study is what's intended to look at what's really going on on the ground. Can you -- what's --

DR. DOREVITCH: Well, I think the -- I think risk assessment and epidemiologic studies are two different approaches to getting at some of the questions. Both kinds of study could try to determine what our rates of illness in an epidemiologic study, that would be directly measured in a risk assessment that would be modeled. So

there are two different ways of getting at the same question.

MS. ALEXANDER: Just a quick followup regarding the risk assessment that I believe I neglected to ask earlier. You testified that you reviewed the risk assessment in draft. Did you have any comments on it at that time?

MR. ANDES: I think it might have been the interim report, which it wasn't actually a draft.

MS. ALEXANDER: I don't believe so. I believe -- actually, well, I should ask you. Was it the interim report that you reviewed, or was it a draft of the final report?

DR. DOREVITCH: No. It wasn't a draft of the final report. I don't remember for sure what was available in February of '07, but if -- I don't know if it was interim or draft, but it was the dry weather risk assessment, and it may have been the interim report.

MS. ALEXANDER: Okay. If it was dry weather in your graph, it was in the interim report.

MS. TIPSORD: For the record, that's Exhibit 76.

MS. ALEXANDER: Okay. I'll ask my question generally. Did you have any comments on either the interim or the final risk assessment when you reviewed it?

DR. DOREVITCH: No.

MS. ALEXANDER: Okay. I'd like to move on to pre-filed question six, which refers to the statement on Page 4 of your testimony, second to the last sentence on that page. This is the first epidemiologic study of the risks of fishing, boating, rowing, and paddling. Have there, in fact, been -- or I should say I believe you identify in your overview at Page 7 previous epidemiologic studies concerning the risk of waterborne illness to nonprimary contact recreational users?

DR. DOREVITCH: Right.

MS. ALEXANDER: Okay. Did these studies find elevated risk of waterborne illness?

DR. DOREVITCH: Well, they didn't all find the same thing, and one of them wasn't really able to comment on elevated risk or not. There are three papers that I was referring to. It's Futrel (phonetic) 1992, which did find an elevated rate of illness in white water slalom canoeists, compared to

people canoeing on -- I'm sorry -- compared to people canoeing on a pristine water, and compared to people who are unexposed.

MR. ANDES: You have all three of these here.

DR. DOREVITCH: Futrel 1994 did not find elevated rates of illness in people who were in canoeing and rowing regattas or canoe marathon and rowing regattas, compared to people who were unexposed, and Lee 1997 didn't have an unexposed group. So they report a rate, but there isn't a reference in terms of what was going on in a similar population, were the rates of illness higher, lower, or the same.

MS. TIPSORD: We have a 1992 Help Steps of Whitewater Canoeing by L. Futrel, et al, from Lancet (phonetic).

MR. ANDES: I'm not sure that we had a complete copy of that.

MS. TIPSORD: Did we just have the first page of that?

MS. ALEXANDER: My copy was incomplete.

MS. TIPSORD: Okay. All right.

MS. ALEXANDER: So let's make it a complete copy.

DR. DOREVITCH: Yeah. It's a three-page paper.

MS. TIPSORD: Okay.

MR. ANDES: That's the first one.

MS. TIPSORD: Okay. And then I also have already in the record -- and again it may have been an incomplete -- Help Steps of Low-Contact Water Activities in Fresh and E-s-t-u-r-i-m-e Waters.

MR. ANDES: That's six pages.

MS. TIPSORD: Let's go ahead and enter it just to be on the safe side, because I don't have the actual exhibit with me. Sorry.

MR. ANDES: And that's the third one.

MS. TIPSORD: And actually before I enter this one -- I'm going to check at break, because I think this one is complete -- I think we do -- do you have your copy with you by chance?

MR. ANDES: I think I did introduce it earlier.

MS. TIPSORD: The 1994 document, the Health Effects of Low-Contact Water Activities, and

I think we entered it as Exhibit 79. I think that's the complete copy that's already admitted. The Lancet copy was only the first page.

MS. WILLIAMS: Do you have it?

MS. TIPSORD: Is that a copy of Exhibit 74? This is the new one he's given us. I think it's six pages. Yeah. We already have this -- the Health Effects of Low-Contact Water Activities by Futrel et al., is already admitted as Exhibit 79. That's from 1994. The Health Effects of Whitewater Canoeing by Futrel et al., the complete copy, we will mark as Exhibit 101, if there's no objection. Seeing none, it is Exhibit 101. And then the other document is, Doctor?

DR. DOREVITCH: Bacteriophages.

MS. TIPSORD: Bacteriophages are a Better Indicator of Illness Rates Than Bacteria Amongst Whitewater Fed by a Low Land River. This is from Pergemon (phonetic), is that correct?

DR. DOREVITCH: Lee. Oh, oh, the journal?

MS. TIPSORD: Yes.

DR. DOREVITCH: Water Science and

Technology.

MS. TIPSORD: Okay. From 1997, and I'll mark that as Exhibit 102 if there's no objection. Seeing none, it's Exhibit 102.

MS. ALEXANDER: Okay. Referring first to Exhibit 101, which is the 1992 Futrel study that you site in your study overview, am I correct that the research there concluded that white water canoer studies were 4.2 times more likely to experience a gastrointestinal illness than nonexposed individuals?

MR. ANDES: Where are you getting that from?

DR. DOREVITCH: Yeah, right. You're talking about table two, in an unadjusted analysis, right, that's what it showed, that GI symptoms were 4.25 times more common in the white water slalom canoeists, compared to people who did not participate in water recreation activity.

MS. ALEXANDER: Okay. Am I also correct in understanding that the fecal coliform content of the water was 185 colony forming units per 100 millimeters?

DR. DOREVITCH: It's 285.

MS. ALEXANDER: 285, I'm sorry. And now Exhibit 102, just so I understand, there was -- am I correct that the conclusion reflected on Page 169 of that study was the use of lowland water for white water canoeing results in a significant rate of gastrointestinal illness related to the microbiologies of the water?

DR. DOREVITCH: I'm sorry. I lost you. Which paper are we on?

MS. ALEXANDER: I'm sorry. We're now on Exhibit 102, bacteriophages are a better indicator.

DR. DOREVITCH: Oh, okay.

MS. ALEXANDER: The Lee paper.

DR. DOREVITCH: The Lett paper. And I'm sorry, would you mind repeating what you had read?

MS. ALEXANDER: Page 169, I just want to confirm that the conclusion stated at the bottom is, in fact, that use of lowland water for white water canoeing results in a significant rate of gastrointestinal illness, which is related to the microbiology of the water.

DR. DOREVITCH: That is what the

authors conclude. I have a little bit of an issue with the idea that they're calling it a significant rate. I think to know whether the rate is higher or lower or the same is a demographically similar group of people, you'd have to study those people, and they know what the rate of illness is among the people who are in the research. They don't really have a basis for comparison. So maybe it's one per thousand higher, or maybe it's one hundred per thousand higher than the general population, but there isn't enough information to know that.

MS. ALEXANDER: Okay. You also footnote, I believe, at page -- at Page 9 of your testimony, in Section 3.1.4, a study by Taylor, et al., in South Africa. Is that correct?

DR. DOREVITCH: Yes.

MS. ALEXANDER: Okay. And am I correct that the Taylor research concluded that canoers are 7.8 times more likely to show evidence of having been exposed to the waterborne pathogen at issue, in that case schistosoma?

DR. DOREVITCH: You know, I don't have that paper front of me, but that may be what they concluded. I -- you know, I don't think that that's

particularly relevant, because schistosomiasis is not a local waterborne disease.

MS. ALEXANDER: But it is a waterborne disease, correct?

DR. DOREVITCH: It sure is.

MS. ALEXANDER: Okay.

DR. DOREVITCH: But not something that we're trying to measure here, because it doesn't occur here.

MS. ALEXANDER: Now are you familiar with the 2007 study by Robert et al. that -- concluded that anglers washing fish in water infected with cryptosporidium had a mean probability of infection of 81 percent?

MR. ANDES: Are we going to introduce this as evidence?

MS. ALEXANDER: We're going to introduce it as an exhibit.

DR. DOREVITCH: I am familiar with that paper.

MS. ALEXANDER: Okay.

MS. TIPSORD: I'm sorry. Did you say you are familiar with it?

DR. DOREVITCH: I am.

MS. ALEXANDER: I would like to have marked this document with the cover page the Journal of Toxicology and Environmental Health.

MS. TIPSORD: And is this a complete copy of this?

MS. ALEXANDER: It appears to be to me.

MS. TIPSORD: Okay. If there's no objection, we'll mark the Journal of Toxicology and Environmental Health Part A --

DR. DOREVITCH: Probabilistic.

MS. TIPSORD: Probabilistic -- too many Bs in there, sorry -- of Cryptosporidium Exposure Among Baltimore Urban Anglers as Exhibit 103 if there's no objection. Seeing none, it's Exhibit 103 of -- the date is January 2007. Thank you.

MS. ALEXANDER: Am I correct that you did not site this study in the documents submitted in connection with your testimony? I'm not sure. There's 800 pages of them.

DR. DOREVITCH: I probably didn't. It's not an epidemiologic study, it's a risk assessment.

MS. ALEXANDER: Okay.

DR. DOREVITCH: And I -- in the context of the epidemiologic study that I'm doing, I want to know about risk assessments, but the primary focus, what's most immediately relevant, are the epidemiologic studies. So I do know about this study, but it didn't inform the design of the CHEERS study at all.

MS. ALEXANDER: Are you also familiar with the 1896 study by Dwailly et al. concerning windsurfing?

DR. DOREVITCH: I don't think so, no.

MS. ALEXANDER: Okay.

MR. ANDES: Can you spell Dwailly?

MS. ALEXANDER: That would be D-w-a-i-l-l-y, and this was the study in which participants were found to be six times more likely to experience diarrhea than nonexposed participants in water containing 1,000 colony forming units of fecal coliform.

MS. TIPSORD: I'm assuming that you have that with you, because he's unfamiliar with it.

MS. ALEXANDER: Okay.

MS. TIPSORD: So if you're going to

ask him about the content, you need to show it to him. I've been handed Public Health Briefs, Health Hazards associated with water, June 1986, which I will mark as Exhibit 104 if there's no objection. Seeing none, it is Exhibit 104.

MR. ANDES: Is there a question?

MS. ALEXANDER: Yes. I will reiterate the question. Well, let me ask it: Does this refresh your recollection at all as to whether you are familiar with this research?

DR. DOREVITCH: I haven't read this paper before. I probably ran across it in literature searches, but because wind surfing isn't among the recreational activities that we're interested in, I don't believe I've read it.

MS. ALEXANDER: Okay.

MS. WILLIAMS: Can I ask a followup on that? So if you were to come across a recreator on Lake Michigan whose primary activity is windsurfing, you wouldn't enroll them as a general use?

DR. DOREVITCH: Correct.

MS. WILLIAMS: Okay. What if they -- what if that was one of their activities? I mean, do you ask them about all the different activities

and differentiate?

DR. DOREVITCH: We ask them what they plan on doing before they start their recreational activity, and if it's one of the exclusionary activities, like swimming or water skiing, or I don't -- you know, any kind of activity that's going to cause somebody to -- you know, that's likely to result in head immersion, like wind surfing, that would not be eligible. Boogie boarding would be another one. So we ask people before they do their recreational activity what they're going to do, and then when they return for their second questionnaire, we ask them what they did, and if it was one of the exclusionary activities, then we don't continue with them in the study. They're not -- we don't do telephone followup on them.

MS. WILLIAMS: Okay. And what about -- so like if they were a canoer who decided to swim, you would then end up taking them out later when you found out they decided to go for a swim?

DR. DOREVITCH: When you say they decided to go for a swim, it sounds like you're talking about intentional swimming, as opposed to the canoe tipping over. So right, if they

intentionally swim, that's not part of what happens when somebody goes canoeing, that's what happens when somebody decides to swim. If the canoe tips over and they swim to shore, they remain in the study.

MS. WILLIAMS: Okay.

DR. DOREVITCH: That's part of the natural history of canoeing.

MS. WILLIAMS: And then where does jet skiing fall?

DR. DOREVITCH: Jet skiing is excluded.

MS. WILLIAMS: Thanks.

MS. ALEXANDER: Let me --

MR. ANDES: I'm sorry. I was just going to follow up on a couple of issues in terms of the Futrel studies we just talked about. Dr. Dorevitch, with regard to the white water canoeing, which is the issue studied in these reports, what's your assessment of the exposure characteristics of the white water canoeing versus, say, canoeing or kayaking on the CAWS?

DR. DOREVITCH: Well, I think it gets to what Ms. Alexander was saying, that people behave

differently in different settings and on the CAWS, I suspect that they're -- well, we'll see what the data shows, but they may be less likely to engage in, say, tipping over.

MR. ANDES: Do you have any --

DR. DOREVITCH: White water is -- you know, a white water slalom course with steep drops is very different than the CAWS, which is a low-flow water system, and I think that a white water slalom course is so different than the CAWS that I'm not sure to what degree you can take their findings of a white water slalom course and apply them to the CAWS.

MR. ANDES: And then even -- even in that circumstance, in the second Futrel study, 1994, the conclusion was the apparent lack of identifiable health effects in these studies suggest may be appropriate to use a for low-contact recreational activities, and that was even in a situation where we were talking about white water activity.

DR. DOREVITCH: Not white water. That was rowing regattas and canoe marathons to rivers and to estuary waters. But they did conclude that the apparent lack of identifiable health effects in

these studies suggested may be appropriate to use a relatively polluted water for low-contact recreational activities. So I think that among the three studies, two of them are about white water slalom activities. The one that found no increase in risk for gastrointestinal illness exposed versus unexposed, that's most relevant in terms of the type of water body would be the Futrel '94, because that is canoeing and rowing.

MR. ANDES: Thank you.

MS. WILLIAMS: Can I follow up again on what I had asked previously?

DR. DOREVITCH: Sure.

MS. WILLIAMS: So we talked about if someone was going to be jet skiing that's excluded.

DR. DOREVITCH: Right.

MS. WILLIAMS: So if you identify a recreator on the CAWS as jet skiing, would they be excluded also?

DR. DOREVITCH: Yeah. An exclusion criteria apply --

MS. WILLIAMS: Do you know --

DR. DOREVITCH: We have the same inclusion/exclusion criteria for CAWS waters and

other waters.

MS. WILLIAMS: Are you keeping track of how many caws recreators you're excluding because their activity is too much --

DR. DOREVITCH: Not incidental contact. Yeah, we do keep track of that.

MS. WILLIAMS: Okay.

DR. DOREVITCH: Yeah, I'm sorry. I didn't --

MS. WILLIAMS: No, no, I think you're following better than what I was expressing, what my question was. So do you know how many of those recreators you found so far, either as a number of or percentage?

DR. DOREVITCH: I have -- there was a summary of the 2007 data that was included with my testimony, and there were four jet skiers observed in -- out of 1,700 recreational observations. So it occurs, but not frequently, based on what we saw last year. But because the purpose of the reserve is to evaluate the health effects of incidental contact activities, we have these exclusionary criteria --

MS. WILLIAMS: Right.

DR. DOREVITCH: -- and it's not just about water recreation in general, so that we focus on canoeing, rowing, boating, and fishing.

MS. WILLIAMS: So -- but when you say that you're keeping track of activities that's included because it doesn't meet the study model, that's based on we saw a jet skier go by, not based on people you would interview, they're getting ready to go recreate?

DR. DOREVITCH: No, it's -- they're two different things.

MS. WILLIAMS: Okay.

DR. DOREVITCH: One is what we call the use survey, that there is a -- teams of about four to seven people go out to recruit and interview study participants, and one of them is designated the use survey person, and they have a tally, and they check, according to our protocol, new uses, new users, and that's counting how many people we see beginning a new recreational activity.

There is something different called the refusal tally, and that is when we -- when the recruiters approach somebody and they ask them to be in the study, somebody may not want to

participate. They may want to participate, but may be ineligible for various reasons, and they do track that as well.

MS. WILLIAMS: Okay. Thank you.

DR. DOREVITCH: Sure.

MS. WILLIAMS: Sorry if I got off track from Ms. Alexander's questions.

MS. ALEXANDER: Dr. Dorevitch, returning to this issue of your testimony concerning the difference between white water and flat water canoeing, essentially, are you aware of any research that has been done to quantify any differential between the amount of water likely to be ingested in one versus the other?

DR. DOREVITCH: I'm not aware of any research about water ingestion for any kind of canoeing, white water or flat water.

MS. ALEXANDER: Is it possible in your view that someone who falls into the water in a flat water contact could ingest as much or perhaps even more than somebody who's engaged in white water canoeing?

DR. DOREVITCH: You're asking me if it's possible?

MS. ALEXANDER: Yeah, in your view.

DR. DOREVITCH: On the level of an individual, an individual could fall in the water in a flat water situation and ingest more than somebody who falls in the water in a white water situation, sure. In terms of general observations, I don't think there's anything out there. You know, I don't -- there's no science to base that on.

MS. ALEXANDER: As a general matter, can you define what the parameters were for your literature survey? You mentioned a few things that you excluded because you didn't think they were relevant. What did you consider relevant for the survey?

DR. DOREVITCH: Well, all epidemiologic studies of water recreation were searched to the degree possible. There were two review articles in the last decade -- well, no, there were Pruse (phonetic), Annette Pruse, I believe in 1996 or 1998, and then there was Timothy Wade in 2003, and those were review articles of the health risks of water recreation, and those two articles cited literature, and then search engines, such as Pub Med and the -- something called the Web

of Science, Web of Knowledge, were searched using terms like canoeing, kayaking, rowing, fishing, boating, swimming, different recreational activities, epidemiology, health risks, water quality. These were some of the search terms that were used to review the -- to identify the literature, and some of those studies are more relevant than others. Some are about primary contact activities, while our interest is limited contact or incidental contact or secondary contact recreation. Some of them are marine settings as opposed to fresh water settings, but so I -- that was the approach.

MS. ALEXANDER: I believe you testified a moment ago that the reason you felt you might not have been familiar with the Dwailly study or might not have focused on it was that it concerned windsurfing, which is not a CAWS activity. What I would like to understand is whether there are any other categories of activities that may have been encompassed in the net of your literature search globally, as you described it, but were not carefully considered or were dismissed as not relevant to the review, besides wind surfing and

swimming and jet skiing, I think has been mentioned.

DR. DOREVITCH: Well, I wouldn't say those were dismissed and not reviewed. I've reviewed many of the swimming studies, especially the large epidemiologic studies. I believe that there's a report about -- it's either scuba diving or snorkeling, or maybe one of each that just were not about activities that take place on the CAWS and were not reviewed. I can't think of any others right now.

MS. ALEXANDER: Okay. What I'm trying to understand is what falls into this category of activities that do not take place on the CAWS that you excluded from further analysis? And you mentioned wind surfing in connection with Dwailly and you just mentioned snorkeling. Is there anything else? Did you exclude studies of fishing on that basis?

DR. DOREVITCH: I didn't say it's because they don't take place on the CAWS, it's because they're not incidental contact recreation, so --

MS. ALEXANDER: Okay.

DR. DOREVITCH: Fishing is incidental

contact recreation that was not excluded. That was something that was reviewed.

MR. ANDES: So let me follow up. There are two separate issues. One is what information was reviewed, and the other is what information is being factored into your work, and if you want to explain the process by which you developed this study and what information is being used in what way.

DR. DOREVITCH: Well, this study is based, more than anything else, on the USEPA's study called the NEER study, the National Epidemiological Environmental Study of Recreational -- now I'm getting confused. National Epidemiological --

MR. RAO: Environmental.

DR. DOREVITCH: Environmental -- thank you -- Assessment of Recreational Waters, and our study is based in many ways on that one, but it's based on others as well that use the perspective cohort design, such as the Futrel 1992, the Lee '97, the Futrel '94, other studies using different designs, such as the randomized control trials were also reviewed. But the ones that are particularly relevant to the development of this study were the

epidemiologic studies of cohort design, looking at recreational water, and if that study addressed incidental contact recreation, or was it very large study like the NEER study, those were reviewed more extensively.

MR. ANDES: And used in designing your study? Is that --

DR. DOREVITCH: They were reviewed in thinking about developing a design for this study. I wouldn't say that there's a particular study that we saw and said "This is what our study has to be." Futrel -- the two Futrel studies, Lee, there's a study of Colfert (phonetic), 2007, which is a perspective cohort study. That was only published after our project was under development, but that and the studies that Tim Wade has published in 2006 and 2008 have a lot of similarities in term of study design to the CHEERS study.

MS. ALEXANDER: And lastly, I just wanted to follow up briefly on Ms. Williams' line of questions. You mentioned that four jet skiers were excluded from the study. Are those -- just help me understand -- those were jet skiers on the CAWS, or was that four total in both the CAWS and in the

control water bodies?

DR. DOREVITCH: Well, I didn't say they were excluded. They were observed. They would've been excluded had they wanted to participate.

MS. ALEXANDER: Okay.

DR. DOREVITCH: But they were people who were observed --

MS. ALEXANDER: Okay.

DR. DOREVITCH: -- doing their jet skiing, and that was at the CAWS. That was -- two were observed at Worth and two were observed in Alsip, so four people.

MS. ALEXANDER: Okay. Did you also observe jet skiers on the control water bodies, Skokie Lagoons and Lake Michigan?

DR. DOREVITCH: Yes.

MS. ALEXANDER: Would you say you observed more jet skiers on those water bodies than on the CAWS?

DR. DOREVITCH: I would say that, yes. We don't track recreational use of the other water bodies. We track -- the use survey is only performed at the CAWS. The refusal tally is

performed at all locations, but the use survey is performed at the CAWS only. So I don't have hard numbers on that, but without a doubt, there's a lot more jet skiing at Lake Michigan, say, than on the CAWS.

MS. ALEXANDER: Can you give me just a general quantification of more, an estimate in your observation?

DR. DOREVITCH: A whole lot. I mean, I don't -- I don't have numbers. So I could make something up.

MS. ALEXANDER: Could it be more than 100 that you observed?

MR. ANDES: He just said he didn't know.

DR. DOREVITCH: You know, I --

MS. ALEXANDER: But he was there.

DR. DOREVITCH: Well, I'm not there all the time. But from the times that I've been out there, it's observed frequently. I'm hesitant to put a number on something that wasn't counted or even estimated, but it seemed commonly.

MS. ALEXANDER: Okay.

MR. ANDES: It's a great lake.

MR. JOHNSON: Let me ask a quick question, Doctor. Are you attempting to subcategorize the more active incidental contact activities and the more sedentary ones? Like, are you trying to keep equal numbers of each in both CAWS and non-CAWS categories?

DR. DOREVITCH: Well, the guiding principal in the CAWS group is that we want recruitment to reflect actual use. So if ten percent of the people are rowers, and --

MR. JOHNSON: That's what you're going to get outside of the CAWS. Okay.

DR. DOREVITCH: That's what we want to get in the CAWS. In the general use waters, you know, we don't tailor or recruit to, you know, say we need three more fisherman or something like that. From a statistical perspective, it would be great if we had even numbers of all recreational activities divided between the two groups. It's not going to come out that way, and when the interviewing teams are out there, we don't want them to have any kind of preconceived notions about "We want these guys in the study, but not those guys." Anybody doing eligible water recreation activities are to be

recruited into the study.

MR. JOHNSON: Do you see what I'm getting at? And I think the more active activities you're going to -- you're necessarily going to have less -- in my opinion -- less illness than you will in the more sedentary activities.

DR. DOREVITCH: That's a -- that's a possibility. We'll find out. You know, we'll see what the data shows.

MR. JOHNSON: Thank you.

DR. DOREVITCH: But those sort of analyses will be performed.

MS. ALEXANDER: I'd like to move on to pre-filed question seven.

MS. TIPSORD: In that case, Ms. Alexander, let's take a 10 minute break.

MS. ALEXANDER: Okay.

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

MS. TIPSORD: Miss Alexander, I think we're ready for your pre-filed question number seven for Dr. Dorevitch.

MS. ALEXANDER: Okay.

MS. TIPSORD: You know what, could we close the door? Thanks, Cecil.

MS. ALEXANDER: Okay. Dr. Dorevitch, pre-filed question seven concerns a statement at the top of Page 6 of your testimony, the first complete sentence, which is "If a participant develops illness, clinical specimens are collected so that the pathogen responsible for the illness may be identified." First question: Am I correct in understanding that you do not collect samples from participants who do not display symptoms of illness or report symptoms?

DR. DOREVITCH: That is correct.

MS. ALEXANDER: Okay.

DR. DOREVITCH: We don't advertise that fact. We -- what we tell participants is that some people will be selected for -- with a request to produce a sample for us. The people who do produce samples are given extra money for their time and effort, and we want to avoid a situation in which people will say "I'm sick. Here's a sample. Can I have the extra money?" So we don't tell people that only people with symptoms will be asked for samples. We -- our little secret here in this

room, then --

MR. JOHNSON: It's public record now, Doctor.

DR. DOREVITCH: Yeah. What we say is that some people will select -- will be selected. But, in fact, it's people with symptoms.

MS. WILLIAMS: I thought you'd be worried they wouldn't want to join if they had to give you a stool sample.

DR. DOREVITCH: They're joining, they're joining.

MS. ALEXANDER: Do infections -- well, I should say I believe you've testified that infections with waterborne pathogens do not, in fact, always cause symptoms. Is that correct?

DR. DOREVITCH: That is correct.

MS. ALEXANDER: And it's possible that a person who is infected with asymptomatic can infect others. Is that correct?

DR. DOREVITCH: That's theoretically correct.

MS. ALEXANDER: Okay.

DR. DOREVITCH: I couldn't -- I wouldn't think that would be very common, though. I

mean, the flip side of this is that is not everybody with symptoms of infection has an infection at all, so it does go both ways.

MR. ANDES: If I can follow up on that, Dr. Dorevitch, are there studies you relied on in terms of deciding not to collect samples from the people that don't exhibit symptoms?

DR. DOREVITCH: Yes. The -- there was a study published in 1991 by Jones in which stool samples were collected from people in a controlled exposure study at a marine beach in England, and they were asked to produce stool samples, all -- there were 276 people in the study, and everybody was asked to provide a stool sample, and out of all of the samples that were collected, only five samples from four people were positive for anything. So it seemed like a very low-yield exercise, and a lot of effort would've gone into selecting samples from a number of people who would have no symptoms of infection and no infection at all.

MR. ANDES: And we have copies of that report.

MS. ALEXANDER: Bear with me one second. I'm looking for a number.

MS. TIPSORD: I've been handed Results of the First Five-Scale Controlled Cohort Epidemiological Investigation Into the Possible Health Effects of Bathing in Sea Water at Langlin Bay (phonetic), by F. Jones et al. It's in 1991, I believe.

DR. DOREVITCH: Yes.

MS. TIPSORD: If there's no objection, we'll mark this as Exhibit 5 -- 105, thank you. Seeing none, it's Exhibit 105.

MS. ALEXANDER: Bear with me one second. I'll look for the number in followup.

MR. GIRARD: Can I just ask a quick followup then?

MS. ALEXANDER: Sure.

MR. GIRARD: In your study, Dr. Dorevitch, then if you do collect a stool sample and someone shows -- you know, shows positive for, say, salmonella, how would you know whether they got the salmonella by ingesting water in the CAWS or whether they got the salmonella from the food they ate?

DR. DOREVITCH: The short answer is at the level of an individual, I wouldn't know that. It's more about once we're looking at thousands of

people in each group that it would be possible to say the rate of infections confirmed on culture, whether it's salmonella or other pathogens, is higher in one group or equal in all groups.

MR. ANDES: And that includes your unexposed control group?

DR. DOREVITCH: Correct. But at the level of an individual, it isn't possible. We do ask questions about things people have eaten. The Futrel 1992 study found that people who ate hamburger were more likely to get sick. We asked people if they've eaten hamburger, we asked about ill contacts, we asked about eating fresh fruits and vegetables, we ask a series of questions that may help identify risk factors for illness, whether it's symptoms only or illness plus confirmation of infection by stool sample to identify non-water related causes or potential causes. And ultimately with the thousands of people in the study, we hope to be able to say after taking into account these foodborne exposures, or animal contacts, or other family contacts, whether water exposure or microbe levels in the water or locations or recreational activities are predictors of illness and infection.

MR. GIRARD: Thank you.
DR. DOREVITCH: You're welcome.
MS. TIPSORD: Ms. Dexter, did you have something?
MS. DEXTER: Hi.
DR. DOREVITCH: Hi.
MS. DEXTER: What would happen if there was an illness reported but no stool sample was collected? How does that data get reported?
DR. DOREVITCH: That's recorded as symptoms, but missing for -- in the presence of a cultured-confirmed infection. In other words, it's not considered negative and it's not considered positive, it's considered missing data.
MS. DEXTER: Okay. Thanks.
DR. DOREVITCH: Sure.
MS. ALEXANDER: Just one second.
MS. TIPSORD: Wonderful when they work, aren't they?
MS. ALEXANDER: Yes, aren't they. Would you agree that there are some pathogens that cause asymptomatic infection more frequently than they cause symptomatic infection?
DR. DOREVITCH: Are you talking

specifically about waterborne gastrointestinal pathogens?

MS. ALEXANDER: Waterborne pathogens.

DR. DOREVITCH: There probably are.

MS. ALEXANDER: Okay.

MR. ANDES: Any particular ones that you have in mind or that you have in mind of asking him about?

MS. ALEXANDER: What about rotavirus?

DR. DOREVITCH: That would be unlikely to be asymptomatic -- what I had in mind was helicobacter, the bacteria that's linked with ulcers and gastric cancers. That's typically asymptomatic, although it hasn't been described in the context of a recreational waterborne pathogen of concern. It is on the EPA's list of emerging contaminants, but we don't typically think that is a recreational -- a recreation as a significant route of exposure for that.

MS. ALEXANDER: So if a study participant were to become infected with a waterborne pathogen asymptomatically, would you know about it?

DR. DOREVITCH: No.

MS. ALEXANDER: Okay. If the asymptomatically infected participant then were to infect a friend or family member who became symptomatic, would you know about that infection, the secondary infection?

DR. DOREVITCH: We'd know something about it, because on telephone followup we ask about ill contacts. So that isn't really designed to track secondary cases of infection, but we do collect some information about that.

MS. ALEXANDER: Do you ask about all ill contacts, or only those within the household?

DR. DOREVITCH: I believe it's household contacts, but I'd have to look up that specific question to tell you the wording.

MS. ALEXANDER: Okay. So it would be fair to say then, though, that if someone became infected by a waterborne pathogen from CAWS recreation but didn't exhibit symptoms, you probably wouldn't find out about it. Is that correct?

DR. DOREVITCH: The -- like I mentioned, the model for the design of this study is the EPA's NEER study. They base their analyses on reporting of symptoms, and that's what we do. We

kind of go the extra step in terms of attempting to identify the pathogens responsible for illness, but there -- like I said, there are -- there may be people who have infections but no symptoms, and there may be people who have symptoms but no infections, and we're only able to identify the ones with symptoms and attempt to identify pathogens within that subset.

MS. ALEXANDER: Okay. Now you mentioned that you're following up on people in households. If a study participant reports that somebody they live with is sick, but that person that they live with is not a participant in this study, you would have no further way of finding out more about the nature of that person's illness. Is that correct?

DR. DOREVITCH: Yes, that is correct.

MS. ALEXANDER: Okay. Since you're not collecting stool samples from roommates, I assume?

DR. DOREVITCH: I hope we're not.

MS. ALEXANDER: I hope you're not. Okay. And you wouldn't be able to ask a battery of questions either to that nonparticipant, correct?

DR. DOREVITCH: Certainly not.

MS. ALEXANDER: Okay. Which viruses are you testing for in the stool samples? I'm sorry, this is pre-filed question eight.

DR. DOREVITCH: The viral testing would identify enterovirus, adenovirus, rotavirus, neurovirus, reovirus, influenzavirus A, influenzavirus B. It would also identify other viruses that are unlikely to be detected, but rhinovirus, parainfluenza virus, paramyxovirus, mumps, measles, varicella, and herpes viruses. And when I say not likely to be detected, I mean that they're not thought of typically as recreational waterborne pathogens in the United States.

MS. ALEXANDER: Did you -- are you testing for all adenoviruses, or just the enteric ones?

DR. DOREVITCH: I don't know the answer to that for sure. I'd have to check with the coinvestigator who runs the hospital microbiology laboratory.

MR. ANDES: What was the question again?

MS. ALEXANDER: Whether they're

testing stool samples for all adenoviruses or only enteric adenoviruses.

DR. DOREVITCH: Yeah. I don't think it's limited to zero types 40 and 41, if that's the question. I think it's broader than that.

MS. ALEXANDER: And, in fact, the nonenteric adenoviruses replicate in the gastrointestinal tract to your knowledge?

MR. ANDES: You're asking if the nonenteric adenoviruses --

MS. ALEXANDER: Yeah. Do nonenteric adenoviruses replicate in the gastrointestinal tract?

DR. DOREVITCH: I don't know the answer to that for sure.

MS. ALEXANDER: Do you know whether they're shedding feces?

DR. DOREVITCH: I don't know.

MS. ALEXANDER: Okay.

DR. DOREVITCH: I can say that this is a very large research team doing this project. There are two infectious disease physicians, an infectious disease epidemiologist, the director of a hospital microbiology laboratory, we work with the

Illinois Department of Public Health's microbiology laboratory. So there are members of the research team who would have the answer to that question, but on the tip of my fingers I don't.

MR. ANDES: We can certainly get back to you on that.

MS. ALEXANDER: Okay. Moving on then to pre-filed question nine, this actually refers to the chart following your testimony in which you illustrate the data on recruitment. Let me just pull up that chart myself. And your testimony -- of course I'm referring to Exhibit 100, and the chart I am referencing is CHEERS monthly enrollment of 44 -- 4,402 participants by group through July 2008. Sub question A, do you have a breakdown of how many participants you have reflecting each type of recreational use?

DR. DOREVITCH: I have that for 2007, but we're still collecting 2008 data. So I don't have that -- let me see that.

MR. ANDES: Is that the one --

DR. DOREVITCH: That's -- you're talking about uses in which study participants are engaged in, or are you talking about uses of the

waterway that are observed by our staff?

MS. ALEXANDER: The former, uses in which --

DR. DOREVITCH: The breakdown of uses amongst study participants?

MS. ALEXANDER: Correct.

DR. DOREVITCH: Yeah. I have that for 2007, but we're still collecting data on 2008. I don't have that.

MS. ALEXANDER: Okay.

MR. ANDES: And that's not it?

DR. DOREVITCH: It's not that.

MS. ALEXANDER: Are we about to put up a chart?

MR. ANDES: We're checking. We don't have a chart, but we do have a handout.

MS. ALEXANDER: Okay.

MR. ANDES: Here's a bunch of copies.

MS. TIPSORD: I've been handed two charts, one titled CAWS Activity Distribution of 2007, and the second is GUV, which is General Use Waters, I assume. Is that correct?

DR. DOREVITCH: Right.

MS. TIPSORD: Activity Distribution,

2007, and I will mark this as Exhibit 106 if there's no objection. Seeing none, it's Exhibit 106. And just to clear up my confusion, this is actual information --

DR. DOREVITCH: Study participants.

MS. TIPSORD: -- from your study participants, not observations?

DR. DOREVITCH: Study participants, correct.

MS. ALEXANDER: Now is it possible -- I'm sorry. Has this been marked yet?

MS. TIPSORD: Yes, it's Exhibit 106.

MS. ALEXANDER: 106. Okay. Referring to Exhibit 106, that's been handed out, do you have a general sense of whether these numbers are holding approximately steady in 2008, or have you simply not counted at this point the 2008 users?

DR. DOREVITCH: The one change that I -- I'm sure we'll see is that there's more fishing in -- among the CAWS group, a higher percent this year versus last.

MS. ALEXANDER: Okay. Do you know of any reason one way or the other why that's the case?

DR. DOREVITCH: This year, the -- we

recruited at the mayor's fishing events along the main stem of the Chicago River, and between those locations and other CAWS locations, I'd estimate that we've recruited about 200 CAWS anglers at this point. That's an estimate, but next year when the 2008 data are put into pie charts like this, the fishing for the CAWS group would be considerably larger than the less than one percent that it was last year.

MS. ALEXANDER: Okay. Do you have any knowledge as to whether in the -- this larger number of anglers who reported subsequently if among that group there are substantial members who are fishing from shore as opposed to fishing from boats?

DR. DOREVITCH: Those are fishing from shore.

MS. ALEXANDER: Okay.

DR. DOREVITCH: The events on the main stem are fishing from shore events.

MS. ALEXANDER: Okay.

DR. DOREVITCH: There are other anglers fishing from shore that we've recruited this year at River Park and Origins Park on the CAWS, so I suspect there's more fishing from shore than

fishing from boat.

MS. ALEXANDER: Could I then refer, please, to Page 7 of your pre-filed testimony, where the second line from the bottom you make the statement "Fishing from shore is relatively uncommon." Is that statement still accurate?

DR. DOREVITCH: It's still accurate. In the context of all recreational activity going on on the CAWS, 200 people is still a relatively small percent.

MS. ALEXANDER: Okay. So you mean relatively compared to all activity, not relatively compared to all angling activity?

DR. DOREVITCH: All angling activity is not rare in relation to all angling activities. But, you know, the angling on the CAWS is rare compared to all of the incidental contact recreational activity that takes place on the CAWS.

MS. ALEXANDER: Right. But more than.

DR. DOREVITCH: It is rare --

MS. ALEXANDER: But -- sorry.

DR. DOREVITCH: It's rare in that the kayakers and the rowers and the boaters take up much more of the pie than the anglers.

MS. ALEXANDER: Okay. But more anglers than not are fishing from shore, you testified. Is that correct?

DR. DOREVITCH: That's my impression.

MS. ALEXANDER: Okay.

DR. DOREVITCH: We'll see what the analysis shows, but that's my impression.

MS. ALEXANDER: Do you have any numbers -- this is sub question B on question 9 -- do you have any numbers at this point regarding the number of users who fell into the water during recreational activity?

DR. DOREVITCH: That I don't have yet. Those analyses for 2007 haven't been performed, but they will be in 2007 and 2008. We will be tracking that.

MS. ALEXANDER: Okay. Short of analyses and formal counts, as it were, do you have any impression having looked at the data in the questionnaire responses yourself?

DR. DOREVITCH: I couldn't -- I haven't looked at that part of the data. I'd say from my own experience last year interviewing people and teaching other people to interview, and then

this year, sort of, supervising the managers as they are doing the field work, I think it's pretty uncommon, but I couldn't tell you whether it's 1 percent or 5 percent. I don't know, but it's atypical.

MS. ALEXANDER: Okay. Do you have any data on the number and age of children participating in this study?

DR. DOREVITCH: Again, I don't have 2008 data. I do have some summary statistics about age distribution from 2007.

MS. ALEXANDER: You have that in a document --

DR. DOREVITCH: I do, yes.

MS. ALEXANDER: -- that Mr. Andes is waiving?

DR. DOREVITCH: Yes.

MR. ANDES: Waiving is such a negative term.

MS. ALEXANDER: I would never intentionally be negative.

MS. TIPSORD: I've been handed two pages, which has Figure 1, Figure 2, and Figure 3. Figure 1 is age distribution of unexposed

participants, 2007. Age distribution of CAWS participants, 2007, is Figure 2, and Figure 3 is age distribution of GUW participants, 2007. If there's no objection, we'll mark this as Exhibit 107. Seeing none, it's Exhibit 107.

DR. DOREVITCH: Is -- this doesn't exactly answer your question about how many children, but this is a bar chart that shows the numbers of people recruited in different age groups, and the two bars to the left on all three of -- the two bars to the left on the Figure 1 and Figure 2 are children. Figure 3, the bar on the left is children. Part of the second bar to the left also includes children.

MS. ALEXANDER: Okay. One quick question on the second page of Exhibit 10, what does GUW stand for again?

DR. DOREVITCH: General use water.

MS. ALEXANDER: Oh, right. Okay. I am observing on Exhibit 107 that the numbers on the horizontal access are not identical. In other words, in Figure 1, you appear to be starting with age four, or range surrounding age four on the horizontal access, where as in Figure 2 you're

starting with age eight, and in Figure 3 you're starting with age twelve. Am I correct in interpreting these?

DR. DOREVITCH: You're correct. This is sort of a quirk of the statistical program. This is certainly not our final report, but when the software generates these frequency distributions, it, sort of, has its own logic about how wide each age -- you know, how wide each bar should be. So you're right, this is not an apples to apples comparison. This is only ten percent of the -- less than ten percent of the enrollment in the study. So it's far from the final word, but it does paint a picture that -- I think to generalize it a bit, it shows that there's a wide spectrum for all three groups.

For all three groups, the bulk of the participants are in their 20s, 30s, 40s, and 50s. In the CAWS group, which is Figure 2, the bottom one on the first page, there's this big spike centered around 16 years in age, which are the high school rowing teams. So the three groups, just from eyeballing it, are not identical, but there are folks at the -- at both extremes of the age spectrum

in all three groups, and the general distributions are similar that the average age of the unexposed is 42 years old as opposed to 47 in the other two groups.

MS. ALEXANDER: Looking at Figure 1, it would appear that there is at least some small percent of participants in the unexposed group who are four years old. Am I interpreting that correctly?

DR. DOREVITCH: Yeah, yeah.

MS. ALEXANDER: Okay.

DR. DOREVITCH: Somewhere around four. It could be three or five, yeah.

MS. ALEXANDER: Do you know whether anyone that young participated in the study as a CAWS participant?

DR. DOREVITCH: No, I don't know that.

MS. ALEXANDER: So you wouldn't know what your youngest -- the age of your youngest CAWS participant?

DR. DOREVITCH: I don't know what it is. The data hasn't been summarized in that way. They're -- yeah, I don't --

MS. ALEXANDER: Okay.

DR. DOREVITCH: I don't know the answer for sure.

MS. ALEXANDER: Do you have any data on the number of pregnant women participating in this study?

DR. DOREVITCH: We collect that information, but that has not been summarized.

MS. ALEXANDER: Okay. Do you know if you have any pregnant women participating?

DR. DOREVITCH: I don't know that. I imagine that it's a small percent, but I don't know if we have any or not.

MR. ANDES: Did you ask the question?

DR. DOREVITCH: We asked the question. We certainly approach everybody, and if there are pregnant women out there and they're engaging in the relevant recreational activities and they don't meet any exclusionary criteria, they would be recruited into the study. If they're not there, then they're not recruited, or if they're not interested or they're not eligible they're not --

MS. ALEXANDER: Okay. So you're just testifying that you don't know one way or the other whether you actually did, in fact, recruit any

pregnant women?

DR. DOREVITCH: Not until that data's been analyzed.

MS. ALEXANDER: Subsection E, question nine, do you have any data on the number of immunocompromised persons participating in this study?

DR. DOREVITCH: Again, that's not been something that's been summarized, but we do ask people if they have any health condition that makes them susceptible to infection. Beyond that, we don't ask specifically "Do you have AIDS, or have you received an organ transplant, or are you on dialysis," et cetera. But we ask that question, and we have basic demographic information about people, and we will look at those subgroups to see if there is a difference in risk that's detectable based on the number of people who are in those categories, or that category, I should say.

MS. ALEXANDER: I'm sorry. And do -- am I correct in understanding that that data would be based on the self-purporting of themselves being within that category?

DR. DOREVITCH: Correct.

MS. ALEXANDER: Okay.

DR. DOREVITCH: We don't do any testing to see whose immune system is weak and whose isn't. We rely on self-purported information.

MS. ALEXANDER: So if someone was HIV, you wouldn't otherwise know?

DR. DOREVITCH: Well, we don't ask them if they're HIV positive, but we ask them if they have any condition that makes them susceptible to infection, just like any question on any questionnaire, it depends on people's honesty in answering that, and that would imply across the board to the three groups of study participants.

MR. ANDES: I don't think they can legally ask that question anyway, could they?

MS. ALEXANDER: I doubt they could. My question, then, is: Do you know at this stage whether anybody has answered yes to that question as to whether they have any condition that would render them immunocompromised?

DR. DOREVITCH: No, I don't know.

MS. ALEXANDER: What percent of the population overall do you believe is immunocompromised, I should say, within the CAWS

study area?

DR. DOREVITCH: What's immunocompromised. I mean, do you mean HIV positive, do you mean AIDS, do you mean under the age of five? What's immunocompromised?

MS. ALEXANDER: I would put all of the above in that. I would include elderly, pregnant women, immunocompromised by virtue of a health condition, which would include the dialysis, chemotherapy, HIV, and children. What percent of the population would you say that encompasses?

DR. DOREVITCH: Yeah. I don't -- I don't know what percent all those groups comprise. I don't know.

MS. ALEXANDER: Okay. Would you have any reason to disagree with testimony by Dr. Charles Gerba in this proceeding, which was that you estimated the percent at around -- I believe it was 25. I'm sure Mr. Andes will correct me if I'm misspeaking.

MR. ANDES: I don't -- I don't recall what the exact statement was by Dr. Gerber, so it's hard for me to object or not, and we can't really read it back.

MS. ALEXANDER: Let me frame my question -- well, first of all, I'll give you an opportunity to answer that.

DR. DOREVITCH: Well, if the question were do I think about 25 percent of the population falls into those categories, I'd say, you know, age under a certain point, age above a certain point, plus those medical conditions, that might be right. I'm not sure that all of those categories are an increased risk for contracting waterborne illness in an incidental contact setting, but it may be that 25 percent of the population falls into one of those categories.

MR. ANDES: Do we have any basis for thinking that a lot of infants and very old people are recreating in canoes and kayaks on the CAWS?

DR. DOREVITCH: You know, I couldn't tell you if there are infants. The resolution on this graph is limited, so I don't know.

MR. ANDES: But the numbers at either end are much lower than the middle?

DR. DOREVITCH: Right. We're talking about 2 or 3 percent would be on the extremes of the age spectrum.

MS. ALEXANDER: Is it possible in your view that immunocompromised persons, and by that I would include the entire category of individuals I listed, currently avoid recreation on the CAWS more than they would avoid your control water bodies of the Skokie Lagoons and Lake Michigan?

DR. DOREVITCH: I'd have no way of knowing that.

MS. ALEXANDER: Okay. Or whether it's possible that parents might be willing -- more willing to take their children on Lake Michigan than they would the CAWS?

MR. ANDES: That's speculation.

DR. DOREVITCH: We do ask people at all locations what they think the health risks are of recreating at the Chicago River System and on other general use waters. So at the end of the study, we will be able to say something about risk perception, but specifically people who choose not to send their children or themselves to recreate on the CAWS, there -- you know, this study isn't designed to answer that question, and I have no way of knowing that.

MS. WILLIAMS: I'd like to ask a

followup.

DR. DOREVITCH: Sure.

MS. WILLIAMS: Mr. Andes was asking you to look at Exhibit 107 and to make conclusions about the percentage of recreators in different age groups, correct? This chart doesn't talk about total percentage of recreators, does it? Doesn't it just talk about people who are enrolled participants in the study?

DR. DOREVITCH: This is only about people enrolled in the study.

MS. WILLIAMS: Okay. Thank you.

DR. DOREVITCH: I'm not sure what -- if he meant in the study or out there total.

MS. WILLIAMS: Okay. I just wanted to --

DR. DOREVITCH: But this graph is people enrolled in the study.

MS. WILLIAMS: Okay. I just wanted to clarify that.

MS. ALEXANDER: And is it your understanding that there is a subset of users, such as rowing teams, who recreate on the CAWS frequently, as many as 100 to 200 times per year?

DR. DOREVITCH: Yes.

MS. ALEXANDER: Okay. Do you have data on the number of those persons participating in the study?

DR. DOREVITCH: No. That's not something that's been summarized at this point. But again, it will be.

MR. ANDES: And if I can follow up, but in the project you've made an effort to reach out to those groups. Am I right?

DR. DOREVITCH: We -- we make an effort to recruit people on the CAWS where they are, doing what they do, to the degree that rowing teams comprise a large percent of the users of the CAWS. We work with rowing clubs and teams and try to recruit them.

MS. ALEXANDER: Okay. Sorry. Okay. I'm going to come back to Question 10. Moving on to Question 11 -- wait, hold on. That may be asked and answered. Yeah. Question 11 B, do you have any jet skiers enrolled, or did you say that you excluded all jet skiers of any kind?

DR. DOREVITCH: All jet skis are excluded.

MS. ALEXANDER: Okay.
MS. WILLIAMS: Would wading -- is wading excluded, just to finish up on that topic?
DR. DOREVITCH: If somebody is an angler, for example --
MS. WILLIAMS: Okay.
DR. DOREVITCH: -- who steps on the shore and off the shore into the water, they are not excluded. We would ask them questions about their wading, whether they're wearing hip boots, and questions to help characterize their exposure. But no, if somebody's going to be fishing, we don't say "Will you be wading in the water and if so, you're excluded." They remain eligible to participate in this study.
MS. WILLIAMS: Thank you.
DR. DOREVITCH: You're welcome.
MS. ALEXANDER: But you would not be studying, as I understand it, per se, children who just wade into the water knee-deep can come out, again, just for the purpose of wading. Is that correct?
MR. ANDES: Where would that take place?

MS. ALEXANDER: Clark Park, River Park.

DR. DOREVITCH: I don't think we've encountered that. I don't know for sure. Let me -- let me check one of my documents.

MR. ANDES: We can get back to you on that.

MS. ALEXANDER: Okay. All right. Moving on to Question 12, which refers to the statement on Page 8, "That preliminary analysis of the 2007 data identifies no difference in rates of gastrointestinal symptoms among recreators in the three study groups." Did you attempt to determine whether there is a difference in rates of any other types of symptoms?

DR. DOREVITCH: No.

MS. ALEXANDER: Okay.

DR. DOREVITCH: That will be done as the analyses proceeds when the data set's complete, but no, that hasn't been done for 2007.

MS. ALEXANDER: Okay. In view of the attempts you've described to minimize bias in reporting by participants being aware of the study's objectives, are you concerned that making these

preliminary results known at this point could introduce bias?

DR. DOREVITCH: Well, we certainly don't talk to the study participants about what we're finding. You know, I think this was stated in the context of a regulatory proceeding in very general terms, and continued as preliminary findings just from 2007. I think if we were to, say, tell study participants we expect 5 percent of you to get sick or we expect 95 percent of you to get sick, that could certainly bias them, where if we told one group but not others information like that. But what we tell people is that we don't know the health risks of water recreation in this setting, and we're doing this research to find out, and I don't think this changes that at all.

MS. ALEXANDER: Well, wouldn't it be the case that if study participants were made aware of this statement -- through whatever channels they might learn of a public hearing -- that it could, in fact, bias the study?

DR. DOREVITCH: I don't see which direction it would bias the study. I mean, we're not saying that we expect rates of illness to be

high or low. I don't think that this is going to cause people to change the way they respond when we interview them.

MS. ALEXANDER: Isn't it possible that someone who believed that the results were going in a negative direction would be less likely to report an illness because they would simply assume it was not significant or not attributable to the CAWS?

DR. DOREVITCH: I don't see why that would help them. I think if somebody's asked "Have you developed any of the following symptoms," you know, with no information about what we expect them to say, I don't see how that's going to change the way anybody responds to that question. They certainly -- my statement is not about what we found in this research. This is the final word. We're not -- you know, I'm not saying anything about safe or unsafe, risky or not risky. I think this is pretty general and limited and qualified, and it isn't something that's discussed in the recruitment and interviewing process. So no, I don't think that's going to bias people.

MS. TIPSORD: Can I ask a question?

DR. DOREVITCH: Yes.

MS. TIPSORD: You don't only call -- in doing your study -- and I apologize if I'm covering stuff that's in the testimony, because I think I'm getting a little confused here -- but for -- you have participants who enroll, and you do phone followups. You don't just talk to people who call you and say "Hey, we got sick," right? You call a sampling of the participants?

DR. DOREVITCH: Yeah. I wonder if I could -- I have a flow diagram --

MS. TIPSORD: Sure.

DR. DOREVITCH: -- of how it works. But we call every single participant.

MS. TIPSORD: Okay.

DR. DOREVITCH: We do provide everybody with information about how to contact the research nurse if they do develop symptoms, but we're not relying on people to call us. We call every single person.

MS. TIPSORD: And I would assume that your -- I don't know if there's a questionnaire in your stuff, but I would assume your questionnaire is set up in such a way that even if someone were to want to mislead you on findings, there are enough

questions in there that would lead you to the correct answer, I guess, is the best way to say it hopefully.

DR. DOREVITCH: I think if somebody really deliberately wanted to provide wrong information, they would. You know, I think that -- I would expect those numbers to be small, and, you know, I would expect them to be distributed among the three groups and maybe distributed among people who want to over report and under report. But if somebody wanted to deceive us, it wouldn't be easy to catch that.

MS. TIPSORD: Okay.

DR. DOREVITCH: Yeah. If it would help, I could walk you through the steps involved. I don't know if -- can you see this?

MS. TIPSORD: He's actually getting ready to hand a hard copy of it.

DR. DOREVITCH: Oh, okay. In that case, I'll wait until everybody has a copy. And this figure comes from the protocol documents that were already submitted with my pre-filed testimony. This is in the overview document, but starting at the top left --

MS. TIPSORD: Okay. Dr. Dorevitch, let me mark this as Exhibit 108 if there's no objection, and this is a flow chart describing study participant activities, environmental sampling, and laboratory analysis. Seeing no objection, it's Exhibit 108.

DR. DOREVITCH: Starting with the left column, study participant activities at the top, initially there is -- there are recruitment activities, and even prior to the day of recreation, we have a full-time recruitment coordinator who is in touch with clubs and teams, and organizations that run water recreation activities, as well as organizations that have nonexposed activities, and we work with them in advance.

On the day the recreation recruitment takes place, there's an eligibility screen to make sure that only people eligible are enrolled. There's a consent process. The university's research ethics board called the IRB, the Institutional Review Board, reviews all of our procedures, and there's a sign consent document that adults will sign for themselves and their children. There's also an assent document that children above

a certain age will sign for themselves along with their parents' consent.

Once consented individuals would go through -- would be interviewed with a pre-recreation survey that's called Field Interview A. The field interviews are done on laptop computers in the field. There's a fixed script, and there's a logic to the way the questions follow one another. Depending on how somebody responds to the first question, it'll dictate what their second question is. But it's -- it's standardized, so that all interviews are saying the same words.

People in Field Interview A will provide some basic demographic information, and then they go out and do their recreational activity. For the Field Interview B, after water recreation -- everybody who does Field Interview B is at that point asked a lot of questions about some of the things I mentioned about "Did you eat hamburger in the last few days, have you had contact with animals, have you had fresh fruits or vegetables, are you -- do you have certain underlying health conditions, do you currently have any gastrointestinal or other symptoms."

And then for the people who did have a water recreation activity, there are a lot of questions about the water contact itself, and those are the "Did you get water on your face, did you get water on your mouth, how much did you get on your mouth, did you swallow the water, did you eat or drink while you were doing your activity," et cetera. And that's where the questions are about the hip boots and wading, that's where the questions are about capsizing, and that interview is complete. A participant at that point gets a CHEERS T-shirt and a Target gift card, and, you know, some information, "Don't forget we'll be calling you 2, 5, and 21 days from now."

They then -- a mailing then goes out to them where they get a fridge magnet, a CHEERS fridge magnet with the phone number of our research nurse, and again, just sort of a reminder, "Don't forget we'll be calling you." We ask people what day -- what times of day would you want to get your call, and we make every effort to reach them when it's convenient for them, and then they get phone calls on days 2, 5, and 21, which inquire about subsequent development of symptoms. They -- all

those surveys go -- start something like "Since we last spoke," so that might mean "Since we last spoke to you while you were out at Clark Park," or it could mean since we last spoke two days ago -- or three days ago on the phone, have you developed any of the following new symptoms, and have you had any subsequent water contact," and mainly the focus there is on the health points.

Going down to the bottom of that column, if it's a telephone interview, either we call them or somebody calls us reporting "I have certain symptoms," we collect a stool sample. If it's an eye infection or drainage from a skin infection, a nurse goes to their home and collects a swab of that, and then those samples, moving to the right of the figure, will go to the laboratory for analyses, and then during recreation, water sampling is done for a variety of pathogens and pathogen indicators. So that's the study flow in a nutshell.

MS. ALEXANDER: A quick followup on that, what protocol do you ask people to follow in collection of their own -- of their stool samples?

DR. DOREVITCH: The University of Illinois Hospital has a standard stool kit and a

standard set of instructions that come from the manufacturer, and we provide that simple information. We have a nurse available to answer phone calls, but those -- those kinds of questions are generally rare, and they call the phone number when they have the sample ready, and a courier comes to their house and brings it immediately to the hospital for analysis.

MS. ALEXANDER: Are they required to refrigerate their sample before you collect it?

DR. DOREVITCH: No.

MS. ALEXANDER: Okay.

DR. DOREVITCH: They're -- we just ask them just to call us right away, and a courier will come to their house in under two hours. That -- they generally are able to get there in under an hour and pick up a sample and bring it to the hospital.

MS. ALEXANDER: Are you aware of any study participants who have declined to comply with this aspect of the study, the stool sample collection?

DR. DOREVITCH: Yes.

MS. ALEXANDER: Okay. Approximately

how many?

DR. DOREVITCH: Approximately 50 percent of the people who have symptoms that would trigger sample collection don't provide stool samples.

MS. ALEXANDER: Are you aware of participants who have dropped out for any other reason besides refusal to give stool samples?

DR. DOREVITCH: Well, refusal to give stool samples isn't dropping out of the study. The participation rate is very high. We -- in 2007, over 99 percent of the people who were eligible for telephone followup participated in at least one of the three telephone interviews. We can't -- it's not 99 percent for phone call on day 2, day 5, and day 21, but the vast majority participate in two or more telephone followup interviews.

MS. ALEXANDER: Okay. Has anyone declined to give other types of samples other than the stool samples, such as the swab of skin infections?

DR. DOREVITCH: Yes.

MS. ALEXANDER: Approximately how many?

DR. DOREVITCH: It's a small number. It's generally been because people will say -- the questions are somewhat broad, like drainage from a skin wound, there have been people who have recently had a biopsy and they're saying "Well, yes, I have drainage from a skin wound, but it has nothing to do with my water recreation." So we don't go out and -- you know, we certainly don't try to push that. Other times people will say "Oh, you know, my eyes are always crusty. It's my allergies. I don't really want to go through the trouble of having a sample collection. It's just my regular old allergies. Every day I have this."

MS. ALEXANDER: Approximately how often has that happened? You quantified it as relatively small, but can you estimate anymore closely?

DR. DOREVITCH: Well, I'm saying that the numbers are small. The number -- it's more common for symptoms to trigger stool sample collection than to trigger collection of eye or skin sample -- skin drainage samples. Maybe ten cases like that where samples weren't collected.

MS. ALEXANDER: Can you identify --

DR. DOREVITCH: But that's --
MS. ALEXANDER: Sorry.
DR. DOREVITCH: That's, kind of, a real rough estimate.
MS. ALEXANDER: Sure.
DR. DOREVITCH: I'm hesitant to -- you know, I'd like to just say when the data's analyzed properly, all these questions will be answered. But, you know, this is kind of a rough guesstimate that you're asking for.
MS. ALEXANDER: Understood. You stated a moment ago that you thought about half had declined to provide the stool samples. Can you give me any kind of a rough fractional estimate with respect to the other kind? Is it greater than that percent, or less than, or about the same?
DR. DOREVITCH: For what?
MS. ALEXANDER: For non-stool sample collections, refusal to participate.
DR. DOREVITCH: I couldn't say for sure. I don't know.
MS. ALEXANDER: All right. I have no further questions for Dr. Dorevitch at this time.
DR. DOREVITCH: If I could just answer

one of the questions you asked before when you asked about the review panel that -- the peer reviewers for the CHEER study, I forgot the name of Dr. Charlie McGee, Charles McGee, of the LA County Sanitation District. I think that's the proper name of his treatment work.

MR. ANDES: And what was the -- there was one question you asked that was -- I know we said we'd get back to you because he has to look at a document, but do you recall what that was?

MS. ALEXANDER: Yes. It was a question of whether you included in your study anyone who is wading with no other end purpose.

MR. ANDES: Oh, okay.

MS. TIPSORD: In that case, we'll move on to the IEPA.

MS. WILLIAMS: Okay. I think I'll ask -- I think I'll ask a followup question on your chart before I go back to my pre-filed questions, if that's okay.

DR. DOREVITCH: Sure.

MS. WILLIAMS: Can you just explain the box related to water sampling for indicators and pathogens? It's not obvious to me based on its

placement in the chart how that fits in time-wise with the other activities.

DR. DOREVITCH: If -- that box is parallel to the box that says recreation, so during water recreation, water sampling takes place, and the way that would work is that if -- we have interview recruitment teams, and then we have water sampling teams, and they're operating in a coordinated fashion, so that if there is recruitment going on at North Avenue from 8:00 a.m. to 8:00 p.m., there's water sampling going on there every two hours from 8:00 a.m. to 8:00 p.m. as well, and there's also water sampling that takes place upstream and downstream of the water reclamation plant upstream of the site. So if it were North Avenue, that would mean upstream of the north side plant, there would be water sampling as well. So there's access point sampling, and there's water reclamation point sampling.

MS. WILLIAMS: Okay. A couple of questions, then. Let's first talk about what parameters they're sampling for.

DR. DOREVITCH: Okay. There are physical, chemical measurements, like dissolved

oxygen temperature, PH, turbidity, conductivity, there are microbial measures of water quality, E. Coli, enrocoxi (phonetic), male-specific or F plus coliphages, somatic coliphages, zero typing of coliphages, and then there is sampling for giardia, cryptosporidium, and neurovirus.

MS. WILLIAMS: And are these samplers district samplers, or are they from the University?

DR. DOREVITCH: Everything is -- the district is not part of the research project.

MS. WILLIAMS: Okay. So the locations that you selected for your upstream and downstream water reclamation plant size, can you explain how that -- those choices were made and where they're located?

DR. DOREVITCH: Sure. It was based on combinations of logistics, what's possible and what's safe for our staff to get down close to the water with their equipment, and also maintaining enough of an upstream distance and trying to keep a similar downstream distance for the north side site and the Calumet plant. So at the north side power street plant, the upside -- the upstream side is at Bridge Street, which is about two and a half miles

upstream of Howard, and the downstream site is Lincoln Avenue, Lincoln Avenue Bridge, which has a ramp that a truck can drive down, and that's about a mile and a half downstream of the -- of the plant. For the Calumet plant, we sampled water at Beaubian Woods upstream, and Riverdale Marina downstream.

MS. WILLIAMS: Just a second. Have you --

DR. DOREVITCH: I think the -- this and the GPS coordinates of those sampling locations --

MS. WILLIAMS: Are in there.

DR. DOREVITCH: -- are in the protocol.

MS. WILLIAMS: I'm just trying to get a sense, a general sense, the location the CHEER study folks chose are different or similar in some ways chosen by the microbial risk assessment samplers. Do you know?

DR. DOREVITCH: I don't think they're the same.

MS. WILLIAMS: Yeah. They sound different, but I'm not sure how different. Okay. Well, we'll look at that a little bit. I think I'll

move back to my pre-filed questions. Question 1, Page 1, Paragraph 1, your pre-file testimony states that you're a medical doctor with training and board certification in emergency medicine, and also in preventative medicine. This training and certification in preventative medicine, would you recommend recreating a disinfected effluent?

MR. ANDES: Are you saying directly, like, at the pipe with the effluent coming out at him, or are we talking about in a waterway with all the disinfected effluent?

MS. WILLIAMS: Both.

DR. DOREVITCH: I wouldn't recommend sitting under the outfall and being directly exposed to effluent. If you're talking about limited contact recreation or incidental contact recreation, I would recommend doing outdoor recreation. I think physical activity is helpful, and I've done it on the CAWS, and I've done it with my family on the CAWS, and the research team has been out on the CAWS many times in inflatable motor boats, rafts, and I think that the -- there's a data gap in terms of how is that safe or isn't that safe, and when the study's done, we'll have an answer to that question.

But at this point, we don't.

MS. WILLIAMS: Did you take any special precautions when you took your family out, relative to if you were on a different waterway?

DR. DOREVITCH: I've taken them out on other waterways too. No, we didn't have any special precautions.

MS. WILLIAMS: My second question I'm going to reword a little bit, because I think it's unclear, but it's referring to a statement at the top of Page 2 of your testimony. "However, in the case of water recreation and limited contact recreation in particular, we're just beginning to develop the scientific data that will help define what regulatory measures are appropriate for protecting the health of the public." Can you be a little more specific for us when you say "We are just beginning to develop the scientific data?"

DR. DOREVITCH: Well, we -- the CHEERS study are collecting the data that would be useful for regulators in establishing water quality standards.

MS. WILLIAMS: Okay. So you were referring specifically to your study?

DR. DOREVITCH: For limited contact recreation, yes. I think we're the only study that's doing a limited or incidental or secondary contact epidemiologic study now.

MS. WILLIAMS: Can you explain a little bit in your view how the results of your city would be used by a regulator in developing?

DR. DOREVITCH: Sure.

MR. ANDES: No chart, but we do have an exhibit.

MS. TIPSORD: I've been handed a chart titled Example of Response Graph, which I'll mark as Exhibit 109 if there's no objection. Seeing none, it's Exhibit 109.

DR. DOREVITCH: Okay. So with this -- this graph is just a made-up example of what a response relationship might look like. Going across is microbe concentration. It could be more broadly water quality measure. It may be non-microbial like turbidity, and then going up is illness rate, and in this made-up graph, there's a straight line that shows with increasing microbe concentration, there's a higher rate of illness. In real life, the line might not be straight. It might go up and then

plateau, it might be flat, and then abruptly increase, but the CHEERS research study will end up producing graphs like this, and for a given measure of water quality or for a given difference between two water quality conditions, illness rates or differences in illness rates would be displayed. That would be the science behind regulation --

MS. WILLIAMS: And it would be the --

DR. DOREVITCH: -- in terms of what is an acceptable risk, where to draw a cutoff and say this illness level is acceptable, let's draw the line on the microbe side, you know, across to keep illness rate below that. That's more of a policy question or something for society in general to think about, you know, what's an acceptable risk and what's an unacceptable risk. So we would be doing the -- you know, we are developing the data that will generate graphs like this that will allow policy makers to identify what measure of water quality and at what level of that measure acceptable risks are protected and unacceptable risks are prevented.

MS. WILLIAMS: Do you think your study alone would be sufficient information for a

regulator to make their policy conclusion with?

DR. DOREVITCH: It would depend where the regulator is. If we're talking specifically about the CAWS, it's hard to imagine a more targeted research study to answer a local policy question. I think it's always nice to have more studies and bigger studies, but if, let's say, our results were applied to a marine beach for swimming, that would be a situation where I'd say more studies need to be done to figure out how relevant our findings are to that very different setting. But to apply our results from our setting to making policy in our setting, yes, I do think it would be sufficient.

MS. ALEXANDER: I have a quick followup to that.

MS. WILLIAMS: Okay.

MS. ALEXANDER: Sorry. Is it possible that a regulator would want to make policy based on something other than overall risk, for instance, risk to a specific subcategory, such as immunocompromised persons or people who fall in the water?

DR. DOREVITCH: Well, it sounds like a legal question, not even a policy question. I think

that the EPA standards for water recreation at beaches were based on the epidemiologic studies of Dufor (phonetic) and Cavelli (phonetic) where rates of illness in the study group were used to make policy, and not specifically, you know, children, immunocompromised, elderly, but overall.

MS. ALEXANDER: Perhaps I need to clarify my question. You made the statement, as I understand it, that you think that a comprehensive nature of this study makes it effectively sufficient as a basis for policy making. This study, being an essentially comprehensive risk -- a comprehensive epidemiological study, as it's been framed, isn't it possible that a regulator would want to look at something other than overall risk data in an epidemiological study, that they want to look at a risk to a more targeted subcategory in making their determination whether it was appropriate to regulate and reduce bacterial loading to the CAWS?

DR. DOREVITCH: It's possible that a regulator might want to do that. I don't know if -- what the implications of the Clean Water Act are for that question. But like I told you before, we do ask people about their age and if they have

underlying health conditions, and that data will be analyzed, and if there is an elevated risk, that's something that a policy maker can consider, but I'm not sure how the Clean Water Act would be applied.

MS. ALEXANDER: I'm not referring specifically to the Clean Water Act. It's a broader question, which is if, in fact, your result was negative for the popular across the board, hypothesizing that, but there was some indication that there was a higher risk to children or if there was an insufficient sample, for instance, with respect to children, or with respect to pregnant women or immunocompromised people, that a regulator might want to decide to protect for -- to protect those specific groups or to protect the subcategory of people who fall into the water, even if you had not, in fact, tested a significant sample of any of those people in your study?

MR. ANDES: We're getting really into legal speculation.

MS. ALEXANDER: No, that's policy.

MR. ANDES: He's not trying to set policy.

MS. ALEXANDER: Well, but he just

testified that he thought his study was the basis for setting policy --

MR. ANDES: Scientific --

MS. ALEXANDER: -- and I'm asking about other bases one might have for setting policy.

MR. ANDES: Is that an adequate scientific basis?

MS. ALEXANDER: Well, okay. But that's exactly the problem, is the epidemiological study as you're framing it an adequate scientific basis, in your view, to assess an overall risk. Is that correct? With the understanding that you're asking specific questions about subcategories of users, you're not trying to do an epidemiological study specifically of risks to immunocompromised persons, correct?

DR. DOREVITCH: Well, I'm trying to do an epidemiologic study that reflects current risks. So if there are a lot of pregnant immunocompromised women on the CAWS, we will be recruiting them, and our risk estimate will reflect that. If this subcategory is minimal in size, then I'm not sure it needs to reflect large numbers of people in that category if they aren't there.

MS. ALEXANDER: But isn't it possible that a subcategory that is not currently a frequent user of the CAWS, and therefore of which you would not have a statistically significant sample so as to assess risks to that subcategory, might be a category, such as children, that a regulator would want to protect, even if your research did not have conclusive findings as to the overall risks specifically to that subcategory?

DR. DOREVITCH: Well, we do involve a lot of children.

MS. ALEXANDER: I -- that's not what I said.

MR. ANDES: I think we're really --

MS. TIPSORD: I think we're beating a dead horse here. You're asking him is it possible. Is it possible?

DR. DOREVITCH: It is possible --

MS. TIPSORD: Is it possible that --

DR. DOREVITCH: -- that there will be not enough people in various subcategories, whether it's recreational activity or immune status to say definitively that they are or are not at increased risk.

MS. ALEXANDER: Just one followup on that, and then I will drop the dead horse.

MS. TIPSORD: I -- because you've asked the same question the same way four times, and you're not getting an answer, but go ahead.

MS. ALEXANDER: I will leave the dead horse alone after this, but am I correct in understanding that you're not purporting to do a risk assessment specifically of the risk -- I'm sorry -- an epidemiologic study specifically of the risk to any of these subcategories? In other words, you're not purporting to do an epidemiological study with the statistically sufficient sample of, say, children, to assess the risks specifically to children on the CAWS. Is that correct?

DR. DOREVITCH: The study is designed to characterize the risk of actual use. So to the degree that children make up a sizeable percent of all use, we will characterize risk to children.

MS. ALEXANDER: Okay. I promised to drop it, so I will.

MS. WILLIAMS: I'm just going to go back to the pre-filed question number three.

DR. DOREVITCH: Yes.

MS. WILLIAMS: There's some information in the beginning of your testimony discussing your experience in USEPA proceedings in the air context.

DR. DOREVITCH: Yes.

MS. WILLIAMS: And I'd just like to understand from that, are you suggesting that the scientific consensus that air pollution causes illness is more subtle than the scientific consensus that bacteria and pathogens cause illness?

DR. DOREVITCH: I --

MR. ANDES: That's really --

DR. DOREVITCH: What I'm saying is that there's a strong scientific consensus that air pollution causes illness. There is very, very little science to say whether or not incidental contact water recreation causes illness.

MS. WILLIAMS: Okay. But not whether bacteria and pathogens?

MR. ANDES: But his statement wasn't about bacteria and pathogens causing illness. I'd object to that characterization. It's not the point he tried to make.

MS. WILLIAMS: I think he can answer

the question though.

MR. ANDES: But it's --

MS. WILLIAMS: I mean it's not for you to say the point he was trying to make.

MR. ANDES: You're assuming there's a --

MS. WILLIAMS: It's a yes or no question.

DR. DOREVITCH: I didn't say anything that we're not sure if bacteria or pathogens cause illness. I think that's been well-established for several hundred years. Even before the microscope was invented they knew about pathogens.

MS. WILLIAMS: Thank you.

DR. DOREVITCH: But what I am saying is that there's a huge amount of science showing that in subgroups, diabetics, elderly, children, multiple cities, different pollutants, measured in lots of different ways, lots of different places, rates of asthma attacks, cardiovascular events, are increased, and it's been consistent among many large studies with tens of thousands of participants, and we're, kind of, flying in the dark when it comes to figuring out what's good policy for incidental

contact water recreation.

You know, those three studies that I mentioned, Futrel, Futrel and Lee, don't really give us a lot of direction about what should we do here in Chicago. You know, this isn't the slalom white water course, and the other studies have their limitations, so there's a huge difference in the amount of certainty we have in air versus incidental contact water recreation.

MS. WILLIAMS: Have you performed an epidemiological study of microbial risk before?

DR. DOREVITCH: Yes.

MS. WILLIAMS: Okay. What did you study?

DR. DOREVITCH: I studied Helicobacter infection.

MS. TIPSORD: Could you spell that for the court reporter?

DR. DOREVITCH:

H-e-l-i-c-o-b-a-c-t-e-r.

MS. WILLIAMS: Which is the bacteria you testified earlier causes ulcers?

DR. DOREVITCH: Correct.

MS. WILLIAMS: And it's not at all

connected to waterborne recreation as far as we know, you testified earlier?

DR. DOREVITCH: It's a study of occupational exposures.

MS. WILLIAMS: I'm going to ask a couple of questions about some of the very general statements you made on Pages 2 and 3 in your bullet points --

DR. DOREVITCH: Okay.

MS. WILLIAMS: -- where you're describing information one would want to know in developing efforts to improve water quality on the CAWS.

DR. DOREVITCH: Yes.

MS. WILLIAMS: And counsel is walking up to the chart board. Are these the bullets I'm referring to?

MR. ANDES: They sure are, and I have copies of them too.

MS. WILLIAMS: So are these the questions you formulated in your testimony that are blown up here?

DR. DOREVITCH: I'd have to double check that they were copied correctly, but it looks

like the same to me, yes.

MS. WILLIAMS: Okay.

MS. TIPSORD: These are on Page 2 and 3 of the testimony, correct?

MS. WILLIAMS: Yes. I had no idea they were important enough for a giant chart.

MS. TIPSORD: They're on -- we're not going to enter these as an exhibit. They're Page 2 and 3 of the pre-filed testimony, which I believe is Exhibit 100.

MS. WILLIAMS: In listing information one would want to know, your testimony includes the following: "Are rates of illness higher among CAWS recreators compared to recreators doing the same activities on water that -- waters that do not receive treated wastewater, and how does the contribution of water reclamation plans to microbial measures of water quality compare to the contributions of runoff and sewer overflow?" Can you explain why it's relevant to your analysis whether the risk the recreator is from disinfected effluent, or another source, such as CSOs?

DR. DOREVITCH: Sure.

MR. ANDES: We have a handout, no

chart.

MS. WILLIAMS: Are you a teacher?

DR. DOREVITCH: Yes.

MR. ANDES: That's not in the testimony.

MS. TIPSORD: This is Sources of Risk by Group, and we will mark this as Exhibit No. 110 if there's no objection. Seeing none, it's Exhibit 110.

DR. DOREVITCH: Okay. So looking at this Exhibit 110, this explains why looking at people at CAWS locations and waters that don't receive treated effluent. The conceptual model of the study is that there is a -- there are background factors that lead to symptoms, and if we're going to talk specifically about gastrointestinal symptoms, people may have gastrointestinal symptoms because of medications they're taking, because of irritable bowel syndrome, because of foodborne illness, and that is what I think of as background factors in the population, and that's what the unexposed group is exposed to.

The general use group would have that as well as water contact. They are getting

splashed, they may be ingesting water, so that water presumably has lower pathogen loads than the CAWS, but clean water has been shown to produce elevated rates, especially respiratory symptoms. In the CAWS group, we have background factors, water contact, and pathogen exposure, presumably coming from plants, but potentially coming from other sources as well, and that by recruiting people at the general use sites that don't receive treated effluent and CAWS locations that do, it'll be possible to attribute risk to CAWS recreation if -- if there is a risk to be attributed.

So that's why -- I mean, so the first part of your question about why CAWS and other water bodies, that's why. The -- the second part about CSOs and other potential sources of pathogens, that's more about providing information that may be useful in developing preventive strategies at a policy level.

MS. WILLIAMS: But how is that relevant to what you're looking at? I understand how it might be relevant to a regulator after the fact.

DR. DOREVITCH: It doesn't change

anything we do.

MS. WILLIAMS: Okay.

DR. DOREVITCH: You know, we don't sample water at CSOs specifically or anything like that. But let's say rainfall or heavy precipitation turns out to be a stronger predictor of illness than microbe concentrations or handwashing or other factors, I think that's important to know. If --

MS. WILLIAMS: Will we be able to know that from your study?

DR. DOREVITCH: We would know something about that, sure. We collect meteorologic data from the -- we get data from the national climatic data center, so we have a lot of information about rainfall and how rainfall may or may not affect water quality. That doesn't change the analyses of differences among groups, but it does paint a broader picture of what determines health risk along the CAWS.

MS. WILLIAMS: So number five asks about another one would want to know bullet point, "Are the pathogens responsible for illness, bacteria viruses, or parasites, which may require different water quality treatment strategies." Explain why it

would matter if one were dealing with viruses instead of bacteria, et cetera.

DR. DOREVITCH: Well, you know, I don't claim to be a civil and environmental engineer, but, you know, my understanding is that there are different disinfection options, like chlorination, ozonization, and UV radiation, and they have varying effectiveness against different categories of microbes, and it might be helpful if disinfection were to take place to know what we're trying to disinfect.

MS. WILLIAMS: Are you basing that on anything other than Dr. Blatchley's testimony?

DR. DOREVITCH: I'm not basing it on Dr. Blatchley's testimony.

MS. WILLIAMS: Okay. What are you basing your understanding that there are different treatment technologies for different types of organisms?

DR. DOREVITCH: Textbooks of wastewater management, water quality management. I don't -- I don't think that that's especially controversial, whether viruses and parasites require the same disinfection approach as bacteria.

MS. WILLIAMS: Sorry about that.
DR. DOREVITCH: That's okay.
MS. WILLIAMS: Number six, another question you posed in your testimony is "If the Pollution Control Board were to establish water quality standards rather than a disinfection requirement, is there a microbial water quality level above which risk is unacceptable, and below which risk is acceptable?" Are you able to recommend such a microbial water quality level to the Board today?
DR. DOREVITCH: I'm not.
MS. WILLIAMS: And this may somewhat repeat what we talked about earlier, but if not, will the CHEERS study result in such a recommendation when complete?
DR. DOREVITCH: This is similar to what I was saying earlier, that we will produce the data and generate the graphs and the mathematical equations that that figure -- I don't remember the exhibit number.
MS. WILLIAMS: It's Exhibit 109.
DR. DOREVITCH: That Exhibit 109 is, you know, sort of a cartoon of. But that

information will be produced by the research study.

MS. WILLIAMS: Now on the left hand column, vertical axis, we have illness rate, and then we have microbe concentration at the bottom. What would you envision microbe concentration saying specifically? Do you anticipate reporting specific indicator organisms that a regulator could use to target to a specific illness rate at the end of your study?

DR. DOREVITCH: Well, there -- we would make graphs of the different permutations of different illnesses versus, you know, on the up down, the Y axis, different illnesses and the rates of those illnesses, and then across on the X axis, we would see how E. Coli predicts illness, you know, what that response looks like. We would do that for enerocoxi, we would do that for somatic coliphages, we would do that for F plus or male-specific for coliphages, for coliphage zero types, for pathogens as well, and then for the physical, chemical water quality parameters that I mentioned as well.

MS. WILLIAMS: With regard to the illness rate column --

DR. DOREVITCH: Yes.

MS. WILLIAMS: -- I believe earlier testimony was that the microbial risk assessment came up with values in the ranges between one and two-ish illnesses per 1,000. Does that sound right to you?

DR. DOREVITCH: That sounds like what the risk assessment found, if that's the question.

MS. WILLIAMS: Yeah, that was my question. Do you agree with their conclusions that that's a low illness rate?

DR. DOREVITCH: It is one to two per thousand lower, you're asking me?

MS. WILLIAMS: Yes.

DR. DOREVITCH: Well, it's lower than 19 per thousand, and, you know, it's lower than some of the other references that stand -- that recreational water quality standards have been based on, you know, USEPA standards. So, you know it's lower -- one to two is lower than 19, yes.

MS. WILLIAMS: Okay. Would it be reasonable for a regulator to conclude that was an unacceptable level of risk?

DR. DOREVITCH: That's not a -- that's a policy question for a regulator, and I'm -- it

would be a mistake for me to think about what I think the right policy is. I'm trying to do this study in a neutral fashion, and the results will be what they are, and, you know, they'll be there for everybody to see.

MS. WILLIAMS: Thank you. I think question number seven asks you to clarify about an outbreak you referenced in Taswell (phonetic) County in your testimony. Can you tell us what the source of that outbreak was?

DR. DOREVITCH: That was a swimming pool and water recreation park.

MS. WILLIAMS: Number eight has been answered with regard to the term outbreak. I don't think we ever got to comparing the definitions of an outbreak with an epidemic. Can you --

DR. DOREVITCH: The terms are used interchangeably. Specifically, outbreak in the context of the waterborne disease, outbreaks surveillance system, it means two cases that are linked, and in general terms, it -- epidemic or outbreak, they're both used interchangeably -- means a greater than expected number of cases.

MS. WILLIAMS: So, I mean, I think in

my mind, epidemic implies something more unusual and serious, and that's not your intention to use epidemic as something more unusual or serious or larger?

DR. DOREVITCH: No, it's not.

MS. WILLIAMS: Okay. Question number nine, I think, has mostly been answered, but I just, kind of, want to understand how with regard to the CBC outbreak database, how we would look at a source -- a potential disease-causing source that was as large as this 78-mile waterway. Would that be common that an outbreak would be pegged to such a large area?

DR. DOREVITCH: Well, I -- the waterway may be 78 miles, but it's not like recreational activity is evenly distributed. There are certain launches where a lot of activity happens, and then there are big stretches were there's no recreational activity, or at least no incidental contact activity. So if there are 200 people at a boat launch and ten percent of them get sick, it's as likely that that'll get reported as if it occurred at a beach. If anything, it may be more likely to be reported in that the rowing teams are,

kind of, social networks, and if two people both get sick or more than two people get sick, they're talking about it. So from that perspective, I think it's -- it could be detected just like a beach outbreak, maybe a little bit more likely if given equal numbers in both settings.

MS. WILLIAMS: Could you go back and explain what you're -- or where you are referring to when you say there are large stretches of the CAWS were there's no incidental contact recreation occurring?

DR. DOREVITCH: Well, I -- it's not like we, the research team, are continually conducting surveillance to see what's happening on the Sanitary and Ship Canal, but recreational activities are concentrated at certain locations on the --

MS. WILLIAMS: I didn't understand what you're saying. You are, or you are not?

DR. DOREVITCH: We are not.

MS. WILLIAMS: Okay. You're not.

DR. DOREVITCH: So I don't think -- from my understanding, you know, from the UIA report, there are areas where there's pretty

limited -- you know, very little, if any, recreational activity.

MS. WILLIAMS: Have your folks gone out to the Western Avenue boat lunch?

DR. DOREVITCH: I don't know -- is there another name for the Western Avenue boat launch?

MR. ANDES: Is it opened?

DR. DOREVITCH: Western on the north branch?

MS. WILLIAMS: Yes. I can answer if you want to swear me in.

MR. SULSKI: On the Sanitary Ship Canal.

DR. DOREVITCH: I know that there's a location where people fish from the sides of the Sanitary Ship Canal, and our folks have been there, and I don't think they call it the Western Avenue site, but that may be it. If that's a new location, that's the kind of place that we'd want to recruit people at next season.

MS. WILLIAMS: Okay. There was some testimony, I think, last week about that, so might want to have the folks take a look at it.

DR. DOREVITCH: Yeah. Thank you.

MS. WILLIAMS: Not last week, two weeks ago. Okay.

MS. TIPSORD: Let's go off the record for just a second.

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

STATE OF ILLINOIS)
) SS
COUNTY OF COOK)

REBECCA A. GRAZIANO, being first duly sworn on oath says that she is a court reporter doing business in the City of Chicago; that she reported in shorthand the proceedings given at the taking of said hearing, and that the foregoing is a true and correct transcript of her shorthand notes so taken as aforesaid and contains all the proceedings given at said hearing.

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SUBSCRIBED AND SWORN TO
before me this 23rd day
of September, A.D., 2008.

Notary Public