

ILLINOIS POLLUTION CONTROL BOARD

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 )

R08-09  
 (Rulemaking-  
 Water  
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STATE OF ILLINOIS  
Pollution Control Board

REPORT OF THE PROCEEDINGS held in the  
 above entitled cause before Hearing Officer Marie  
 Tipsord, called by the Illinois Pollution Control  
 Board, taken by Steven Brickey, CSR, for the State  
 of Illinois, 100 West Randolph, Chicago, Illinois,  
 on the 19th day of October, 2010, commencing at  
 the hour of 9:00 a.m.

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I N D E X

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1 MS. TIPSORD: Good morning,  
2 everyone. My name is Marie Tipsord and I've been  
3 appointed by the Board to serve as hearing officer  
4 in this proceeding entitled Water Quality  
5 Standards and Effluent Limitations for the Chicago  
6 Area Waterway Systems and Lower Des Plaines River  
7 Proposed Amendment to 35 Ill. Admin. Codes 301,  
8 302, 303 and 304.

9 This is docket number R08-9 and  
10 this is specifically sub docket B. We also are  
11 going to be covering the economics on sub docket A  
12 today. With me today to my immediate right is  
13 acting Chairman G. Tanner Girard, presiding Board  
14 member. To his right, is Board member Carrie  
15 Zalewski and Board members Andrea Moore and Gary  
16 Blankenship are stuck in traffic and will be here  
17 shortly. To my far left is Board member Thomas  
18 Johnson. To my immediate left is Anand Rao and to  
19 his left Alisa Liu from our technical unit.

20 This is the third day of hearing  
21 in sub docket B, but it is the 42nd day overall in  
22 this proceeding. The subject of today's hearing  
23 is the Chicago Health and Environmental Exposure  
24 and Recreation Study known as the CHEERS.

1                   The CHEERS report is in the  
2 record as Public Comment 478 and the errata sheet  
3 as Public Comment 484. Today's hearing will also  
4 satisfy the requirements of Section 27(b) of the  
5 Environmental Protection Act for sub docket A.  
6 Section 27(b) of the act requires the Board to  
7 reflect the Department of Commerce and Economic  
8 Opportunity to conduct an economic impact study on  
9 certain proposed rules prior to the adoption of  
10 those rules.

11                   If DCEO chooses to conduct the  
12 economic impact study, DCEO has 30 to 45 days  
13 after such request to produce a study of the  
14 economic impact of the proposed rules. The Board  
15 then must make the economic impact study DCEO's  
16 explanation for not conducting the study available  
17 to the public at least 20 days before public  
18 hearing on the economic impact of the proposed  
19 rules.

20                   In accordance with Section 27(b)  
21 of the act, the Board requested by a letter dated  
22 August 11th, 2010, that DCEO conduct an impact for  
23 the above -- for this rulemaking. The sub docket  
24 A only. We will do this again with sub docket B

1 as we go to first notice with the rules. The  
2 Board received a response letter dated September  
3 27th, 2010, indicating that no ECIS would be  
4 conducted.

5 A copy of the Board's letter and  
6 DCEO's letter are available on the steps right  
7 here behind the court reporter. In addition,  
8 there is a sign-up sheet for anyone who wishes to  
9 comment on DCEO's decision. We will hear them at  
10 the end of the day tomorrow or perhaps depending  
11 upon the schedule midday tomorrow, but if you wish  
12 to comment, please sign up on the sign-up sheet.  
13 That sheet is only to comment on the DCEO  
14 decision. It is not to testify regarding  
15 disinfection.

16 Before we begin, there is a  
17 pending motion filed by the Metropolitan Water  
18 Reclamation District of Greater Chicago to allow  
19 the testimony of Thomas Granato to be read into  
20 the record. Both the Illinois Environmental  
21 Protection Agency, the proponent of this  
22 rulemaking, and the environmental group in this  
23 case represented by the National Resources Defense  
24 Counsel objected to the motion. The district



1 filed a reply which I will allow. After reviewing  
2 the motion responses and reply, as well as the  
3 testimony, I will allow Mr. Granato to read his  
4 testimony into the record. We will begin with  
5 Mr. Granato and go to Dr. Samuel Dorevitch. We  
6 will present both witnesses then for questions  
7 beginning with the Natural Resources Defense  
8 Counsel followed by the IEPA and finally the  
9 people.

10 After completing the questions  
11 for the district, we will move to the testimony of  
12 Dr. Mark Gorelick and questions from the district.  
13 Finishing with Sharon Bloyd-Peshkin. Am I  
14 pronouncing that correctly? And the questions for  
15 the district. The testimony will be marked as an  
16 exhibit and entered as if read.

17 As always anyone may ask a  
18 follow-up question and you need not wait until  
19 your turn to ask questions. I do ask that you  
20 raise your hand, wait for me to knowledge you.  
21 After I've acknowledged you, please state your  
22 name and whom you represent before you start your  
23 question. Please speak one at a time. If you're  
24 speaking over each the court reporter will not be

1 able to get your questions on the record. Please  
2 note any questions asked by a Board member or  
3 staff are intended to help build a complete record  
4 for the Board's decision and not to express any  
5 preconceived notion or bias. And I emphasize if  
6 you ask a question, please stand up and speak  
7 loudly and clearly. Because of the setup, the  
8 court reporter is going to have his back to you  
9 when your questions from the audience so -- and if  
10 you're going to ask a series of questions, we may  
11 ask that you move forward so we can get all the  
12 questions on the record. Dr. Girard?

13 MR. GIRARD: Good morning. On  
14 behalf of the Board, I welcome everyone to hearing  
15 day 42 in this rulemaking. The Board is very  
16 grateful for all the time and effort that the  
17 various participants have put into this  
18 rulemaking. It certainly will help us craft a  
19 better rule. We certainly have a very extensive  
20 record to look at. So be patient with us as we  
21 sit down. So, with that, we look forward to your  
22 questions and testimony today and let's get on  
23 with it. Thank you.

24 MR. ANDES: I'm sorry. If there was

1 some confusion. We would like to have  
2 Dr. Dorevitch testify first and then Dr. Granato.

3 MS. TIPSORD: Okay. Sure. I'm  
4 easy. As long as there's no objection. Seeing  
5 none. With that then, can we have the witness  
6 sworn?

7 WHEREUPON:

8 SAMUEL DOREVITCH  
9 called as a witness herein, having been first duly  
10 sworn, deposeth and saith as follows:

11 MS. TIPSORD: And, with that, we'll  
12 mark his testimony. I've been handed the  
13 pre-filed testimony of Samuel Dorevitch. If  
14 there's no objection, we will mark this as Exhibit  
15 398. Seeing no objection, it's Exhibit 398.

16 (Document marked as IL EPA  
17 Exhibit No. 398 for  
18 identification.)

19 E X A M I N A T I O N

20 BY MS. ALEXANDER

21 Q. Good morning, Dr. Dorevitch. I'm  
22 Ann Alexander from the Natural Resources Defense  
23 Counsel. I'll be asking you questions this  
24 morning. And I would like to turn now to the

1 first of our pre-filed questions in which I asked  
2 you to please describe the journal of publications  
3 status, if there is any, of the CHEERS study?

4 A. No. Nothing from the CHEERS study  
5 has been published in any journals. One article  
6 is currently under review at a journal. Two will  
7 be submitted to journals in the next two weeks.  
8 Another one is going to be submitted to a journal  
9 next month and beyond that there will be  
10 additional manuscripts submitted for publication.

11 Q. Turning to the one under review,  
12 does that mean it is currently under peer review  
13 when you say under review?

14 A. Right. It was submitted to a  
15 journal. The journal sends it out to reviewers to  
16 determine if it should be published or if  
17 revisions are necessary. So it's being reviewed  
18 by the journal's reviewers.

19 Q. And which journal is it submitted  
20 to?

21 A. Water Research.

22 Q. And what specific topic or subset of  
23 issues was the subject of this article submitted  
24 to Water Research?

1           A.       It's about water ingestion during  
2 water recreation. How much water people swallowed  
3 during a variety of water recreation activities.

4           Q.       So is it based essentially on your  
5 series of questions concerning water exposure in  
6 the survey and your analysis of that data?

7           A.       It's partly that, but it also  
8 includes the study that was conducted in the  
9 swimming pools where a chemical that's in outdoor  
10 pools, cyanuric acid, was measured in urine  
11 samples from people who had used the pool. The  
12 more cyanuric acid in their urine, the more pool  
13 water they had swallowed.

14                       So that study involved 662  
15 people and we collected urine samples and asked  
16 them the same questions that were part of the  
17 CHEERS questionnaire, the Field Survey B, and that  
18 way we were able to translate the self-reported  
19 information. Somebody says I swallowed a teaspoon  
20 of water, what does that mean in terms of  
21 milliliters of water?

22           Q.       What was your role in this swimming  
23 pool study? Were you the principal investigator?

24           A.       Yes.

1 Q. And what was the timing of that  
2 study as compared with the CHEERS study? Was it  
3 concurrent? Did it precede it?

4 A. It took place in the summer of 2009.  
5 So the final season of CHEERS data collection.

6 Q. Have you received any peer review  
7 comments back on that piece?

8 A. I have.

9 Q. Okay. And what is the nature of the  
10 comments you've received?

11 A. There were -- there was a prior peer  
12 review before it went to publication. I shouldn't  
13 say publication. Before it was submitted to the  
14 journal. That study was funded in part by the  
15 Water Environment Research Foundation and there  
16 was a project review team. The team included Al  
17 Dufour who works for the US EPA Office of Research  
18 and Development in Cincinnati and he had  
19 previously published a similar study, again, using  
20 cyanuric acid in swimming pools and in urine  
21 samples to estimate how much water people  
22 swallowed during swimming in a pool. Our study  
23 was swimming as well as limited contact recreation  
24 like kayaking and canoeing and fishing. So I

1 received comments from the WERF project team, but  
2 nothing yet from the journal.

3 Q. When you say you studied limited  
4 contact recreation and ingestion associated with  
5 that, was that part of the study also conducted in  
6 a swimming pool or was that conducted somewhere  
7 else?

8 A. That was conducted in the swimming  
9 pool.

10 Q. So you actually had kayakers in a  
11 swimming pool and you ascertained through this  
12 study how much they ingested if I'm understanding  
13 you correctly?

14 A. Yes. Several swimming pools  
15 actually, but yes.

16 Q. Did you have the kayakers doing  
17 rolls?

18 A. Yes.

19 Q. Did anyone besides WERF fund the  
20 study?

21 A. WERF provided funding and in a sense  
22 the Water Reclamation District also supported the  
23 study in that the personnel who worked on the  
24 swimming pool study were already being supported

1 through the contract that the university has with  
2 the Water Reclamation District.

3 Q. Okay. You said another two journal  
4 articles will be submitted in the next two weeks.  
5 Could you please describe what those are?

6 A. Sure. One is about viral pathogens  
7 that were measured in water samples collected on  
8 the CAWS as well as other area waters. The other  
9 article, the other manuscript, is about a rapidly  
10 measured indicator of water quality using a  
11 technique called QPCR. That rapid measurement was  
12 used on a subset of CHEERS samples and that  
13 manuscript reports the relationship -- it compares  
14 the relationship of rapidly measured and  
15 conventionally measured indicators as predictors  
16 of pathogen presence in waters.

17 Q. And what journal are you submitting  
18 those studies to?

19 A. Also the Journal of Water -- the  
20 Journal of Water Research.

21 Q. Is that -- is Water Research a  
22 publication associated with a particular  
23 organization?

24 A. I believe the International Water



1 Association. It's a premier peer review  
2 publication.

3 Q. Okay.

4 A. It's not part of WERF or anything  
5 like that.

6 MS. TIPSORD: Could you explain what  
7 the acronym WERF is?

8 THE WITNESS: Water Environment  
9 Research Foundation.

10 MS. TIPSORD: Thank you.

11 THE WITNESS: Sorry about that.

12 BY MS. ALEXANDER:

13 Q. When these various pieces are  
14 submitted to the journal, can you please describe  
15 the process after it's submitted for peer review  
16 and the peer reviewers come back with comments?  
17 Then what happens?

18 A. Well, there are different types of  
19 comments. It could be this journal is ready for  
20 publication as is which almost never happens. It  
21 could be the manuscript requires significant  
22 changes and then might be acceptable. It could be  
23 the journal -- the manuscript is publishable, but  
24 minor changes need to be made or something along

1 the lines of this manuscript is not suitable for  
2 this journal or something like that. So reviewers  
3 generally list recommendations or questions and  
4 then I will respond to them and potentially modify  
5 the manuscript if appropriate.

6 Q. Okay. And then who decides  
7 ultimately whether the article is ready for  
8 publication, is that the journal editors?

9 A. Yes.

10 Q. All right. Looking at my notes, I  
11 think I missed one. You indicated that there will  
12 be another submitted to a journal next month.  
13 What will that piece be about and which journal?

14 A. That will be about precipitation  
15 rain events and CSO events and how that influences  
16 the relationship between indicators and pathogens  
17 on the CAWS and elsewhere and I'm not a hundred  
18 percent decided yet which journal that's going to  
19 go to.

20 Q. What are the options at this point?

21 A. Environmental Science and Technology  
22 or Water Research.

23 Q. Are there any other pieces besides  
24 what we talked about that you plan to submit for

1 publication?

2 A. Yes.

3 Q. What are they?

4 A. The primary study objectives of  
5 health risks of limited contact water recreation,  
6 the objective of the relationship between water  
7 quality and health outcomes and the clinical micro  
8 biology, the microbes that were identified in  
9 stool samples of CHEERS participants who developed  
10 gastrointestinal symptoms.

11 Q. When do you expect to submit those  
12 for publication?

13 A. Those haven't been written yet. So  
14 those are in the pipeline, but it won't be until  
15 next year.

16 Q. Do you know where you plan to submit  
17 those.

18 A. I have an idea, yes.

19 Q. Are you likely to submit them  
20 somewhere other than any of the journals you just  
21 mentioned to me?

22 A. Yes.

23 Q. Can you give me the short list?

24 A. Sure. The American Journal of

1 Epidemiology, the Environmental Health  
2 Perspectives and the Journal of Infectious  
3 Diseases.

4 Q. Okay.

5 MR. RAO: May I ask a follow-up  
6 question?

7 MS. ALEXANDER: Sure.

8 MR. RAO: Dr. Dorevitch, you  
9 mentioned that one of the papers you're submitting  
10 relates to the effect of CSO's and anticipation of  
11 pathogens in the CAWS?

12 MR. DOREVITCH: Yes.

13 MR. RAO: Have those provisions been  
14 submitted to the Board yet?

15 MR. DOREVITCH: No, they have not.

16 MR. RAO: Are you planning on  
17 submitting those provisions to the Board or is  
18 that something that's being done?

19 MR. DOREVITCH: That's something  
20 that could be done. I don't know if I'll be back  
21 here testifying again, but I am certainly open to  
22 providing that information to the Board.

23 MR. RAO: Okay. If it's possible  
24 and if the District gives it the blessing, I think

1 we'd like to have that information in the record.

2 MR. DOREVITCH: Okay.

3 BY MS. ALEXANDER:

4 Q. Generally speaking, Dr. Dorevitch,  
5 have you ever encountered a situation in which --  
6 involving one of your publications or a colleagues  
7 in which a journal article whose results  
8 conflicted with previous research was submitted  
9 for publication?

10 A. Sure.

11 Q. Okay. Is anything generally done by  
12 the journal in that situation?

13 A. Well, sometimes that's what makes an  
14 article more interesting is that it's describing  
15 something that hasn't been described or the  
16 results, the conclusions are different in  
17 something that's been previously described. So  
18 the issue isn't so much -- I don't think the  
19 journal would want to keep publishing the same  
20 thing over again. If there's a novel setting that  
21 a study was done in or a novel method that was  
22 used to make measurements and the new approach  
23 generates results that conflict with something  
24 that was done previously that becomes interesting

1 and the discussion section of the manuscript like  
2 that would generally describe how the findings of  
3 that study compare to prior research, what's  
4 consistent and what is different.

5 Q. All right. Moving onto pre-filed  
6 question two. I asked you to please describe the  
7 nature of your discussions, if any, with Water  
8 Reclamation District's commissioners or staff  
9 concerning the CHEERS study. It's a general  
10 question so if you can give me a general overview  
11 that would be helpful.

12 A. I discussed the study with staff  
13 regularly. The project is being coordinated by  
14 the district. It used to be called research and  
15 development. I think it's now called the  
16 monitoring and research department and about once  
17 a month I'll meet with them and provide them with  
18 updates on the status of this study. I really  
19 don't discuss the project with commissioners.  
20 I've bumped into commissioners and there's usually  
21 a little bit of chitchat "How is the study going?"  
22 "Oh, the study is going fine." But that's sort of  
23 the general answer.

24 Q. Can you tell me which staffers that

1 you meet with in the monitoring and research  
2 department?

3 A. Dr. Tom Granato, Dr. Geeta Rijal.

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

6 THE WITNESS: Yes. G-E-E-T-A. Last  
7 name, R-I-J-A-L.

8 MS. TIPSORD: Thank you.

9 BY THE WITNESS:

10 A. And Dr. Katherine O'Connor and other  
11 people sometimes sit in on other meetings, but  
12 those are the primary contacts I've had.

13 BY MS. ALEXANDER:

14 Q. When did you first start meeting  
15 with them concerning the study?

16 A. I met with them before the study  
17 began.

18 Q. Okay.

19 A. That was -- the first meeting was  
20 January of 2007 and I've been meeting with them,  
21 like I said, on average maybe about once a month  
22 ever since.

23 Q. And when you met with them before  
24 the study generally, what kind of discussions did

1 you have with them? What were you talking about?

2 A. I was trying to understand what the  
3 questions are and then I tried to develop a study  
4 that would answer the questions. The district had  
5 questions related to the UAA process about what  
6 are the health risks of using the CAWS for  
7 recreation under current conditions and I had  
8 conceptualized that into terms of hypothesis that  
9 could be tested through an epidemiologic study.  
10 So that was the focus of the studies.

11 The meetings were at the very  
12 beginning and then those were followed by planning  
13 logistics and where can water be sampled and how  
14 can we access the waterway and whose permission do  
15 we need to conduct the study at various locations.

16 Q. And what about -- during the course  
17 of data gathering, what kind of discussions were  
18 you having with the staff?

19 A. Updates on progress of the study,  
20 how many people were enrolled, as we got into the  
21 second year of this study, what the preliminary  
22 results of this -- you know, the preliminary  
23 analyses of the data was showing, budget issues,  
24 personnel issues, timelines, the peer review by



1 WERF, Water Environment Research Foundation.

2 Those would be the other main topics we talked  
3 about.

4 Q. And did the district engineers also  
5 chime in with their thoughts on things like the  
6 study design and these various issues that you  
7 mentioned?

8 A. Not much. There were some meetings  
9 with engineers. In 2000 -- I believe 2008 there  
10 were high levels of giardia and cryptosporidia  
11 relatively high in the area of Ping Tom Park and  
12 Canal Origins and I was trying to understand why  
13 the levels of those parasites would be higher than  
14 they were closer to the north side plant and I met  
15 with district engineers who did testing to see if  
16 there were discharges into the south branch that  
17 were bypassing the waste water treatment process  
18 or mixed up connections or leaking pipes and none  
19 were identified.

20 I met with engineers about  
21 sampling CSO flow at pumping stations and I went  
22 to pumping -- to the north side pumping station  
23 with engineers to evaluate the logistics of  
24 collecting water samples there. But, by and

1 large, the engineers were not present at the  
2 regular meetings I had with the district.

3 Q. Leaving aside the engineering, the  
4 people you mentioned, Tom Granato, Geeta Rigal,  
5 Katherine O'Connor, did they give you feedback of  
6 any kind on the things you presented?

7 A. Of course.

8 Q. What kinds of feedback did they give  
9 you?

10 A. Well, you know, over the last four  
11 years we've talked about a lot of things. It's  
12 sort of hard to give you a general answer to that.

13 Q. For instance, did they have comments  
14 on the study design and how it was being designed  
15 and how you were going to carry it out, would you  
16 talk with them about it?

17 A. They had ideas about initially we  
18 were trying to figure out where the study -- where  
19 people use the CAWS and I had the draft version of  
20 the Camp Dresser McKee summary of recreational  
21 uses in the UAA report when it was in draft form,  
22 but I wanted to find out more about where can  
23 we -- are there other locations that we might look  
24 that aren't listed there. I needed a little bit

1 of help from the district to conduct the study  
2 within the Chicago -- within the Cook County  
3 Forest Preserve District and district personnel  
4 were instrumental in moving things along on that  
5 front. So, you know, I guess the general answer  
6 is they were responsive and helpful.

7 Q. Okay.

8 A. And the same with the Chicago Park  
9 District. They helped in the process of securing  
10 a type of permit that gave us sort of blanket  
11 permission to be on Park District property  
12 conducting the study, setting up tents, doing  
13 things that ordinarily would require permits  
14 specific to locations and dates.

15 Q. Okay. Then after you were done  
16 collecting your data, did you continue to meet  
17 regularly with this -- with the staff?

18 A. Less frequently. The report that  
19 was developed -- the CHEERS final report, August  
20 31st, 2010, that was submitted previously existed  
21 in draft versions that were submitted to external  
22 reviewers to the WERF peer review and I  
23 communicated the state of that through e-mail. I  
24 can't remember if we had an in-person meeting, but

1 we definitely meet less frequently now than we did  
2 when this study was on the drawing Board or in the  
3 field.

4 Q. Can you give me an estimate of how  
5 frequently less frequently is?

6 A. I probably have been out to Stickney  
7 twice in the last six months maybe. Maybe once.

8 Q. I take it Stickney is where you held  
9 your meetings?

10 A. Right. That's where the research  
11 and monitoring department is based.

12 Q. Okay.

13 A. Sorry. It's where the research and  
14 monitoring department is based.

15 Q. When did you first show a draft of  
16 the CHEERS report to the research and monitoring  
17 staff?

18 MS. TIPSORD: If I may,  
19 Ms. Alexander, I'd like you to clarify that  
20 because we have had a draft report submitted to  
21 the Board. So do you mean a draft report prior to  
22 that draft report or do you mean the final report?

23 MS. ALEXANDER: I mean, any draft of  
24 the CHEERS report.

1 MS. TIPSORD: Thank you.

2 BY THE WITNESS:

3 A. Well, like Ms. Tipsord said, there  
4 was the interim technical report that was  
5 submitted in May. I would guess that there was a  
6 draft of that in maybe February or March that I  
7 first sent to UIC's internal consultants, they're  
8 infectious disease medicine and epidemiology and  
9 environmental scientists who are actually not part  
10 of the data collection process, but sort of serve  
11 as a resource. And then I sent them a draft in  
12 something like April -- I'm sorry. Something like  
13 February or March and then by April I sent an  
14 updated version to the district and -- yeah,  
15 something like April.

16 BY MS. ALEXANDER:

17 Q. Okay. And then following submission  
18 of the interim technical report, when did you  
19 first submit a draft of the actual study report to  
20 the district staff?

21 A. That probably would have been a  
22 similar timeframe. We had a meeting in Chicago of  
23 the peer reviewers of the study on May 25th and  
24 26th. So, working backwards, I probably had a

1 version for them to review about three or so weeks  
2 before that and -- so that's sort of the beginning  
3 of May. Probably by, again, April the district's  
4 examiners of water monitoring and research folks  
5 would have seen a draft.

6 Q. Would I be correct in understanding  
7 that the peer reviewers received it approximately  
8 contemporaneously with the district staff?

9 A. The district staff saw it before the  
10 peer reviewers.

11 Q. Okay. How much before?

12 A. A couple of weeks.

13 Q. Did the district staff comment on  
14 the draft at any point?

15 A. Yes.

16 Q. Okay. Did they comment in writing  
17 or comment orally? How did that work?

18 A. They commented in writing.

19 Q. Did they comment as part of this  
20 peer review process or outside it?

21 A. They're not peer reviewers so it's  
22 outside of that.

23 Q. What kind of comments did you  
24 receive from the district on the draft?

1           A.       The comments were about typos,  
2           grammar, formatting, clarity of writing,  
3           mislabeled figures. Things like that. It was --  
4           it was about the presentation rather than the  
5           conclusions or the results.

6           Q.       Was that also true of the interim  
7           report draft that you sent them, did they have any  
8           substantive comments on that?

9           A.       You know, I'd have to have it in  
10          front of me to check what their comments were, but  
11          for sure 98 percent of it would have been about  
12          the presentation of the results rather than the  
13          content of the results.

14          Q.       Other than the writing comments, did  
15          you have verbal, nonwritten conversations with the  
16          district staff concerning either of these drafts,  
17          the interim report or the draft final report?

18          A.       Yes.

19          Q.       Were any of those conversations  
20          about the substance as opposed to the typos?

21          A.       There was no difference in the kind  
22          of things that were communicated orally or in  
23          writing.

24          Q.       Have you talked to the district

1 engineers on the subject of publication of the  
2 study?

3 A. No.

4 Q. I should say any of the district  
5 staff concerning publication of study?

6 A. Yes.

7 Q. Okay. Which district staff you  
8 talked to?

9 A. Dr. Granato and Dr. Rijal.

10 Q. And what was the nature of those  
11 conversations?

12 A. That I am planning to publish  
13 manuscripts and I told them what the manuscripts  
14 are and I sent them copies of the manuscript for  
15 their comment.

16 Q. Did they give you any comments?

17 A. Yes.

18 Q. What kind of comments did they give  
19 you?

20 A. Primarily comments about -- there  
21 weren't a lot of comments, but there were comments  
22 on the manuscript about water ingestion, comparing  
23 information that was in the manuscript to the  
24 information that was in a report that went to WERF



1 about this number doesn't match. You know, the  
2 number of people who swam is different than the  
3 number -- in the report is different than the  
4 number of people who swam in the manuscript. It  
5 was off by two. So they caught things like that.

6 Q. So you made changes based on those  
7 kinds of comments?

8 A. I evaluated the comments and I made  
9 some changes and I didn't make all changes, but  
10 the nature of that review is different than I'd  
11 say the review that would go for documents that  
12 are submitted to the Board. It's more a service  
13 that the district is doing for me to, you know,  
14 look over the manuscript and Dr. Rijal,  
15 Dr. Granato, they review manuscripts for journals  
16 and to get their feedback is helpful.

17 I don't have to ask their  
18 permission to do that and I don't have to follow  
19 their recommendations, but it's helpful to me to  
20 have another pair of eyes read it over before that  
21 one shot at getting it published with a given  
22 journal. So it's sort of this optional step that  
23 I'm choosing to take.

24 Q. Did you ever discuss with them, by

1       them being the district staff, the timing of  
2       publication when you were going to publish these  
3       things?

4             A.       I told them the same timetable that  
5       I told you, that manuscripts are in the pipeline  
6       as they get closer to being ready, I let them know  
7       that, yes.

8             Q.       Did they have any feedback for you  
9       on that question about timing?

10            A.       Well, it wasn't really a question.  
11       It was, you know, this is where I'm at in  
12       preparing manuscripts.

13            Q.       Okay.

14                    MR. RAO:   May I ask a question?

15                    MS. ALEXANDER:   Sure.

16                    MR. RAO:   Are any of the district's  
17       staff coauthors on your applications?

18                    THE WITNESS:   No, they're not.

19                    MR. RAO:   Thank you.

20       BY MS. ALEXANDER:

21             Q.       Did the district provide you with  
22       any kind of administrative support, logistical  
23       support, for any aspect of the study?

24             A.       They offered to provide the

1 administrative support in preparing the CHEERS  
2 final report and there probably wouldn't have been  
3 the errata sheet had I taken them up on that  
4 offer, but we did that internally at UIC, meaning  
5 there wouldn't have been, you know, the mistakes,  
6 the omissions or mislabeled figures or figures  
7 that didn't appear, but there was a caption.

8           They probably would have done a  
9 more professional job of packaging the report, but  
10 they did offer administrative support, but I  
11 didn't follow up on it. I didn't ask them to  
12 provide it and we didn't -- I didn't use that -- I  
13 didn't request any help.

14           Q.       Okay. Have you ever had a  
15 discussion with district staff or commissioners on  
16 the general matter of this efficiency of the  
17 CHEERS study as a basis for determining whether  
18 disinfection is necessary in the CAWS?

19           A.       No.

20           Q.       Okay. Have you ever previously been  
21 involved in any epidemiology research that you  
22 knew would be considered in a publication health  
23 or safety decision-making process? I mean, I know  
24 it all potentially can be, but that you knew

1 specifically was going to be considered.

2 A. I did a study of air pollution  
3 surrounding public housing high-rises that were  
4 undergoing demolition on the south side of Chicago  
5 and the near west side of Chicago and I measured  
6 particulate matter, dust in the air, during  
7 demolition and on days where there was no  
8 demolition taking place and I monitored the health  
9 of people with asthma who lived in public housing  
10 buildings that were not being demolished, but were  
11 right next to the demolition sites and I expected  
12 that at some levels that's going to become  
13 relevant in policy or regulatory matters.

14 Q. Was there a particular policy or  
15 regulatory matter at stake there that was at issue  
16 when you were doing your research?

17 A. The research wasn't conducted in  
18 order to address a specific policy regulatory  
19 matter, but the US EPA every five years conducts  
20 reviews of the literature of air pollutants and  
21 generates new criteria documents and has the  
22 opportunity to issue new or revised criteria.

23 So the research wasn't done in  
24 response to a request to answer a policy decision,

1 but I expected that at some level it will impact  
2 policy or at least be or considered by  
3 policymakers.

4 Q. So, in other words, EPA collects a  
5 lot of epidemiologic data every five years and  
6 they make their decisions, is that what you're  
7 saying?

8 A. I'm saying that, yes.

9 Q. Okay.

10 A. I also communicated with city of  
11 Chicago agencies, the Department of the  
12 Environment and, I think, it's the Department of  
13 Buildings. I'm not a hundred percent sure about  
14 that, but -- and also the Chicago Housing  
15 Authority about hazardous situations that were  
16 observed in the process of conducting the study  
17 and communicated with them the need to respond and  
18 do something different at demolition sites.

19 Q. Were you involved in any way in  
20 drafting or reviewing any of the written material  
21 that the district issued concerning the  
22 significance of the CHEERS study results?

23 A. What -- well, the short answer is  
24 no, but I'm not sure what specifically -- what

1 statement was communicating the significance of  
2 the CHEERS results.

3 Q. Just to be specific in terms of what  
4 I'm aware of which may not be the universe. There  
5 was testimony at the last set of hearings  
6 concerning a press release, which my recollection  
7 is you said you were not involved in. More  
8 recently there has been a pamphlet called the  
9 Disinfection Debate. Were you involved at all in  
10 reviewing or drafting or commenting on that?

11 A. No, I haven't seen that.

12 Q. Okay.

13 MS. TIPSORD: I think all three of  
14 us -- the Disinfection Debate pamphlet, is that  
15 part of the record at this point?

16 MS. ALEXANDER: It will be.

17 MS. TIPSORD: Okay. That's where I  
18 was going.

19 MS. ALEXANDER: Good morning.  
20 Dr. Gorelick is here.

21 MS. TIPSORD: Good morning.

22 BY MS. ALEXANDER:

23 Q. Moving onto pre-filed question  
24 three. Can you please describe for me the nature

1 of your contractual relationship with the Water  
2 Reclamation District in connection with this  
3 study?

4 A. I don't have a contractual  
5 relationship with the Water Reclamation District.  
6 The Water Reclamation District has something  
7 called a master agreement with the University of  
8 Illinois and this allows the University of  
9 Illinois, not specifically UIC, but the University  
10 of Illinois to contract with the Water Reclamation  
11 District in sort of a streamline way. The  
12 University of Illinois at Chicago, UIC, has a  
13 contract with the Water Reclamation District for  
14 this research and I'm an employee of the  
15 University of Illinois, but I don't have a  
16 contract with the -- I don't have a contractual  
17 relationship with the district.

18 Q. So help me understand how the  
19 financial arrangement works. There's a blanket  
20 amount of money that is allocated to the  
21 university for all research or was there a  
22 specific allocation by the Water Reclamation  
23 District for your research?

24 A. There was a specific allocation.

1 Q. And were there any additional terms  
2 or conditions associated with that allocation that  
3 you're aware of?

4 A. What do you mean by terms or  
5 conditions?

6 Q. My understanding, and correct me at  
7 any point if I'm wrong, is that there is an  
8 overall agreement with the University Illinois for  
9 the conduct of scientific research at the request  
10 of the Water Reclamation District, is that the  
11 case?

12 A. Yes.

13 Q. Okay. And within that framework,  
14 funds are periodically authorized by the district  
15 for this or that research, is that correct?

16 A. Yes.

17 Q. And would there be some kind of  
18 directive instructions, anything that comes along  
19 with that? I mean, how do you know what your  
20 marching orders are when you get the allocation?

21 A. Right. That's where the specific  
22 contract for a given -- I guess maybe I'm not  
23 exactly sure what the district calls it. Maybe  
24 something like a work order or something like that



1 that the university and the district have a  
2 contract about the specific project which  
3 describes what the project is and what UIC will do  
4 and I imagine that that's part of the record. I  
5 may be wrong, but it might be. It's public and I  
6 think maybe in 2008 we talked about it.

7 Q. Okay.

8 MR. JOHNSON: Dr. Dorevitch, it  
9 seems like we're dancing around the question. Let  
10 me be blunt. During the course of this study and  
11 from the first time you met with people at the  
12 district until today, has anyone from the district  
13 ever suggested to you what they wanted the outcome  
14 or the conclusion of your study to be?

15 THE WITNESS: No, they didn't tell  
16 me, suggest, what they wanted the outcome to be.  
17 I'm aware of their position on the disinfection  
18 issue. So it's sort of obvious what conclusion  
19 would support their position, but, no, it was  
20 never presented to me this is what we want to see  
21 in the results or maybe in a more subtle way  
22 suggesting what sort of findings the district is  
23 hoping to see. That's never happened.

24 MR. JOHNSON: Okay. Thanks.

1 THE WITNESS: Sure.

2 BY MS. ALEXANDER:

3 Q. I won't weigh in on the question of  
4 whether that's granted in the record -- or the  
5 contract or I should say because I haven't seen,  
6 but I just want to ask you a couple questions  
7 about it.

8 A. Sure.

9 Q. Did the contract, to your knowledge,  
10 contain any terms concerning the nature of the  
11 study design?

12 A. Yes. I developed a proposal that  
13 went before the Board of Commissioners and Water  
14 Reclamation District in April of 2007 and I  
15 described what the study would do and how it would  
16 do it and how many people we needed to recruit and  
17 when we would -- I believe when we would begin our  
18 fieldwork and how long it would take. So that  
19 information became an attachment to the contract.

20 Q. Okay. All right. Moving onto  
21 pre-filed question four. And that question is,  
22 does the report submitted to the Board on August  
23 31st as amended by the September 20th errata  
24 represent the final version addressing the first

1 two study objectives?

2 A. Yes.

3 Q. Okay. Can you just clarify why the  
4 errata sheet was necessary? Did you have a  
5 corrected version as of August 31st, but were not  
6 able to send it for some reason or were these  
7 corrections made after August 31st?

8 A. I had a version -- I had a file that  
9 became corrupted when I was trying to PDF it. So  
10 I had to go back to a previous version. So the  
11 changes -- so the version that was submitted on  
12 August 31st had little comments in there to myself  
13 like "Don't forget to add this" and that appears  
14 in the final version of the report and the errata  
15 replaces those comments with what was meant to be  
16 added in that location.

17 Q. Okay. Moving onto pre-filed  
18 question five. Did the CHEERS study review that  
19 illness rates differed within the CAWS in the  
20 general use waters depending on location?

21 A. There's a table in chapter five,  
22 Table V-9, that includes rates of illness by  
23 location group, by say CAWS North System or  
24 Cal-Sag or Lake Michigan beaches, but those are

1 unadjusted. Those are what I would call crude  
2 rates. So it doesn't take into account the types  
3 of recreational activity that are taking place at  
4 those locations, the age, gender, health status of  
5 the study participants. So there is information  
6 reported about rates of illness by group, but  
7 those are not meant to suggest that -- those are  
8 not final results of no kind. Those are data that  
9 need to be analyzed more completely and that's  
10 what was done in the report. That's presented in  
11 later tables in the report.

12 MS. TIPSORD: Just to clarify Table  
13 V-9 is V as in Roman numeral V --

14 THE WITNESS: Right.

15 MS. TIPSORD: -- 9 and it's on what  
16 is V-2 of the report?

17 THE WITNESS: Let me check that.

18 MR. ANDES: Yes.

19 BY MS. ALEXANDER:

20 Q. Bear with me one minute. I thought  
21 I had it in front of me. I'm trying to pull it so  
22 we all have it.

23 MS. TIPSORD: Do you have it? I  
24 have it right here.

1 BY MS. ALEXANDER:

2 Q. I actually had it separately as an  
3 exhibit pulled out and for some reason it seems to  
4 have disappeared off the table. If you can just  
5 give me two seconds. I should be able to find it.  
6 You said V-9, right?

7 A. I said that. I'm checking to make  
8 sure I said the right thing. Yes, V-9. Roman  
9 numeral V-9.

10 MS. TIPSORD: Just for the record,  
11 too, before we get very far as I'm seeing this up  
12 here off the record, the page numbering is off.

13 THE WITNESS: Right.

14 MS. TIPSORD: There is more than one  
15 V-2. There's actually three V-1's. So this is  
16 actually on the second V-2 of the final report,  
17 which is Public Comment 41.

18 MS. ALEXANDER: What I have done,  
19 assuming people believe it is helpful, is these  
20 have been copied -- each portion of the text that  
21 we were going to be discussing is a separate  
22 exhibit. So we can pass them out as exhibits and  
23 discuss them that way or you can just refer to  
24 your text. Either way is fine with me.

1 MS. TIPSORD: Does -- I mean, we  
2 have the copy in front of us, but it might be  
3 easier since there are page numbers that are off  
4 to go ahead and do them as exhibits.

5 MS. ALEXANDER: So I always ask  
6 this. What are we up to?

7 MS. TIPSORD: I forget already.  
8 399.

9 BY MS. ALEXANDER:

10 Q. I would like to present Exhibit 399,  
11 an excerpt from the CHEERS final report which  
12 includes Table V-9 that we have discussed. So  
13 looking at Table V --

14 MS. TIPSORD: Hang on. I'm sorry.  
15 Okay. I was just double checking to be sure that  
16 the numbers line up and everything. I have been  
17 handed an excerpt of the what is Public Comment  
18 484 from chapter five of 484 beginning -- the page  
19 numbers of this excerpt from chapter five begin  
20 with what is the third V-1 on PC 484 and go  
21 through V-13. If there are no objections, we will  
22 make this excerpt as Exhibit 399. Seeing none,  
23 it's Exhibit 399.

24

1 (Document marked as IL EPA  
2 Exhibit No. 399 for  
3 identification.)

4 MS. TIPSORD: Okay. Go ahead, Ms.  
5 Alexander.

6 BY MS. ALEXANDER:

7 Q. Okay. All right. Looking at Table  
8 V-9 that you were just discussing, these questions  
9 are with the understanding as we just explained  
10 that these are unadjusted numbers, but my question  
11 is, do these -- isn't it the case that these  
12 numbers reflect divergent numbers of cases of AGI  
13 per 1,000 individuals depending on location within  
14 the CAWS and within the general use waters?

15 A. I wouldn't say depending on  
16 location. I would say it may be dependant on  
17 other factors like what recreational activity  
18 takes place at these locations or how wet do  
19 people get at these locations. So I wouldn't say  
20 it's depending on location. I'd say that the  
21 table presents cases of illness, cases of acute  
22 gastrointestinal illness per 1,000 by location  
23 group and those unadjusted rates are not all the  
24 same, but I wouldn't say that it's because they're

1 at different locations or there's something about  
2 the location, per se, that is driving those  
3 differences.

4 Q. Did you do any analysis to determine  
5 whether the adjusted rates of illness differed  
6 within the CAWS or within the general use waters?

7 A. No.

8 Q. Okay.

9 A. But my understanding is that the  
10 CAWS -- the study objective is to evaluate rates  
11 of illness attributable to CAWS recreation and not  
12 rates of illness attributable to specific  
13 locations on the CAWS. That can be done, but  
14 that's never been the question that the study was  
15 designed to answer.

16 Q. Okay.

17 MR. ANDES: As a follow-up.

18 THE WITNESS: Yes.

19 MR. ANDES: Is it your sense that  
20 people will recreate on various different areas of  
21 the CAWS?

22 THE WITNESS: People recreate on  
23 various areas of the CAWS, yes.

24 MR. ANDES: And they may travel from



1 an area of the CAWS to another area of the CAWS?

2 THE WITNESS: Yes.

3 MR. ANDES: Thank you.

4 BY MS. ALEXANDER:

5 Q. And just to follow-up on that. If  
6 I'm understanding you correctly, you don't have  
7 any data concerning where they traveled on the  
8 CAWS exactly and how the rates of illness might or  
9 might not have differed among those different  
10 areas, is that correct?

11 A. Yes and no. Yes, I have information  
12 about where people travel. If somebody started  
13 out at one location and ended at a different  
14 location, I know that if somebody traveled in one  
15 direction, turned around, and came back to their  
16 starting location I know what direction they  
17 traveled in and their estimate of how far they  
18 went, but, no, I don't have health information  
19 that takes into account those types of sort of  
20 crossing reaches of the CAWS.

21 MS. TIPSORD: Ms. Meyers Glen.

22 MS. MEYERS-GLEN: Stacy Meyers-Glen  
23 with Openlands.

24 MS. TIPSORD: I can't hear you.

1 Sorry.

2 MS. MEYERS-GLEN: Story of my life.  
3 Stacy Meyers-Glen with Openlands. I just have two  
4 follow-ups, if I may. Along those lines is there  
5 anything prohibiting people from rowing right past  
6 the outfall of the north side MWRD plant to a  
7 location such as -- from Oakton Boat Launch, let's  
8 say, upstream to a location like River Park on the  
9 North Shore or north branch of the Chicago River  
10 so they could start upstream and go right past the  
11 outfall and go downstream to a location and get  
12 out? Is there anything stopping that from  
13 happening?

14 THE WITNESS: I believe when people  
15 rent canoes or kayaks there, they're told to go  
16 north, to go upstream, but I don't think there's  
17 any physical barrier to them going downstream.

18 MS. MEYERS-GLEN: Okay. And  
19 CHEERS -- the study only sampled about a half a  
20 mile from outfall and not at the point of  
21 discharge, correct?

22 THE WITNESS: About half a mile  
23 upstream of the outfall, but more than half a mile  
24 downstream. The location downstream that was

1 generally sampled for the north side plant was at  
2 Lincoln Avenue, which is about two miles  
3 downstream.

4 MS. MEYERS-GLEN: And did the CHEERS  
5 study talk to anyone at the Summit Boat Launch  
6 downstream of the Stickney waste water treatment  
7 plant?

8 THE WITNESS: No.

9 MS. MEYERS-GLEN: And what attempts  
10 were made to gather information about users for  
11 this location?

12 THE WITNESS: Is that the same as  
13 the Western Avenue launch?

14 MS. MEYERS-GLEN: No. It's further  
15 south. It's actually downstream of the Stickney  
16 waste water plant.

17 THE WITNESS: I don't know. I know  
18 that project staff went out to a variety of  
19 locations looking for people to recruit, trying to  
20 identify busy recreational areas. I don't know if  
21 the Summit location was evaluated and had very  
22 recreational activity or if it wasn't evaluated.

23 MS. MEYERS-GLEN: Are you aware of  
24 any information that suggests that people actually

1 do use that boat launch?

2 THE WITNESS: I don't -- no, I'm not  
3 aware of it and I'm not disputing it, but I don't  
4 know what happened when, you know, field staff  
5 went out four years ago or three and a half years  
6 ago to specific locations.

7 MS. MEYERS-GLEN: Thank you.

8 MS. TIPSORD: Ms. Alexander?

9 BY MS. ALEXANDER:

10 Q. Sure. Just one moment. Now,  
11 generally speaking, would it be your understanding  
12 that it's possible that indicators and/or  
13 pathogens have different characteristics of  
14 transport survival fate and regrowth in different  
15 areas of the general use waters or the CAWS?

16 A. Yes, that's possible.

17 Q. Okay. And that could depend, for  
18 example, on whether they're flowing or not  
19 flowing?

20 A. Yes.

21 Q. Okay. I'm going to move onto  
22 pre-filed question six. Can you explain to me how  
23 your set of questions concerning water exposure in  
24 the CHEERS study was developed?

1           A.       The questions were developed in part  
2       from the NEEAR study, the NEEAR study, NEEAR, is  
3       the US EPA's research study of the health risks of  
4       water recreation at beaches and specifically  
5       swimming at beaches. Their questionnaire has  
6       items about getting wet and swallowing water and,  
7       where possible, I use that information in  
8       developing our questions. They're not identical  
9       in the NEEAR study -- well, in CHEERS's, we asked  
10      each person the questions about did your face get  
11      wet or did your hands get wet. In the NEEAR study  
12      they asked one person in a family group about how  
13      wet other people in the group got.

14                   So we change that aspect of it  
15      and because we were looking at limited contact  
16      activities I got more specific about what part of  
17      your body got wet and how wet did it get because  
18      obviously in swimming the expectation is if you're  
19      swimming your whole body gets wet. So some  
20      questions were adapted from the NEEAR  
21      questionnaire and others were created de novo  
22      because nobody had ever asked such questions  
23      before. So to the degree possible, I developed  
24      them using the NEEAR questions as a starting

1 point.

2 Q. Were they validated?

3 A. They were validated to the degree  
4 that the NEEAR study questions were validated, but  
5 beyond that the study that I mentioned to you that  
6 we were discussing earlier about swimming in a  
7 pool and getting wet and measuring cyanuric acid,  
8 that was done to evaluate the validity of how much  
9 water did you swallow question and the conclusion  
10 was, yes, that those questions were valid. So, in  
11 that respect, I validated the water ingestion  
12 portion of the questionnaire.

13 Q. So you validated water ingestion  
14 portion, but not the other portions concerning  
15 degree of wetness, splashed, drenched, et cetera,  
16 would that be correct?

17 A. It would be challenging to do that.  
18 I did conduct another small study where we had  
19 sponges on people, where we had sponges that were  
20 affixed to a life jacket or an ankle and the study  
21 was designed to, like you said, validate the  
22 exposure questions. This required developing a  
23 method that's unlike the swimming pool cyanuric  
24 acid, which I had previously described. No

1 similar method existed for evaluating splash  
2 exposures to the body.

3 So I developed a method, and we  
4 tried it in the field, and those data show a  
5 relationship, but the analysis isn't complete and  
6 it hasn't been sent for peer review. But what I  
7 would say is an effort was made to validate those  
8 questions as well.

9 MR. ANDES: And if I can follow up,  
10 the panel that indicated that your ingestion  
11 questions are valid, including Dr. Dufour, who is  
12 the EPA person who developed the original bacteria  
13 standards for EPA, am I right?

14 THE WITNESS: Yes, that's right.

15 BY MS. ALEXANDER:

16 Q. Now, in your swimming pool studies  
17 of the kayakers, how long were the kayakers in the  
18 water?

19 A. An hour.

20 Q. And what did you instruct the study  
21 participants to do during that water?

22 A. To do what they do when they kayak.  
23 That was the equivalent of what the EPA did in  
24 their study where they told people do what you do

1 when you swim, but there were sessions where kayak  
2 instructors and their classes were learning to do  
3 Eskimo rolls and recover from capsizing  
4 participated in this study.

5 So on days that certified  
6 instructors were present, people could do the  
7 rolling and the recovery and I'd say a lot of  
8 teenagers and preteens did a whole lot of  
9 unrequested capsizing of each other. So there was  
10 substantially more water exposure there than  
11 occurred in the CHEERS study.

12 MS. TIPSORD: I'm sorry.  
13 Ms. Meyers-Glen?

14 MS. MEYERS-GLEN: Just one follow  
15 up, if I may.

16 MS. TIPSORD: Speak up.

17 MS. MEYERS-GLEN: Stacy Meyers-Glen  
18 with Openlands. Did you consider survey findings  
19 along the lines of time from Openlands and Friends  
20 of the Chicago River that the majority of trips in  
21 northeastern Illinois that lasted two to four  
22 hours was 48 percent of the participants and that  
23 the second highest was four to six hours, which  
24 was 30 percent of the participants in that study?



1 THE WITNESS: So -- I'm sorry. What  
2 is the question?

3 MS. MEYERS-GLEN: Did you consider  
4 surveying findings from -- that were introduced  
5 into evidence previously in this proceeding from  
6 Openlands and Friends of the Chicago River for the  
7 majority of trips in northeastern Illinois lasted  
8 two to four hours that was 48 percent of study  
9 participants at that the second highest was four  
10 to six hours and that was 30 percent of the  
11 participants?

12 THE WITNESS: I didn't consider that  
13 in the analysis of the swimming pool data, which  
14 was what we're talking about now. I agree I've  
15 observed in the CHEERS study that there are people  
16 that especially on, say, the Des Plaines River,  
17 canoe marathon people who are on the water for  
18 many hours and for the Friends of the Chicago  
19 River Flat-Water Classic many hours. So what  
20 you've described sounds not -- sounds similar,  
21 sounds comparable to the duration of recreational  
22 activity that we sought for kayakers and canoers  
23 in the CHEERS, but specifically about validating  
24 the questionnaire here, the issue is if somebody

1 says that they swallowed a mouthful of water, how  
2 many milliliters of water was that.

3 It's different if they say they  
4 swallowed a drop of water or if they say they  
5 swallowed no water and that's what took place in  
6 the swimming pool study and that's where we found,  
7 yes, there are differences and if somebody says  
8 they swallowed a mouthful of water that is about  
9 five times the amount of water that somebody  
10 said -- that somebody swallowed if they say, no, I  
11 don't remember getting any in my mouth.

12 MS. MEYERS-GLEN: In the swimming  
13 pool study, did you give people an option of  
14 specifying a specific number of mouthfuls more  
15 than one that they swallowed or was it identical  
16 to the CHEERS study where it was just one mouthful  
17 or more?

18 THE WITNESS: It was identical to  
19 the CHEERS questionnaire.

20 MR. ANDES: In the CHEERS study,  
21 what percentage of people did report swallowing a  
22 mouthful or more?

23 THE WITNESS: About half a percent,  
24 a little less than half a percent.

1 MS. MEYERS-GLEN: In developing  
2 these questions, other than the swimming pool  
3 study that you mentioned and the incomplete  
4 research with the sponge affixed to the body, did  
5 you make any other efforts to fine-tune the  
6 questions and, by that, I mean, did you try  
7 different types of questions or similar questions  
8 to see if they illicit different types of  
9 answers?

10 THE WITNESS: We did some pilot work  
11 in -- it must have been June, May or June of 2007,  
12 where we developed our questionnaire and based on  
13 the NEEAR study and then recruited people. A  
14 bunch of them were from Friends of the Chicago  
15 River guides and there was a little tour that was  
16 happening near Armitage and the north branch and  
17 we administered the questionnaires not to enroll  
18 these people in the CHEERS study, but to evaluate  
19 people's responses to the questions and to  
20 identify questions that were poorly worded or  
21 ambiguous or, you know, just seemed to be off  
22 track.

23 So, yes, that he was done and  
24 then the final version of the questions that were

1 submitted as part of the quality assurance project  
2 plan back in July of 2008 to the Board includes  
3 the questions that sort of pass that pilot stage.

4 BY MS. ALEXANDER:

5 Q. Okay. Did you ever write up that  
6 pilot analysis in any way?

7 A. No, I didn't. I have the piloted  
8 version and the final version, but, no. I had to  
9 recruit 11,000 people so that definitely took the  
10 backseat.

11 Q. Did you ever ask participants  
12 specifically to tell you the duration of their  
13 trip?

14 A. I did, but I think ultimately the  
15 best data we have there comes from the  
16 questionnaires and that the questions were  
17 administered using a computer -- computer-assisted  
18 interview technique. So there's a time signature  
19 on the interviews so when somebody completes their  
20 pre-recreation interview I know what time that was  
21 and then when they go and do their recreation and  
22 they come back and then we interview them for the  
23 field interview B, I know what time that started.

24 So I think that those estimates

1 are probably the best estimates we have rather  
2 than the self report because there were some that  
3 just didn't seem plausible.

4 Q. Did you specifically use the  
5 duration data in determining your study results?

6 A. No.

7 Q. Okay.

8 MR. ANDES: Would duration -- if the  
9 purpose of this study was also to determine who  
10 got sick, would duration of exposure be  
11 necessarily part of recording those results?

12 THE WITNESS: Duration of exposure  
13 wouldn't -- it isn't part of determining if  
14 somebody got sick. Conceivably, if people on  
15 places where water quality was very different than  
16 others had a much longer or a much shorter  
17 duration of recreation that could influence the  
18 results, but by the same token, we took into  
19 account self-reported exposure and, again,  
20 presumably the more somebody is kayaking, the more  
21 opportunities for exposure.

22 So I think ultimately what  
23 matters is the exposure, not the duration of  
24 somebody kayaked for five hours and didn't get wet

1 at all, that's not what matters. What matters is,  
2 you know, how wet did they get or did they swallow  
3 water.

4 BY MS. ALEXANDER:

5 Q. But it's possible then that some  
6 people would have been out for less than an hour  
7 and some people might have been out for close to  
8 all day and that's just not data that you  
9 tabulated or factored in, is that correct?

10 A. I did summarize. It isn't in the  
11 report, but I have summarized the duration of  
12 recreation by activity, but, you know, like I  
13 said, it would only matter in theory at least if  
14 there were big differences. Let's say CAWS  
15 recreators were on the water for much longer or  
16 much shorter than people in the general use  
17 waters.

18 Q. But speaking within the four  
19 corners of the report, we don't know, for  
20 instance, as a statistical matter whether people  
21 are taking longer trips in the general use waters  
22 than they are in the CAWS?

23 A. From -- right. The report doesn't  
24 have that information in it. I would say that in

1 the NEEAR study they report swimmer/nonswimmer  
2 differences. The analyses of swimming generally  
3 just count somebody as a swimmer, not  
4 differentiating two minutes of swimming or two  
5 hours of swimming.

6 So I think we're following the  
7 approach that was used in the NEEAR study and the  
8 CHEERS peer reviewers including the leadership of  
9 the NEEAR study didn't have any issue with not  
10 adding to our models something that would account  
11 for duration of recreation.

12 Q. Just specifically in terms of the  
13 questions, if I'm understanding correctly, you  
14 gave survey choices to people that they could  
15 specify in terms of their water exposure, non,  
16 sprinkled, splashed, drenched or submerged, is  
17 that correct?

18 A. Yes.

19 Q. Then you asked them to specify what  
20 part of their body was thus exposed?

21 A. The opposite, but, yes.

22 Q. Okay.

23 A. First, we asked them -- the logic  
24 was, first, did any part of your body get wet

1 today.

2 Q. Right.

3 A. Then came, you know, what part of  
4 your body got wet or what parts and then for each  
5 body region, those questions about not at all,  
6 splashed, drenched -- sprinkled, splashed,  
7 drenched, submerged.

8 Q. So in some cases you'd be asking  
9 people to remember, for instance, whether their  
10 leg got sprinkled during a five-hour trip and in  
11 other cases, you'd be asking them to remember that  
12 same information after a half hour trip, is that  
13 correct?

14 A. Unless we were right there in the  
15 kayak with them asking them every half hour,  
16 right, we'd have to settle for asking them when  
17 they finished their recreation and if it was a  
18 ten-minute trip, it would be what happened ten  
19 minutes ago and if it was a five-hour trip, it  
20 would be what's happened over the last five hours.

21 Q. So is it possible then that people  
22 who are out all day or for five hours might not  
23 have quite as clear a memory of whether their leg  
24 got sprinkled than the people who were out for



1 half an hour?

2 A. That is possible.

3 MR. ANDES: Would that be true of  
4 the people on the CAWS as well as the people in  
5 the general use waters?

6 THE WITNESS: That would be true for  
7 both.

8 BY MS. ALEXANDER:

9 Q. And is it possible that the people  
10 on the CAWS, if they perceived that water body to  
11 be less clean, might be more acutely aware of  
12 whether their leg got sprinkled than the people in  
13 the general use waters?

14 A. The people on the CAWS perceive the  
15 same level of risk as people on the general use  
16 waters. So I don't think that that's what  
17 happened.

18 Q. What are basing that on?

19 A. We asked the question -- well, we  
20 asked the question what is -- on a scale of zero  
21 to ten where zero is not at all and ten is very  
22 risky, how much of a health risk do you think it  
23 is to use the Chicago River system for water  
24 recreation.

1           Q.       Did you ask them on the different  
2 waterbodies whether they behaved differently,  
3 anything like that?

4           A.       We didn't ask them if they behaved  
5 differently, but we asked them individual  
6 questions about how wet they got.

7           MS. TIPSORD: Can I ask a question?

8           THE WITNESS: Yes.

9           MS. TIPSORD: This is something  
10 after reading the testimony that we're going to be  
11 hearing over the next couple of days. And some of  
12 the testimony in evidence we've had before about  
13 suspect class and whether or not there are suspect  
14 classes and stuff like that.

15                   My question is, did you have any  
16 indication or do you have any indication from this  
17 survey that, for example, pregnant women are  
18 deciding not to recreate on the CAWS at all so  
19 that's maybe why they don't show up in your survey  
20 for children under six, their parents aren't  
21 allowing them to recreate on the CAWS?

22           THE WITNESS: Well, I don't have any  
23 information about pregnant women. We didn't ask  
24 women if they're pregnant. So the study couldn't

1 have answered that question. About the issue of  
2 are the people who use the waterway the same -- do  
3 they reflect the general population or are some  
4 people not recreating there for reasons like you  
5 said, the parents won't allow them or something  
6 like that, no.

7 This study begins when somebody  
8 arrives at the CAWS or at a general use water. We  
9 don't interview nonusers to see why they're not  
10 using the CAWS or general use waters.

11 BY MS. ALEXANDER:

12 Q. Regarding your question concerning  
13 perceived risks that you asked people, was that  
14 question validated in any way?

15 A. No, I'm not aware of any validated  
16 questionnaire about perceived risk. I've looked  
17 for questionnaires about perceived risk and there  
18 was a prior study that included a question of  
19 perceived risk and that's why I included one --  
20 and that was a study by Fleischer that I believe  
21 was published in 1998 and describes how risky  
22 somebody thinks using the water is an important  
23 determinant of whether they end up reporting  
24 symptoms afterwards. So that's why I put a

1 question in, but a validated question doesn't  
2 exist.

3 Q. So, in other words, if you had, say,  
4 a kayaker on the CAWS who gave a five on the one  
5 to ten scale and a kayaker on the general use  
6 waters who gave a five, you wouldn't know, for  
7 instance, whether the kayaker on the CAWS was  
8 saying, sure, it's safe if you don't fall in and  
9 the kayaker on the general use was saying, sure,  
10 it's safe to do Eskimo rolls, those would be kind  
11 of two different answers, correct?

12 A. They didn't get the same question.  
13 I mean, I should say they got the same questions.  
14 They got the question of "How much of a health  
15 risk do you think it is to use the Chicago River?"  
16 If somebody was at the Skokie lagoons, they got  
17 the question -- "How much of a health risk do you  
18 think it is to use the Chicago River?" So the  
19 question is about perceived risk of Chicago River  
20 use. So it might mean the same thing about  
21 Chicago River use, but just like any kind of  
22 subjective scale, like, this it might be different  
23 things for different people.

24 I don't think it means -- I

1 don't know how to determine if it means different  
2 things to people on the CAWS and different things  
3 to people on general use waters and different  
4 things to non-water users.

5 Q. And the question specifically, if  
6 I'm understanding correctly, would be, can you  
7 tell me how much of a health risk you think it is  
8 to do water sports on the Chicago River? That was  
9 the question.

10 A. Right.

11 Q. Was there any attempt to break down  
12 answers for individual water sports like whether  
13 somebody in a large power boat would answer  
14 differently from somebody in a kayak or canoe?

15 A. No, that wasn't done.

16 Q. Okay. Is it possible that among  
17 your 11,000 respondents, not all of them  
18 understood the words, for instance, splash to mean  
19 exactly the same thing?

20 A. I wouldn't expect everyone to think  
21 it means exactly the same thing, but I wouldn't  
22 expect splash to mean something different to CAWS  
23 recreators versus general use recreators.

24 Q. Well, is it possible, first of all,

1 generally speaking, that some people might think  
2 of splashed as being a few drops that fall off a  
3 paddle and somebody else might think of splashed  
4 as, you know, throwing a bucket of water at them  
5 in a water fight?

6 A. To me, throwing a bucket at a water  
7 fight that sounds like drenched.

8 Q. To you?

9 A. Exactly. So what I said is, yes, I  
10 agree with you that I wouldn't expect everybody to  
11 think it means the exact same thing, but I don't  
12 think there would be a systematic difference in  
13 that CAWS recreators thinks splash means one thing  
14 and general use water recreators on average think  
15 it means something very different.

16 Q. If it were the case since you didn't  
17 actually evaluate the specific questions that  
18 kayakers specifically were being more cautious in  
19 the CAWS and they had their sanitary wipes out and  
20 they were worried about water contact, isn't it  
21 possible that they would have a different  
22 definition of splashed and would report -- be more  
23 likely to report a few drops of water as a splash  
24 then somebody out in the general use waters of who

1 wasn't really focused on it?

2 MR. ANDES: You're constructing a  
3 hypothetical without any evidence, correct?

4 MS. ALEXANDER: There's no evidence  
5 one way or the other according -- in this  
6 framework of this testimony according to  
7 Dr. Dorevitch. Whether there's external evidence  
8 is another question.

9 BY THE WITNESS:

10 A. Well, I think -- I mean, I'm just  
11 answering the question you asked. I mean, in any  
12 study, if there's a study of a new antibiotic for  
13 strep throat and some people get the new drug and  
14 some people get the old drug, everyone is being  
15 asked how long did it take before your throat got  
16 better or something like that.

17 The assumption is that a  
18 question like that, which doesn't require any sort  
19 of specialized knowledge is going to be understood  
20 a little bit differently by all the people, but  
21 there shouldn't be a systematic difference in the  
22 way people understand that question.

23 So if I thought that CAWS  
24 recreators think water means one thing or paddle

1 means one thing and boat means one thing, but in  
2 general use waters, it means something different  
3 that would have been problematic, but I had no  
4 reason to think that, you know, these common words  
5 mean different things to people, many of whom, use  
6 both CAWS and general use waters.

7 BY MS. ALEXANDER:

8 Q. Did you do anything to determine  
9 whether there was a systematic difference between  
10 the CAWS and the general use other than that one  
11 question about perception of risk of water sports  
12 generally?

13 A. Well, in the CHEERS report in  
14 chapter three, the August 31st report, there is a  
15 Table III-17 and that table breaks out for boaters  
16 separately, for canoers separately, for kayakers  
17 separately, for rowers separately and for fishers  
18 separately, how wet people reported getting on the  
19 CAWS and the locations. So, in that table, it  
20 does show differences in how wet people got in the  
21 CAWS and their reported wetness is different and I  
22 suspect that the difference in wetness does have  
23 something to do with perceived risk and efforts to  
24 avoid water contact at the CAWS.



1 MS. WILLIAMS: Can I ask a follow-up  
2 to that?

3 MS. TIPSORD: You need to identify  
4 yourself for the record.

5 MS. WILLIAMS: I'm Debra Williams  
6 for the Illinois Environmental Protection Agency.

7 MS. TIPSORD: I only heard about a  
8 third of that. I'm sorry.

9 MS. WILLIAMS: I'm Debra Williams,  
10 Illinois Environmental Protection Agency.

11 MS. TIPSORD: Did you get that?

12 THE COURT REPORTER: Yes.

13 MS. WILLIAMS: Dr. Dorevitch, is it  
14 also possible that the differences in wetness you  
15 described can be related to the physical nature of  
16 the CAWS versus the other waterbodies you studied?

17 THE WITNESS: It is possible that  
18 wetness has to do with things -- I assume you mean  
19 things like flow or turbulence, is that what you  
20 mean when you say physical conditions?

21 MS. WILLIAMS: And the vertical  
22 walls and the nature of activity occurring.

23 THE WITNESS: I'm talking about  
24 nature within factors --

1 MS. WILLIAMS: Are you --

2 THE WITNESS: -- but kayakers.

3 MS. WILLIAMS: But kayakers who are  
4 forced to enter and exit at specific designated  
5 points in the system, that type of  
6 physical factors?

7 THE WITNESS: Let's say a CAWS  
8 location is you have to walk in the water or at  
9 several locations you have to walk into the water  
10 launch or something like that, those physical  
11 factors?

12 MS. WILLIAMS: I mean, it's not --  
13 don't worry about my perception of physical -- my  
14 question to you is, do you see any physical  
15 differences between the water -- the CAWS waters  
16 and other waters that you studied that could  
17 relate to wetness. If the answer is no, that's  
18 fine.

19 THE WITNESS: I just want to make  
20 sure I understood the question. I don't -- I'm  
21 not specifically attributing differences in  
22 wetness among CAWS recreators or swallowing water  
23 among CAWS recreators versus swallowing water  
24 among general use recreators to something very

1 specific. It could be because of perceived risk.  
2 It could be because of physical factors, but  
3 differences do exist and I wouldn't expect  
4 physical factors to translate into something like  
5 how much water people swallow.

6 MS. WILLIAMS: You think it's more  
7 likely it's perceived?

8 THE WITNESS: I do. If there were,  
9 let's say, a general use water where capsizes  
10 occurs frequently, in that case, I would say it  
11 may have nothing to do with what you perceive.  
12 You're getting knocked out your kayak every time  
13 so you're swallowing a lot of water, but that was  
14 a rare event and wouldn't have enough people to  
15 capsizes to influence these results.

16 MS. WILLIAMS: Thank you.

17 MS. TIPSORD: Ms. Alexander?

18 BY MS. ALEXANDER:

19 Q. So just to summarize where we are,  
20 you have your non-validated question concerning  
21 perceived risk. You have the data concerning  
22 exposure, which does seem to be different between  
23 the CAWS and the GWU, but you have not actually  
24 evaluated that to see if there is any difference

1 in what it's based on?

2 A. I take issue with all of the  
3 questionnaire is non-validated.

4 Q. I don't mean --

5 A. I think these questions in these  
6 questionnaires went through a much higher  
7 process -- you know, a much more involved  
8 validation process than your run of the mill  
9 survey, you know, health survey or something like  
10 that. So, you know, elements of it actually were  
11 validated using, you know, complex measurements of  
12 chemicals in pool water and urine and other  
13 aspects of it were taken directly from the EPA  
14 NEEAR study.

15 So -- and they had a process in  
16 place that developed their questionnaires. So I  
17 wouldn't overstate the idea that nobody knows if  
18 any of the information means anything. I think  
19 there's real information there.

20 Q. Okay. I appreciate the answer, but  
21 it's not to the specific question I asked, which  
22 was specifically regarding your question on  
23 perceived risk, you had the one question, which  
24 was whether people perceive the risk of, quote,

1 unquote, water sports to be at some level on a one  
2 to ten scale, that specific question was not  
3 validated, correct?

4 A. If I knew how to validate that, I  
5 would have validated that, but I don't think there  
6 is a simple way to figure out if somebody says "I  
7 think it's a seven level of risk" you know, what  
8 inside their head is really going on. It's the  
9 best available information that I was able to  
10 collect.

11 Q. Okay. So you have that and then you  
12 have what appears to be an actual difference in  
13 people's level of wetness, but we do not have  
14 analysis to determine why that would be different?

15 A. Right.

16 Q. Okay.

17 MR. ANDES: Let me follow up. In --  
18 did any of that affect your study results in terms  
19 of determining how many people got sick as a  
20 result of recreation?

21 THE WITNESS: No.

22 BY MS. ALEXANDER:

23 Q. Moving on to pre-filed question  
24 number seven, could you please explain how the

1 wetness score in your study was generated for  
2 water exposure?

3 A. Yes. There were the measures that I  
4 mentioned, questions about how wet did each part  
5 of your body get. So four body regions; arm, leg,  
6 torso and face, and within each of those there  
7 were five levels of response; none, sprinkled,  
8 splashed, drenched, submerged. So none was scored  
9 as zero, sprinkled as one, et cetera. Submerged  
10 is four. So there are four body regions. Four  
11 levels of wetness. So those were some to create  
12 sort of a composite of wetness that goes from 0 to  
13 16.

14 Q. Okay. So, in other words, if  
15 somebody has a final wetness score of, say, four,  
16 it reflects some composite or combination of the  
17 number of body parts that were exposed and the  
18 degree of exposure?

19 A. Yes.

20 Q. Okay. So, for instance, this final  
21 score of four or whatever it happens to be could  
22 result either from multiple parts of the body  
23 getting slightly wet, like sprinkled, or from one  
24 part of the body getting really wet, submerged?

1           A.       Correct.

2           Q.       Has this model been validated for  
3 the wetness score?

4           A.       No. This is what was sort of my  
5 best judgment about a way to evaluate something  
6 that had never been evaluated before. So I  
7 wouldn't say that the number five is particularly  
8 meaningful or that five, let's say, means  
9 something very different than six on that scale,  
10 but what I would say is an aggregate if people on  
11 the CAWS or the general use waters have very  
12 different levels that is meaningful. If the level  
13 of wetness is a predictor of who is going to get  
14 sick, clearly there's information in that wetness  
15 score and both of those were the case.

16          Q.       But in terms of the composite  
17 nature of it, do you have any research basis to  
18 believe that multiple parts of the body getting a  
19 little bit wet has the same impact or risk as one  
20 part of the body getting completely soaked?

21          A.       We had another score called the  
22 weighted wetness score and for gastrointestinal  
23 illness thinking what somebody swallows is what  
24 matters most in determining their risk. We

1 weighted head and face more than torso and arms,  
2 and torso and arms more than feet.

3 And that also shows differences  
4 across groups, but in terms of predicting health  
5 outcomes, the wetness score performs better than  
6 the weighted wetness score. So I think you're  
7 onto something when you raise this issue of  
8 weighting and how do you know that all body parts  
9 should count the same and I did evaluate that.

10 MR. ANDES: And did the peer review  
11 panel for the report review this aspect of the  
12 study?

13 THE WITNESS: Yes.

14 MR. ANDES: And did they generally  
15 approve of this concept that you used?

16 THE WITNESS: Well, they didn't  
17 specifically comment on this, but they didn't  
18 raise any objections. They would have raised an  
19 objection if they thought there was an important  
20 issue to be worked out there.

21 MR. ANDES: Would it be possible to  
22 take a short break?

23 MS. TIPSORD: If we're finished with  
24 question seven. I would not rather break in the



1 middle of the question.

2 MS. ALEXANDER: Yeah, I think we're  
3 finished with question seven.

4 MS. TIPSORD: Okay. Let's take ten  
5 minutes.

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

9 MS. TIPSORD: I think we're ready to  
10 go back on the record.

11 Ms. Alexander, if you'd like to  
12 begin.

13 BY MS. ALEXANDER:

14 Q. Okay. I know that I said that I was  
15 moving onto question eight, but I just have few  
16 brief follow ups on things we discussed this  
17 morning. First question regarding -- your  
18 question regarding perceived risk of water sports,  
19 do I understand correctly that the question was  
20 asked only about perceived risk of the Chicago  
21 River?

22 A. Yes.

23 Q. Okay. So you did not ask people  
24 whether they perceived the general use waters to

1 be risky?

2 A. Correct.

3 Q. And so we don't have any comparison  
4 between the perceptions of the two?

5 A. Correct.

6 Q. Okay.

7 A. And, in effect, to just explain the  
8 focus of the study has been on CAWS, the issue  
9 here is all about the CAWS, and that's why that  
10 question was put in the questionnaire in the first  
11 place.

12 Q. Okay. So if somebody answered that  
13 they thought the Chicago River was a five, they  
14 might have thought that Lake Michigan or the Fox  
15 River was a one, but we wouldn't know that?

16 A. Right.

17 Q. Okay. Secondly, regarding pre-filed  
18 question seven and the wetness score, do I  
19 understand correctly that you indicated if I'm --  
20 correct me if I'm wrong, that the wetness score  
21 ultimately was a better prediction of risk than  
22 the weighted wetness score?

23 A. Yes.

24 Q. Okay. So, in other words, you

1 didn't conclude that there was a correlation  
2 between degree of wetness and degree of risk?

3 A. Yes.

4 Q. Okay. Last question about the  
5 validation before we move on, do I understand  
6 correctly that your validation of the wetness  
7 questions in the swimming pool study was done  
8 essentially in the last year of data gathering for  
9 the CHEERS study?

10 A. It wasn't the wetness question. It  
11 was specifically water ingestion and that was done  
12 in the last year of data gathering.

13 Q. So the water ingestion questions  
14 were validated after you had done most of the data  
15 gathering, is that correct?

16 A. Yes.

17 Q. Why was it done in that order? Why  
18 did you not do the ingestion survey research prior  
19 to the CHEERS study?

20 A. In the ideal world, if there were  
21 lots of years to get this done that would have  
22 been the optimal way to do it. The fact that, you  
23 know, it was validated is sort of the main  
24 takeaway message and it means we were on the right

1 track for the first three years of the study --  
2 you know, for the two prior years to the study,  
3 but the focus was on getting the field study  
4 started on time.

5 Q. Okay. So had you not been under  
6 deadline pressure to get the field study done,  
7 would you have done the validation research on the  
8 ingestion first?

9 A. I think that would have been an  
10 incredible luxury. I mean, the EPA was doing the  
11 NEEAR study before their swimming pool ingestion  
12 study was done as well. I think in the ideal  
13 world, we could take years to develop and evaluate  
14 all aspects of data collection, but, practically  
15 speaking, it isn't possible to do that.

16 Q. Moving onto question eight.

17 MR. ARMSTRONG: Can I ask one follow  
18 up question really quickly?

19 MS. ALEXANDER: Sure.

20 MR. ARMSTRONG: Andrew Armstrong for  
21 the Illinois Attorney General's Office asking  
22 about the perception of risk issue again.

23 THE WITNESS: Yes.

24 MR. ARMSTRONG: Do you have any data

1 showing what -- how users of general use waters  
2 perceived the risk of using general use waters to  
3 be.

4 THE WITNESS: I don't.

5 MR. ARMSTRONG: Thank you.

6 BY MS. ALEXANDER:

7 Q. Pre-filed question eight, can you  
8 please describe how the CHEERS study addressed the  
9 possibility of selection bias?

10 A. Selection bias is a -- the phenomena  
11 of selecting people, recruiting people, into the  
12 study -- into the sample that is studied who are  
13 not representative of the population of interest  
14 and it's primarily a problem if, let's say --  
15 let's say we thought that water recreation water  
16 qualities related to health risks so we were only  
17 going to go to locations where we thought water  
18 quality was the worst or where we thought -- or we  
19 only recruited people who we thought were most  
20 likely to get sick, we would end up with a study  
21 sample that isn't representative of the population  
22 of interest. When people approached the  
23 recreational areas for CAWS and for general use  
24 waters, the protocol called for recruiting

1 everybody -- approaching everyone who set foot in  
2 the recruiting area.

3           So if somebody was out there,  
4 they were approached and invited to be screened  
5 for eligibility and invited to be in the study.  
6 So we didn't -- it isn't so much of dealing with  
7 selection bias at the face of data analysis. It  
8 was in the design of the study that everybody was  
9 approached and that way we didn't select people  
10 based on what we thought the outcome might be or  
11 what the water quality might be. There really was  
12 no selection.

13           Q.       Now, my understanding is that you  
14 also compared observed levels of different  
15 recreational activities with the numbers involved  
16 in those particular recreational activities who  
17 are study participants, is that correct?

18           A.       On the CAWS, yes.

19           Q.       You didn't do that on the general  
20 use waters, right?

21           A.       Correct.

22           Q.       Okay. And would I be correct in  
23 noting that that data, the comparison between  
24 observed uses and study participant uses is

1 reflected in the Table III-21 of the study?

2 MS. ALEXANDER: Do people need that  
3 handed out? I can do that.

4 BY THE WITNESS:

5 A. Was it in the handout?

6 BY MS. ALEXANDER:

7 Q. It's not in the one you have  
8 already. Let me just hand it out to people.

9 MS. TIPSORD: III-21, did you say?

10 MS. ALEXANDER: Yeah. If you have  
11 it, if this is a waste of paper --

12 MR. ANDES: Can we get it?

13 MS. TIPSORD: Actually, the one is  
14 going to be on II-18. But, yeah, we'll go ahead  
15 and enter it as an exhibit.

16 MR. ANDES: That's the second II-18.

17 MS. TIPSORD: Yes. The second  
18 II-18. It's actually in Section 3.06 of Public  
19 Comment 484 and I've been handed that excerpt,  
20 which we'll mark as an exhibit for ease. If  
21 there's no objection, seeing none, I believe this  
22 is, drum roll, please, Exhibit 400. Seeing no  
23 objection, it's Exhibit 400.

24

1 (Document marked as IL EPA  
2 Exhibit No. 400 for  
3 identification.)

4 BY MS. ALEXANDER:

5 Q. Okay. To turning to the table on  
6 page II-18, which is Table III-21, would that be  
7 the table that reflects this comparison?

8 A. Yes.

9 Q. Now, I would note that you concluded  
10 in the study that the observed activities were,  
11 quote, broadly similar to the study participant  
12 activities, is that correct? I'm referring  
13 specifically to the text under the heading  
14 "Section 3.07, Summary and Conclusions"?

15 A. It says, "the distribution of  
16 activities in which CAWS participants engaged was  
17 broadly similar to all CAWS uses. Though, the  
18 study sample contained a relatively lower  
19 proportion of motorboaters and a relatively higher  
20 proportion of kayakers."

21 Q. And, in fact, the difference between  
22 the motorboaters in terms of observed CAWS uses  
23 and CAWS study participants was 35.8 versus 16.7,  
24 is that correct?



1           A.       That's correct.

2                   MR. ANDES:  So let me be clear.  So  
3 your study group had less motorboaters and more  
4 kayakers than the full population?

5                   THE WITNESS:  Correct.

6                   MR. ANDES:  So to the extent one is  
7 really trying to assess risks, the kayakers you  
8 overrepresented those folks in your study group?

9                   THE WITNESS:  Yes.

10           BY MS. ALEXANDER:

11                   Q.       In your actual findings, which group  
12 had the highest risk of illness among the  
13 recreators?

14                   A.       The boaters and fishers.

15                   Q.       The boaters, you mean the  
16 motorboaters?

17                   A.       The motorboaters.

18                   Q.       So, in other words, the motorboaters  
19 had the highest risk in your study for whatever  
20 reason, we may not be sure of right now, but those  
21 participants were underrepresented compared to  
22 general CAWS users?

23                   A.       Yes.

24                   MR. ANDES:  So the contention is we

1 shouldn't have --

2 MS. ALEXANDER: I'm not making a  
3 contention. I'm asking him to confirm an  
4 observation.

5 BY THE WITNESS:

6 A. Observation confirmed.

7 BY MS. ALEXANDER:

8 Q. Thank you.

9 MR. ANDES: So the people with the  
10 highest risk, highest risk of illness here would  
11 be motorboaters?

12 THE WITNESS: Yes. The motorboaters  
13 and fishers.

14 MR. ANDES: Not the kayakers?

15 THE WITNESS: Not the kayakers.

16 BY MS. ALEXANDER:

17 Q. Now, is it possible that there was  
18 also a difference between the parts of the CAWS  
19 and the general use waters that are most heavily  
20 used by the general population and the part that  
21 were most heavily used by your study participants?

22 A. That's a little trickier. If you're  
23 saying where does limited contact recreation take  
24 place, are you talking about throughout Chicago

1 the area or specifically at the locations where we  
2 recruited people?

3 Q. Well, my question is more general  
4 than that. I'm asking you is it possible as a  
5 general matter that the areas of the CAWS or the  
6 areas of the general use waters, I mean, the  
7 subsets of the respective waters that are actually  
8 used by the public most heavily are not the areas  
9 that are most heavily represented in your study,  
10 that there's a difference there?

11 A. Well, the areas that's most heavily  
12 used is the north branch North Shore channel and  
13 that is the area that was -- that accounts for the  
14 greatest percent of CAWS recreators.

15 MS. TIPSORD: Excuse me. I'm sorry  
16 to interrupt. We have a follow up.

17 MS. MEYERS-GLEN: Stacy Meyers with  
18 Openlands. Did you study rowers that were --

19 MS. TIPSORD: I'm sorry. You're  
20 going to have to stand up and speak to us, not to  
21 the witness, please.

22 MS. MEYERS-GLEN: Did the study take  
23 into account rowers that either were practicing or  
24 competing in Blue Island on the Cal-Sag Channel?

1 THE WITNESS: I remember that event  
2 and I know that we were trying to coordinate that  
3 event. I can't remember off the top of my head if  
4 that ended up working out or not, but that was,  
5 like, in August of 2008.

6 MS. MEYERS-GLEN: I didn't see  
7 anything in the study regarding the capture of  
8 either rowing events on the Cal-Sag Channel and I  
9 was wondering whether or not either one was  
10 present in the study?

11 THE WITNESS: Well, let me check.

12 MS. MEYERS-GLEN: Sure.

13 THE WITNESS: No. That was not part  
14 of the study. I remember my discussions with  
15 Michael O'Gorman or something like that trying to  
16 coordinate that. I know it was complicated. It  
17 had to do with these collegiate teams and what  
18 they can and can't do and we can't recruit people  
19 if they've used the water in the prior 48 hours  
20 and I think that they did not have a 48-hour  
21 period when they were not rowing. So I think  
22 that's what happened, but I know -- I think that's  
23 what happened.

24 MS. MEYERS-GLEN: So they weren't

1 captured on the Cal-Sag?

2 THE WITNESS: Not on the Cal-Sag,  
3 no. A lot of rowing teams were captured on the  
4 north branch of the North Shore Channel.

5 MS. MEYERS-GLEN: And along the same  
6 lines are you aware of how many students, either  
7 ones that are practicing outside of the CAWS  
8 school systems as well as the ones that go to  
9 school in the area and routinely practice in the  
10 CAWS, how many of them routinely practice rowing  
11 on the Cal-Sag Channel?

12 THE WITNESS: I don't know.

13 MS. MEYERS-GLEN: And did your study  
14 take into account any of the students either here  
15 or visiting here that practiced routinely on that  
16 waterway?

17 THE WITNESS: We recruited people  
18 who were there at the locations on the CAWS. So  
19 if they were there and they were eligible, we  
20 approached them and tried to recruit them.  
21 Specifically, with teams, we coordinated with team  
22 captains -- not captains, but coaches and with  
23 parents and we were able to work things out with  
24 some schools and some clubs, but not all.

1 MS. MEYERS-GLEN: And I saw that  
2 more broadly, especially in the North Shore  
3 Channel area, but my question specifically is out  
4 of Blue Island where all the students launch and  
5 then come back, was anybody there and accounting  
6 for those students that practiced routinely on the  
7 Cal-Sag challenge.

8 MR. ANDES: Your question is did  
9 they ask questions of any students at Blue Island  
10 at any time?

11 MS. MEYERS-GLEN: Yes. Sure.

12 MR. ANDES: Do you have a way of  
13 classifying students or not students?

14 THE WITNESS: No, but it's called  
15 something like the Chicago Rowing Center or  
16 something. I'm trying to remember the name of it.  
17 I know we tried to work with that -- there's a  
18 women's rowing club.

19 MS. MEYERS-GLEN: That's one of the  
20 groups that practices out of there, yes.

21 THE WITNESS: There were efforts  
22 made to coordinate with them, but they didn't work  
23 out. So we're on the Cal-Sag Channel at Worth and  
24 Alsip regularly and we were able to work things

1 out with those municipalities and approach anybody  
2 who was there, but I don't think we were ever able  
3 to work it out at the facility that you're talking  
4 about.

5 MS. MEYERS-GLEN: Thank you.

6 THE WITNESS: Sure.

7 BY MS. ALEXANDER:

8 Q. Okay. Turning back to our  
9 locational comparison, would I be correct in  
10 understanding that CAWS in the north, that  
11 category, included the locations Clark Park,  
12 Skokie Rowing Center, North Avenue, Le Moyne  
13 Magnolia, North Avenue Kingsbury and River Park.

14 A. Yes.

15 Q. Anything else? Did I leave anything  
16 out?

17 A. I think you got them all.

18 Q. Okay.

19 MS. ALEXANDER: I am going to hand  
20 out another excerpt that I will ask be marked 401,  
21 which includes at page II-1, Table III-1. Bear  
22 with me one second.

23 MS. TIPSORD: Again, it's the second  
24 II-1. It's chapter three, "Study participants.

1 Section 3.01, CAWS Uses." Public comment 484, if  
2 there's no objection, we'll mark this excerpt as  
3 401, Exhibit 401. Seeing no objection, it's  
4 Exhibit 401.

5 (Document marked as IL EPA  
6 Exhibit No. 401 for  
7 identification.)

8 BY MS. ALEXANDER:

9 Q. Okay. Turning to Table III-1, would  
10 you agree with me as an arithmetic matter that if  
11 you add up the CAWS north locations that we just  
12 cited, the Clark Park, Skokie, the two North  
13 Avenue locations and River Park, you get about 51  
14 percent?

15 A. Yes.

16 Q. And Table III-1, if I'm correct,  
17 represents your observed uses of these locations?

18 A. Right.

19 Q. Turning to Exhibit 399, which was  
20 Table V-9, I call your attention to the fact and,  
21 again, correct my arithmetic if I'm wrong that  
22 approximately 67.9 percent of actual study  
23 participants were from the CAWS north area, is  
24 that correct?



1           A.       That is correct.

2           Q.       So, in other words, you had  
3 substantially more participants in CAWS north than  
4 observed uses, is that correct?

5           A.       Yes.

6           Q.       Okay.

7                   MR. ANDES: And those were  
8 proportionally motorboaters, am I right?

9                   THE WITNESS: No.

10                  MR. ANDES: In the CAWS north area?

11                  THE WITNESS: No. Those were just  
12 proportionally kayakers, canoers and rowers.

13 BY MS. ALEXANDER:

14           Q.       Is it possible that this difference  
15 biased your study results?

16           A.       Well, as you know, we didn't report  
17 results by location group. So we have CAWS and we  
18 have general use waters and how people are  
19 distributed within CAWS isn't part of what we  
20 found. It conceivably -- you know, chapter two  
21 shows that water quality measures are generally  
22 the highest on the CAWS north. So I would suspect  
23 if there was a bias that it would be that we have  
24 more heavily exposed people in the parts of the

1 waterway that have the highest level of indicators  
2 and pathogens.

3 Q. But wasn't it -- looking again at  
4 Table V-9, wasn't it also the case that CAWS north  
5 had the lowest number of cases of AGI per 1,000  
6 users of all the areas of CAWS?

7 A. That is an unadjusted number. That  
8 isn't something to hang your hat on.

9 Q. But it's one that you have really  
10 made any attempt to adjust or figure out why that  
11 would be the case, is that correct?

12 MR. ANDES: Are you saying he should  
13 have adjusted?

14 MS. ALEXANDER: No.

15 BY MS. ALEXANDER:

16 Q. My point is that it's just not  
17 within the framework of the study to have  
18 determined whether, in fact, there is a lower risk  
19 to this CAWS north area that was disproportionally  
20 represented in the study or whether there is some  
21 other reason why the AGI numbers were lowest  
22 there, we just don't know within the four corners  
23 of the study, is that correct?

24 A. The study wasn't trying to figure

1 out rates at specific locations. The goal was to  
2 evaluate rates of illness attributable to limited  
3 contact recreation on the CAWS under current  
4 conditions and additional analyses could be done  
5 to try to figure out, you know, try to model  
6 within individual locations what is associated  
7 with illness, but that hasn't been something that  
8 I've heard anybody say they wanted up until now.  
9 I do think eventually, you know, once we start  
10 breaking things up into groups and subgroups,  
11 we're going to run into issues of power.

12 The study wasn't designed to  
13 come up with, you know, is the rate higher at  
14 North Avenue than at Clark Park or Skokie Rowing  
15 Center. It was to identify rates of illness  
16 attributable to CAWS recreation broadly.

17 MR. ANDES: And the information  
18 that -- correct me if I'm wrong, the information  
19 you collected in terms of water quality levels and  
20 illness rates, including the fact that CAWS north  
21 has higher bacteria levels and, yet, lower illness  
22 rates, that will all be factored into the  
23 supplemental report that is being prepared for  
24 filing on November 6th, am I right?

1                   THE WITNESS: Sort of. The  
2 different illness rates at locations is not being  
3 factored into anything because it's about  
4 identifying rates of illness in relation to CAWS  
5 recreation, not specific locations, but the  
6 microbe levels, yes.

7                   If people on the CAWS north are  
8 exposed to the highest microbe concentrations that  
9 information -- those microbe levels will be  
10 applied to more study participants than, say, at  
11 the mainstem where there were fewer participants.  
12 So the supplement, which we'll address the  
13 relationship between water quality and health in  
14 that sense represents a larger share of, like you  
15 said, 67.9 percent of study participants as  
16 opposed to about half of all CAWS users.

17                Q.       So, in other words, just to rap this  
18 up, in order to actually understand whether  
19 there's a difference in risk between CAWS north  
20 and the Cal-Sag, you'd have to do another study,  
21 is that correct?

22                A.       I could conduct analyses, but I  
23 haven't done that and I'm not sure I'd have to do  
24 another study if -- you know, depending on the

1 magnitude of difference the study may have  
2 adequate power to identify that, but that hasn't  
3 been something that I've heard.

4           If I thought that the -- I mean,  
5 if the Pollution Control Board wants to come up  
6 with different analyses of -- you know, come up  
7 with a different assumptions of, you know, what  
8 would the benefits be of disinfection on these  
9 reaches or those reaches and it's important to  
10 know specifically about uses attributable to  
11 specific reaches, I could conduct those analyses,  
12 but I'm not sure that -- I mean, I haven't heard  
13 that question before.

14           Q.       And, by definition, any such  
15 analysis would have less statistical power than  
16 the entire analysis, is that correct, because  
17 you'd have fewer people involved?

18           A.       That's by definition, but less power  
19 doesn't mean inadequate power.

20           Q.       We just don't know if there's  
21 adequate power because you haven't done the  
22 analysis?

23           A.       Right.

24           MS. TIPSORD: Mr. Meyers-Glen, you

1 have a follow up?

2 MS. MEYERS-GLEN: One follow up  
3 question. Since your study did not include any  
4 recreators below the Stickney Waste Water  
5 Treatment Plant or anything regarding levels from  
6 that plant, how would any future analysis account  
7 for any of those recreational users without doing  
8 further study?

9 THE WITNESS: The study did not  
10 address the Cal-Sag. I'm sorry. The Sanitary and  
11 Ship Canal and points below Stickney. So the  
12 study was conducted on the mainstem, north branch,  
13 the North Shore Channel, Bubbly Creek, Ping Tom,  
14 Canal Origins and Cal-Sag. The area downstream of  
15 Stickney was not part of the scope of the study.

16 So if recreational activity and  
17 participants -- and user demographics and water  
18 quality are within the range of what we've studied  
19 in the other parts of the CAWS, I think the  
20 results would probably be relevant to downstream  
21 of Stickney, but that wasn't the focus of the  
22 study.

23 MS. TIPSORD: Ms. Williams?

24 MS. WILLIAMS: I have a very quick

1 clarification. Dr. Dorevitch, I believe your  
2 counsel said there was a supplemental report  
3 coming on November 6th. Did he misspeak as far as  
4 the date?

5 THE WITNESS: I didn't catch that,  
6 but --

7 MR. ANDES: Yes.

8 THE WITNESS: I think the date is  
9 December 6th.

10 MS. WILLIAMS: Thank you.

11 MR. ANDES: I stand corrected.

12 MS. TIPSORD: Mr. Harley?

13 MR. HARLEY: Keith Harley,  
14 representing the Southeast Environmental Task  
15 Force.

16 Doctor, was the decision not to  
17 address the Sanitary and Shi Canal part of your  
18 original proposal to the Water Reclamation  
19 District?

20 THE WITNESS: Yes.

21 MR. HARLEY: Why did you make that  
22 choice?

23 THE WITNESS: My understanding was  
24 that downstream of Stickney there was little

1 recreational activity taking place.

2 MR. HARLEY: At the time you made  
3 that discretionary choice, were you aware of the  
4 boat launch at Summit?

5 THE WITNESS: No.

6 MR. HARLEY: Thank you.

7 MS. TIPSORD: Ms. Alexander?

8 BY MS. ALEXANDER:

9 Q. Yes. I just have one follow on the  
10 questions by Ms. Meyers-Glen. Why was the  
11 decision made not to include the area downstream  
12 of Stickney in the scope of the study?

13 MR. ANDES: He just explained that.

14 BY MS. ALEXANDER:

15 Q. I'm sorry. I was --

16 A. I was under the impression that  
17 there was very little recreational activity that  
18 took place there.

19 Q. Where were you under that impression  
20 from?

21 A. I don't remember specifically. Like  
22 I said, there was a draft use attainable analysis  
23 report that I reviewed, but -- and I spoke with,  
24 you know, waterway users and organizations. I



1 don't remember specifically anybody saying you've  
2 really got to be downstream of Stickney, there's a  
3 lot of recreation there.

4 MR. ANDES: Is there any reason to  
5 believe that the findings that you've come up with  
6 for other areas of the CAWS would be different for  
7 that area?

8 THE WITNESS: Like I said, if the  
9 demographics and underlying medical conditions or  
10 nature recreational activities and exposures are  
11 every different there, then the results would be  
12 harder to generalize. If what goes on there is  
13 pretty similar to what goes on the other parts of  
14 the CAWS, I don't think it would be problematic to  
15 generalize.

16 BY MS. ALEXANDER:

17 Q. But we don't have any data one way  
18 or the other, is that correct, as to whether  
19 activities, health levels, any of that, is  
20 similar, dissimilar, we just don't know, is that  
21 correct?

22 A. I'm not aware of any reason to think  
23 that it's dramatically different there.

24 Q. But you don't know one way or the

1 other, you just don't have any information, is  
2 what you're saying, is that correct?

3 A. Just like, you know, I study people  
4 at North Avenue and I study people at Clark Park.  
5 I didn't go in between Clark Park and North Avenue  
6 and measure water quality or try to recruit people  
7 there, but what was going on at those locations is  
8 similar to what goes on in between. So I assume  
9 that the results apply not only to these specific  
10 boat launches, but to other boat launches onto  
11 waterways.

12 MS. TIPSORD: Ms. Meyers-Glen?

13 MS. MEYERS-GLEN: So when you're --  
14 Stacy Meyers-Glen with Openlands. When you're  
15 looking at the difference between the Clark Park  
16 and River Park and Oakton, per se, that's all  
17 pertaining to the North Side Waste Water Treatment  
18 Plant, right?

19 THE WITNESS: Right.

20 MS. MEYERS-GLEN: And isn't that  
21 plant configured differently and has a different  
22 capacity than Stickney?

23 THE WITNESS: Well, there are three  
24 plants in terms of the North Shore Channel at the

1 north side plant, Stickney and then the Calumet  
2 plant on the Cal-Sag. So there are differences  
3 among all three. I studied people at locations  
4 downstream of two of them, the locations where the  
5 most water recreation takes place.

6 Q. So are you saying that north side  
7 and Stickney are comparable as far as what they  
8 are putting in the water?

9 A. I didn't say that at all.

10 MS. TIPSORD: Ms. Alexander?

11 BY MS. ALEXANDER:

12 Q. Okay. Moving onto pre-filed  
13 question nine, can you please explain the basis  
14 for the statement in your testimony, and this is  
15 at page five, and I'll just read the statement,  
16 "Several dozen individuals on rowing teams each  
17 use the CAWS more than a hundred times per year.  
18 Similarly, some boaters on the Worth and Alsip  
19 launches use the Cal-Sag Channel dozens of times  
20 per season. Thus, a small number of users account  
21 for a relatively large proportion of users" and  
22 what I'm specifically looking for the basis for is  
23 that last statement?

24 A. Okay. In response to your question,

1 I did conduct another data summary -- data  
2 analysis and summarized the results. We asked  
3 CHEERS participants how many times have you used  
4 the water, the CAWS, in the last 12 months and if  
5 somebody was using the CAWS for the first time in  
6 the last 12 months and they would have said, "I  
7 used it zero times before." If somebody used it a  
8 hundred times before, they'd say "I used it a  
9 hundred times before."

10 So I tallied the total number of  
11 person days of CAWS use, each person times the  
12 number of times they've used the water and came up  
13 with a summary of how many people and how many  
14 uses are there and what percent of uses are  
15 accounted for by subgroups, users based on  
16 frequency of use and Mr. Andes is passing around  
17 the results.

18 MS. TIPSORD: I've been handed,  
19 "Table Prior Uses, Frequency Uses Percent Across  
20 the Top of the Table." If there's no objection,  
21 we will mark this as Exhibit 402. Seeing no  
22 objection, it's Exhibit 402.

23

24

1 (Document marked as IL EPA  
2 Exhibit No. 402 for  
3 identification.)

4 BY THE WITNESS:

5 A. So going to the bottom row, there  
6 were 3,893 people who said that they had used the  
7 water a total of 30,422 times prior, including  
8 their current time. There were -- the people who  
9 had never used it prior, there were 1,696 of them.  
10 So on that date they contributed 1,696 personal  
11 days of use, but that's only about six percent of  
12 all uses.

13 A small number, 93 people, used  
14 the water 50 or more times. Generally, the rowing  
15 team kids we're talking about having used the  
16 water 200 times per year more or less. There were  
17 people that said they used water more than 200  
18 times, some of these people in the 30 plus  
19 category are less than 200, but because they have  
20 so many uses, it's like one person that used it  
21 200 times counts the same as 200 people that used  
22 the water once.

23 So a small number of 200-time  
24 users do account for a disproportionate amount.

1 About half of all uses are accounted for by the  
2 frequent users. So that's the basis of that  
3 statement.

4 BY MS. ALEXANDER:

5 Q. Is there some particular reason this  
6 data was not included in the CHEERS study report?

7 A. It wasn't pertinent to making the  
8 assessment CAWS versus who -- CAWS versus general  
9 use water and CAWS versus unexposed comparisons  
10 toward the clinical microbiology. So I didn't  
11 include it. Once you asked for it, I generated  
12 that.

13 MS. TIPSORD: Sorry. Mr. Harley,  
14 you have a question?

15 MR. HARLEY: Keith Harley, Southeast  
16 Environmental Task Force. As a practical matter,  
17 what you just described, does this mean that you  
18 could have you a single user who's answers were  
19 counted 200 times?

20 THE WITNESS: No. If they were in  
21 the study and we asked them questions about their  
22 participation that day, it was that day's  
23 responses that were -- it was their responses for  
24 that day that we asked about and recorded and if

1 somebody said, let's say somebody didn't get sick,  
2 but they had used the water 200 times before we  
3 didn't weight their response by 200. This is only  
4 about uses and users. It is not about analysis of  
5 the health risk data.

6 MR. HARLEY: Okay.

7 BY MS. ALEXANDER:

8 Q. Now, just to be clear, when you were  
9 referring in your testimony to several dozen  
10 individuals on rowing teams, you're referring to  
11 specifically to several dozen participants in the  
12 study, is that correct?

13 A. I am referring to participants in  
14 the study and I believe it's true about use in  
15 general.

16 Q. I guess the question would be, is  
17 your statement somehow that there's only several  
18 dozen individuals who are actually using the CAWS  
19 more than a hundred times per year or that's how  
20 many you observed as part of your study using it  
21 that frequently?

22 A. Interviewed, recruited, participated  
23 in the study, right. If there are 93 people who  
24 were in the study that used CAWS for 50 or more

1 times, there are probably -- there are certainly  
2 more than 93 people like that, but either they  
3 chose not to participate or weren't eligible to  
4 participate or weren't approached to participate.

5 Q. Do you know one way or the other  
6 whether any of your participants were recruited  
7 from either Chicago River Canoe at Clark Park --  
8 I'm sorry. What is the name of it? Yes. I'm  
9 sorry. The name is Kayak Chicago North Avenue,  
10 any participants from there?

11 A. Yes.

12 Q. Okay. And what about the Chicago  
13 River Canoe Company, anybody from there?

14 A. Is that Clark Park?

15 Q. Yeah, I believe that's at Clark  
16 Park.

17 A. Yes.

18 Q. Okay. Did you at any point do any  
19 inquiry into the actual number of people annually  
20 who rent canoes and kayaks from those businesses?

21 A. No, I do not. I don't think that  
22 would impact any of the analyses that I did.

23 MR. ANDES: So if I could just go  
24 back for a second to understand, in terms of this



1 table, you have 93 people out of 3,800 or  
2 somewhere around 2.5 percent that represent 49  
3 percent of the reported use, is that correct?

4 THE WITNESS: Amongst study  
5 participants, yes.

6 MR. ANDES: Thank you.

7 THE WITNESS: CAWS study  
8 participants.

9 BY MS. ALEXANDER:

10 Q. All right. I'm going to skip ten  
11 for now and move on to 11. That question is was  
12 the CHEERS study powered specifically to meet its  
13 objective number of three, which is identifying  
14 pathogens responsible for symptoms of acute GI  
15 among recreators.

16 A. Powered and sample size have to do  
17 with hypothesis testing. Study objective three  
18 was more qualitative. In identifying pathogens,  
19 there isn't a specific hypothesis there and sample  
20 size calculation wouldn't fit into that type of  
21 descriptive analysis.

22 Q. Now, am I correct, in understanding  
23 that you asked all study participants who  
24 experienced any GI symptoms at all to submit a

1 stool sample?

2 A. No, they had to be new symptoms.

3 Q. Right.

4 A. If somebody had symptoms at the time  
5 of recruitment, they were not eligible for the  
6 determination of did they develop GI illness  
7 because they had a good baseline.

8 Q. But the symptoms didn't have to  
9 meet your definition of acute GI illness, is that  
10 correct, you still asked them to submit a sample?

11 A. That is correct.

12 Q. And would I be correct also in  
13 understanding that less than a quarter of the  
14 people who had some GI symptoms had symptoms that  
15 met your definition of acute?

16 A. Let me check that. Okay. In the  
17 CHEERS report, the August 31st CHEERS report,  
18 there's a table, incidents of pathogen positive GI  
19 symptoms by AGI mean acute gastrointestinal  
20 illness? Yes. And let me give you the table  
21 number. Okay. Table X-16 -- no. Actually, hang  
22 on. Yeah, I guess maybe that is right. Table  
23 X-16.

24 MS. TIPSORD: That's located on X-9

1 of the report, which is Public Comment 478.

2 BY THE WITNESS:

3 A. So I think it was less than that had  
4 the -- yeah. So that table shows that of the 664  
5 people whose stool samples we had 177 of them met  
6 the definition of acute gastrointestinal illness  
7 and the majority did not. However, there isn't a  
8 difference in whether or not pathogens were  
9 detected based on whether the participant met the  
10 acute gastrointestinal illness definition standard  
11 or not.

12 BY MS. ALEXANDER:

13 Q. Okay. But just in terms of who you  
14 were testing, if only a quarter of them had acute  
15 GI symptoms and the rest had some other nonacute  
16 kind, I mean, isn't it possible that some of the  
17 people you were testing weren't really actually  
18 sick?

19 A. They said they were sick so that's  
20 what I have to go on. If the definition means --  
21 I mean, part of the definition was three diarrhea  
22 stools in 24 hours. I mean, if somebody had two  
23 diarrhea stools and nausea, they're saying they're  
24 sick whether they meet the AGI definition or not.

1 So AGI is sort of a concept. It's not a medical  
2 diagnosis or anything, but it's a way of sort of  
3 weeding out the symptom complexes that are most  
4 convincing for an acute gastrointestinal infection  
5 than the individuals who have symptoms, but maybe  
6 not the full constellation of symptoms.

7 Q. And just to be clear, though, you  
8 didn't include anybody in your stool sampling who  
9 had no symptoms, is that correct?

10 A. Right.

11 Q. Okay. Moving on to pre-filed  
12 question 12, can you explain how the CHEERS study  
13 accounted for asymptotically infected  
14 participants passing their illness along to  
15 others?

16 A. That was not part of the NEEAR study  
17 that our study was based on and it wasn't done --  
18 the NEEAR study wasn't done in CHEERS. You know,  
19 it's sort of a two-way street. It's possible that  
20 people in CHEERS gave people outside of the study  
21 an infection. It's possible that people from  
22 outside of the study gave study participants their  
23 infection, but that isn't something that is, you  
24 know, on the front of validating information.

1 That would be awfully challenging to try to  
2 determine the secondary spread of infection.

3 Q. So, in other words, if somebody got  
4 sick asymptotomatically from recreation on the CAWS  
5 and they passed it along to their students or  
6 their coworkers or, you know, anybody else like  
7 that around them and that person got sick, you  
8 would have no way of knowing or attributing those  
9 secondary illnesses to CAWS recreation?

10 A. In the same way, if, let's say, an  
11 unexposed person or general use water recreator or  
12 a CAWS recreator didn't get sick from their  
13 recreational activity, but contracted it from  
14 another person, we wouldn't be able to account for  
15 either of it. It goes both ways. People could be  
16 receiving or transmitting infections, but that  
17 isn't something that is readily trackable.

18 Q. Moving onto question 13, would you  
19 agree generally that the CHEERS study confirmed  
20 the existence of a correlation between water  
21 exposure and water recreation?

22 A. Do you want to restate that maybe?

23 Q. I'm sorry. I mean -- yes, let me  
24 rephrase that. Would you agree that the CHEERS

1 studied confirmed the existence as a general  
2 matter of the correlation between water exposure  
3 and illness?

4 A. Yes.

5 Q. Sorry. That's what I meant. And  
6 for eye symptoms, you found the CAWS to be riskier  
7 than general waters, is that correct?

8 A. Yes.

9 Q. Okay. And then you found, if I'm  
10 correct, 12 to 13 additional cases of GI illness  
11 per 1,000 attributable to CAWS and GU recreation,  
12 both, is that correct?

13 A. Yes.

14 Q. Okay. Now, isn't it the case that  
15 US EPA's benchmark for water safety and other  
16 contacts is eight illnesses per 1,000?

17 A. Well, for swimming there's two.  
18 There's a freshwater standard and a -- not  
19 standard even, but a targeted level of risk one  
20 for freshwater is eight and one for marine water,  
21 which is 19.

22 Q. And we're dealing with freshwater  
23 here, is that correct?

24 A. Well, the studies that arrive at

1 those numbers were done on swimming, but the  
2 freshwater swimming number was eight.

3 Q. But the eight per 1,000 isn't so  
4 much a study result as an acceptable risk  
5 benchmark, is that correct? That's EPA saying  
6 that's what the number of people we're going to  
7 allow to get sick and if it's higher than that we  
8 have a problem, is that correct?

9 A. Well, I don't really thinking  
10 calling that acceptable is accurate. I know  
11 people do that, but I think it's a targeted level  
12 of risk. I think really determining what is  
13 acceptable would involve state holder input.

14 So EPA came up with this number  
15 from studies that it had conducted in the late  
16 1970's and early 1980's at beaches that people  
17 accepted the risk by swimming there, but I don't  
18 really think that those numbers truly convey what  
19 is acceptable.

20 Q. Right, but my point -- I'm just  
21 trying to understand what eight in 1,000 is. It's  
22 not a study result, per se, but rather a decision  
23 by EPA as a policy matter that that's going to be  
24 their benchmark for making risk decisions. In

1 other words, if it's more than eight in 1,000,  
2 we'll close this beach or do X or Y and try to get  
3 the number under eight per 1,000, is that correct?

4 A. No, it really did come from a study.

5 Q. What do you mean it came from a  
6 study?

7 A. In the late 1970's and the early  
8 1980's, the US EPA conducted a series of studies  
9 of health risks of swimming at beaches in marine  
10 and freshwater. These were published as criteria  
11 documents that led to the establishment of the  
12 1986 criteria and these numbers of eight and 19  
13 did come from those studies of marine water and  
14 freshwater. It did not come from some  
15 pre-oriented determination or other process for  
16 determining what is acceptable. Those numbers  
17 came from those studies.

18 Q. Okay. But the point I'm trying to  
19 make is what the number itself represents  
20 regardless of what they looked at to get is that a  
21 determination was made that we're going to use  
22 eight in 1,000 as a benchmark to determine whether  
23 risk is over eight in 1,000, are more people than  
24 that getting sick or less people and make an act



1 accordingly?

2 A. That's correct.

3 MR. ANDES: Is EPA reevaluating  
4 those primary contact standards at this point?

5 THE WITNESS: Yes.

6 BY MS. ALEXANDER:

7 Q. Do you have any reason to believe  
8 they're reevaluating the eight in a 1,000  
9 benchmark?

10 A. They held an expert workshop in  
11 Virginia in 2007 and one of the issues that came  
12 up was this discordance of why does it make sense  
13 to have a marine water standard and a freshwater  
14 standard and I believe they are reevaluating that.

15 Q. I guess the question that I'm  
16 getting at is is there any reason that the fact  
17 that this number is used for swimming would have  
18 any particular policy significance?

19 Is there any reason why it would  
20 be acceptable for more people to get sick boating  
21 than it is to get sick swimming? Like, is there  
22 any reason why they would say it's fine if 13 in a  
23 1,000 people or 20 in 1,000 people get sick when  
24 they're in canoes, but we only one eight in 1,000

1 to get sick when swimming?

2 A. I wouldn't overstate that these  
3 numbers represent what these numbers represent.  
4 They came from studies of swimmers. If it were a  
5 study of the boaters, then the numbers were  
6 exactly the same, the number of people and the  
7 rates of illness and all that they would have come  
8 up with the same number for boating. They studied  
9 swimming so they have a swimming number.

10 Your question is really about  
11 acceptable risk as opposed to the targeted levels  
12 of risk that the EPA is using, which really can't  
13 be called acceptable in that nobody has really  
14 decided what is acceptable or not. It's numbers  
15 of swimmers in beaches that came from this one.

16 Q. Would you agree that that's a  
17 commonly used term, "acceptable risk"?

18 A. I would agree that the term  
19 "acceptable risk" is commonly and probably  
20 incorrectly used.

21 MR. ANDES: To follow up with a  
22 couple more questions about those numbers that we  
23 were just talking about; Dr. Dorevitch, I have  
24 three figures from the abstract of the CHEERS

1 study discussing these particular comparisons  
2 between CAWS general use water recreators and  
3 non-recreators and I wondering if you could just  
4 walk us through the numbers we just discussed. So  
5 if you want to come up here and do that.

6 THE WITNESS: Sure. My apologies to  
7 those of you who can't see this.

8 MS. TIPSORD: Before you begin,  
9 let's be clear. Remember, not everybody who reads  
10 this transcript can see that.

11 THE WITNESS: Yes.

12 MS. TIPSORD: This is from Public  
13 Comment 478, Page I, which is not the first  
14 page I, under abstract.

15 MS. ALEXANDER: How is it labeled?

16 MS. TIPSORD: The title of Figure 1  
17 is cases attributable to CAWS recreation, with  
18 non-water recreation as the reference for AGI  
19 equals acute gastrointestinal illness. AR equals  
20 acute respiratory illness. Thank you, go ahead.

21 BY THE WITNESS:

22 A. So this is really these three series  
23 of figures -- or this series of three figures  
24 really are the final results of the study

1 regarding study objective number one. What are  
2 the rates of illness attributable to CAWS  
3 recreation and there are a couple of issues  
4 involved in making that statement. We arrived at  
5 attribution by comparing CAWS recreators to  
6 another group of recreators.

7 So I compared CAWS recreators to  
8 general use recreators, CAWS recreators to  
9 unexposed recreators. These are the people who  
10 are bicycling, jogging, et cetera, but don't have  
11 water contact and then general use waters to the  
12 unexposed recreators and these are attributable  
13 risk differences.

14 What this means is that compared  
15 to the non-water recreators, if 1,000 CAWS  
16 recreators and 1,000 unexposed recreators and they  
17 were identical in every way except where they were  
18 doing their recreation there would be 12.5 more  
19 cases of illness, acute gastrointestinal illness,  
20 among the CAWS recreators than among the unexposed  
21 recreators.

22 There would be 15.5 so say 16  
23 cases of eye symptoms more in the CAWS group than  
24 in the unexposed recreator group after equalizing

1 for gender and ethnicity and a long list of 20  
2 variables that have already been presented, acute  
3 respiratory illness, skin rash and ear symptoms  
4 are no different for the CAWS group and the  
5 unexposed group. Comparing the general use  
6 recreators to the unexposed recreators --

7 MS. TIPSORD: Excuse me, Doctor.

8 Now, we're looking at Figure 2, cases attributable  
9 to general use water recreation with non-water  
10 recreation as the reference group and this is page  
11 two of the abstract in Public Comment 478.

12 BY THE WITNESS:

13 A. So, again, 1,000 general use  
14 recreators, 1,000 non-water recreators, they're  
15 identical in terms of their medical conditions and  
16 their gender, ethnicity, et cetera. There would  
17 be 13 more cases per 1,000 uses of GU, general use  
18 waters, for acute gastrointestinal illness  
19 compared to the unexposed.

20 In other respects, the groups  
21 are comparable. There's actually less skin rash  
22 among the general use waters recreators than among  
23 the unexposed, but the difference between -- the  
24 most significant difference is between -- is more

1 gastrointestinal illness, higher rates among  
2 general use water users and then this is the  
3 comparison of CAWS users to general use water  
4 recreators.

5 MS. TIPSORD: And, again, just for  
6 the record this is Figure 3, again, on page 2 of  
7 the abstract.

8 BY THE WITNESS:

9 A. And unlike the previous two figures,  
10 because both of these groups are water recreators,  
11 it takes into account what are the recreators  
12 doing and do they reach the same level of -- are  
13 as they likely to swallow water similarly between  
14 the two groups. So after adjusting for all  
15 differences that, I could -- it was a list of 20  
16 variables, one difference stood out and that is  
17 the CAWS recreators were more likely to develop  
18 eye symptoms for every CAWS users and every 1,000  
19 general use water users there would be 11 more  
20 cases of eye symptoms in the CAWS group. So  
21 that's --

22 MR. ANDES: Those are minor eye  
23 symptoms?

24 THE WITNESS: Those are eye itching,

1 crusting, redness or irritation.

2 MR. JOHNSON: It's minor if it's  
3 someone else's eyes.

4 THE WITNESS: The study did ask  
5 people about the severity of their symptoms. Did  
6 you have to go seek medical attention? Did you  
7 need prescription medication? Did you need  
8 over-the-counter medication and very few people in  
9 the eye symptom -- who had eye symptoms required  
10 even nonprescription medications? So, in that  
11 sense, I'd say it's somebody else's, but it's not  
12 particularly severe.

13 MR. ANDES: That's the only  
14 significant difference between the CAWS and  
15 general use recreators, am I right?

16 THE WITNESS: Yes.

17 MR. ANDES: Thank you.

18 BY MS. ALEXANDER:

19 Q. Before you take that down.

20 A. Yes.

21 Q. Looking at Figure 3, can you just  
22 explain, and I apologize. I missed this in your  
23 explanation. Looking specifically at the vertical  
24 line representing AGI?

1           A.       Yes.

2           Q.       Would I be correct in understanding  
3           that the heavy bar next to the net figure, 0.6,  
4           was your determination of the statistical  
5           comparison is between AGI and the CAWS versus  
6           general use, is that right, it came out to 0.6?

7           A.       No. It means that the best estimate  
8           of how many excess cases there are out on the CAWS  
9           would be 0.6 per 1,000 and then those -- the  
10          vertical line is sort of the 95 percent confidence  
11          interval. So it's somewhere between 10 extra  
12          cases in CAWS and 10 extra cases in general use  
13          waters, but the best point estimate is 0.6 per  
14          1,000.

15          Q.       In other words, that whole vertical  
16          line represents your margin of error and the  
17          actual number could be anywhere in the margin of  
18          error, but your estimate is the heavy horizontal  
19          line, is that correct?

20          A.       The best estimate, yeah.

21          Q.       Okay. In terms of -- you can put  
22          down the chart now.

23          A.       Thank you.

24          Q.       In terms of this question of



1 severity of GI illness, do you have a recollection  
2 of what percent of people during the Milwaukee  
3 cryptosporidium outbreak actually sought medical  
4 attention?

5 A. I believe I read it in Dr. Granato's  
6 testimony.

7 Q. It was 6.5, is that correct?

8 A. I'll trust you there.

9 Q. So, in other words, my point being  
10 is that number is significantly lower, is it not,  
11 than the number who sought medical attention for  
12 GI symptoms in the CHEERS study?

13 A. I think you got to recognize that  
14 these answers were arrived at using different  
15 methods. So this isn't an apples to apples  
16 comparison. There were 400,000 or more people in  
17 Milwaukee. 400,000 people weren't individually  
18 asked what were your symptoms and did you use  
19 medication or seek medical attention. So I'd be  
20 leery about making an -- you know,  
21 over-interpreting those differences.

22 Q. I'm going to move onto pre-filed  
23 question 14. Can you please explain what is meant  
24 by the statement, I quote from page three of your

1 testimony and the statement is, "In calculating  
2 our necessary number of study participants, we use  
3 typical values of a one in 20 chance of a false  
4 positive result and a one in five chance of a  
5 false negative result"?

6 A. What that means is that statistical  
7 testing of hypothesis is what are the chances we  
8 got these results due to chance alone. If we  
9 found that the rate of illness in CAWS was 12.5  
10 percent and in GU it was 12.3 percent those are  
11 really close together.

12 So the point of the statistical  
13 test would be to say is this just sort of random  
14 and it's really the same for both or how likely is  
15 it that these are two different rates of illness.  
16 So the convention is to set a one out of 20 chance  
17 of falsely concluding that a difference exists  
18 when, in fact, none exist. That's the P equals  
19 0.05. That's there's a five in a hundred chance.  
20 So that's one in 20.

21 As far as the one in five  
22 chances of a false negative, that would mean there  
23 truly is a difference, say, between the CAWS and  
24 GU or the CAWS and the nonexposed and we failed to

1 detect it and that the chances of that type of  
2 result would be one out of five and, again, that's  
3 sort of, you know, the benchmark, you know, the  
4 industry standard of the power of point eight.

5 Q. So just to put that in lay language,  
6 would I be correct in understanding that the one  
7 in 20 versus the one in five means it's a lot more  
8 likely that the study failed to identify a risk  
9 that's actually there as opposed to mistakenly  
10 identifying a risk that's not there?

11 A. No, that would not be correct. You  
12 asked the question -- the question about was it  
13 due to chance alone regarding positive results.  
14 If you find an association, then you want to know  
15 was it due to chance alone. If you find no  
16 association, EPA would wonder were there enough  
17 people in the study to have missed an association  
18 that really is there, but we didn't have enough  
19 people to determine that.

20 If you find a difference, the  
21 issue of the one in five sort of falls -- isn't  
22 relevant anymore. It's when you don't find a  
23 difference that you say there was the one in five  
24 chance that there really was a difference, but we

1 didn't find it, but if you do find a difference  
2 then you're focusing on was it one to 20 due to  
3 chance alone or could it -- is it really unlikely  
4 that it was due to chance alone.

5 So if you don't find a  
6 difference, that's where you wonder about were you  
7 in the one in five as opposed to the four out of  
8 five.

9 Q. Okay. I don't think I'm saying  
10 anything different than that although it might  
11 have sounded that way. Let me try again with  
12 specifics.

13 With respect to your AGI  
14 results, am I correct in understanding you did not  
15 find a statistically significant difference  
16 between CAWS risk and GU risk?

17 A. Correct.

18 Q. So is that was a negative result in  
19 that sense, is that correct?

20 A. Absolutely.

21 Q. So there is a one in five chance  
22 that that is a false negative, correct?

23 A. That -- the original calculations  
24 were based on the assumption that we would have

1 enrolled a much smaller sample size. We were  
2 hoping to enroll 9,330 people with the expectation  
3 that 15 percent of them would be lost to follow  
4 up. Instead, we enrolled close to 12,000 people  
5 and a smaller percent were lost to follow up. So  
6 the study had more power than originally designed  
7 and I think it's substantially less than one in  
8 20. I'm sorry. One in five especially given the  
9 fact that we did detect differences between the  
10 CAWS group and the general use water group.

11 Q. But then by the same token, looking  
12 at the eye symptoms, that was a positive result,  
13 is that correct?

14 A. Right.

15 Q. So would I understand correctly that  
16 originally the goal was -- you know, that positive  
17 result under the original statistical power of  
18 calculation would have had only a one in 20 chance  
19 of being a false positive, but now you have more  
20 study participants it would be something even less  
21 than a one in 20 chance of being a false positive?

22 A. Not exactly. It depends on the  
23 strength of association. If eye symptoms in a  
24 study group are strongly associated, you know, no

1 matter what the number of people in the study is,  
2 it could end up being only a one in 100 chance or  
3 a one in 1,000 chance that it's due to chance  
4 alone.

5 So it doesn't automatically  
6 become one in 20. That's the criteria used to  
7 determine whether it's likely due to chance using  
8 the sort of industry standard 0.05, one in 20  
9 chance of a false positive. It may be one in  
10 1,000.

11 Q. So let me put an even less fine  
12 point on it. Would it be fair to say based on  
13 this distinction that the chance that the eye  
14 symptoms are a false positive is a lot lower than  
15 the chance that the negative result on the AGI is  
16 a false negative?

17 A. No, I don't think that I could say  
18 that. There's the term that is used is sort of  
19 borderline statistical significance, approaching  
20 statistical significance, where you might say,  
21 well, it doesn't reach a 0.5 level of  
22 significance, but it reached a 0.7 level of  
23 significance. So something is probably going on.  
24 No, it doesn't meet the 0.5 standard, but you

1 wouldn't throw the baby out with the bathwater and  
2 saying there's no meaningful information here.  
3 You might want to follow that up and conduct  
4 additional analysis or think about your finding  
5 differently.

6                   With the CAWS verse general use  
7 water difference, that 0.6 you were mentioning  
8 that's pretty close to zero. It's not like that  
9 CAWS group had ten extra cases, but it didn't  
10 reach statistical significance and it was 0.7.  
11 There was no suggestion of a difference at all,  
12 0.6 cases out of 1,000. So I wouldn't just say  
13 it's one out of five chances that it's wrong. I  
14 would say studies in general, you know, one out of  
15 five that might be true, but I wouldn't say that  
16 that's the case here.

17                   MS. TIPSORD: Mr. Harley?

18                   MR. HARLEY: Dr. Dorevitch, Keith  
19 Harley, Southeast Environmental Task Force.

20 During your presentation, the term "significance"  
21 in relationship to the eye symptoms that people  
22 developed was used in two different ways and I  
23 want to make sure the record is really clear about  
24 this. In the report, you conclude that the eye

1 symptoms that you identify in CAWS versus  
2 unexposed in general use users is statistically  
3 significant, is that correct?

4 THE WITNESS: Yes.

5 MR. HARLEY: Now, is it within the  
6 range of the study to conclude that the symptoms  
7 are significant, not that they're statistically  
8 significant, but that they are significant for the  
9 effected individual?

10 THE WITNESS: If I said that the  
11 symptoms aren't medically, clinically, personally  
12 significant, I used the wrong term. I'm not sure  
13 that I said that, but I think there's a section in  
14 the report that talks about the symptom severity  
15 and I think that those symptoms were characterized  
16 as being relevantly low in severity, but I don't  
17 remember saying that the symptoms are, you know,  
18 not medically significant. Did I say that?

19 MR. HARLEY: So it is not your  
20 testimony that the eye symptoms, which an infected  
21 individual, would experience are medically  
22 insignificant?

23 THE WITNESS: I'm saying that  
24 they're not especially severe.



1 MR. HARLEY: And on what basis are  
2 you making that statement? Are you an  
3 ophthalmologist?

4 THE WITNESS: I am not an  
5 ophthalmologist.

6 MR. HARLEY: Do you have any  
7 training in terms of eye diseases or eye  
8 infections?

9 THE WITNESS: Yes.

10 MR. HARLEY: And can you describe  
11 that training, please?

12 THE WITNESS: I trained for three  
13 years at the Cook County Hospital emergency  
14 department in emergency medicine and I was the  
15 chief resident after that and served on the  
16 faculty. I gave lectures in examination of the  
17 eye. I taught residents how to use an instrument  
18 called a slit lamp. I continued my practice and I  
19 evaluate people for eye infections and other eye  
20 symptoms.

21 MR. HARLEY: Based on that  
22 experience, why is it that an individual who  
23 recreates in the CAWS would develop itching,  
24 crusting, redness and/or irritation of their eyes?

1 THE WITNESS: It could be because of  
2 an infection. It could be because of irritation.  
3 It could be because of allergy. Those would be  
4 the three main things assuming that something  
5 physical like a foreign body isn't there.

6 MR. HARLEY: Can an eye infection be  
7 significant?

8 THE WITNESS: Of course.

9 MR. HARLEY: Can an eye irritation  
10 be significant to an infected individual?

11 THE WITNESS: Sure.

12 MR. HARLEY: Can an allergy  
13 triggering response be medically significant to  
14 the an infected individual?

15 THE WITNESS: Yes.

16 MR. HARLEY: Thank you, Doctor.

17 Ms. Alexander?

18 BY MS. ALEXANDER:

19 Q. Yes. Just to wrap up my previous  
20 line of questioning, would I be correct in  
21 understanding, leaving aside whatever you could  
22 make of this study data, that the design of the  
23 study was such that there was a greater likelihood  
24 of a false negative than a false positive?

1           A.        I think that's true of studies in  
2           general and it's true of this study as well.

3           Q.        Okay. I want to move onto pre-filed  
4           question 15, which I ask you to please explain  
5           what you meant by the statement in your testimony,  
6           "The CHEERS study has defined the risks that  
7           limited contact recreators face under current  
8           waste water management practices."

9           A.        Was there a specific part of --

10          Q.        Yes. If you could, please explain  
11          what you mean by that statement. I can ask you a  
12          follow up, but that is kind of unclear.

13                   MR. ANDES: Is there a particular  
14          part of this statement that you're unclear about?

15                   MS. ALEXANDER: Yes. Let me follow  
16          up on that.

17          BY MS. ALEXANDER:

18          Q.        Do you believe that the CHEERS study  
19          has definitively defined that risk?

20          A.        The study is as close as it's ever  
21          going to get to defining the risk of CAWS  
22          recreation.

23          Q.        Would you make the statement that it  
24          proves that the risk in the CAWS is roughly the

1 same as the risk in the general use waters for GI  
2 illness?

3 A. I don't think I said that.

4 Q. I don't think you did. I'm asking  
5 whether you would make that statement?

6 A. No, I wouldn't make that statement.

7 Q. Why not?

8 A. I would say -- well, to me, proof  
9 sounds like something that exists in mathematics  
10 and, you know, you can prove that a theorem is  
11 true or false or something along those lines. In  
12 epidemiology and public health, proof is not  
13 really an achievable expectation.

14 Q. Is it possible in your review that  
15 another researcher could come and do a similar  
16 study of CAWS recreators and come up with  
17 different results than you did?

18 A. I would be extremely surprised if  
19 they came up with results that are different in a  
20 meaningful way. If somebody else found that the  
21 risks are 13 out of 1,000 and I found that they  
22 are 12.5 out of 1,000, I wouldn't be surprised at  
23 all, but if, you know, zero out of 1,000 or a  
24 hundred out of 1,000, I would be very, very

1 surprised.

2 Q. Is it possible that risks could be  
3 different if a researcher came and studied one of  
4 the particular subgroups of the CAWS?

5 A. They would need a whole lot of them  
6 so we studied about 3,900, I think, CAWS  
7 recreators. So if they wanted to find a subgroup  
8 they might want to, say, find 3,900 pregnant women  
9 in the CAWS and recruit them and I suspect what  
10 they would find wouldn't be dramatically  
11 different, but if they wanted to do that that  
12 would be -- they had the resources and enough  
13 pregnant women out there to recruit they could do  
14 it.

15 Q. Or children or kayakers or any other  
16 subgroup, same thing?

17 A. I wouldn't say that. Kayakers and  
18 children are groups that we have looked at.

19 Q. But you haven't looked at 3,900 of  
20 them in the CAWS, is that correct, of each of  
21 those?

22 A. I didn't have to. I found  
23 differences in risks by recreational activity and  
24 by age category. So whatever differences exist

1 they were significantly large enough to be  
2 identified given the sample size.

3 Q. But a moment ago, you indicated  
4 that a researcher coming along to study pregnant  
5 women would have to get 3,900 pregnant women and  
6 study them, is that correct, to have sufficient  
7 power?

8 A. 3,900 might not be enough either.  
9 It depends on, you know, how small the effect size  
10 is that you're trying to identify. How different  
11 the risk is of pregnant women versus all others.  
12 If it's a very large risk difference, then maybe  
13 1,000 people would be enough, but 3,900 was the  
14 number of people that were recruited in this  
15 study. The idea is somebody coming along and  
16 finding enough pregnant women on the CAWS to study  
17 is a bit of a stretch.

18 Q. But, in other words, you don't have  
19 3,900 in your study, is that correct?

20 A. Correct.

21 Q. And you don't have 3,900 kayakers or  
22 any of those, those are all subgroups that you  
23 have fewer?

24 A. Correct.

1           Q.       So your statistical power for all of  
2 those groups was less and in many cases  
3 substantially less than your overall statistical  
4 power for the study, is that correct?

5           A.       It's true for any group, any  
6 subgroup, there's going to be the smaller number  
7 of people the less the power. It doesn't mean  
8 inadequate power. Inadequate power has to be the  
9 effect size of the risk difference that you're  
10 trying to identify. It doesn't have to be huge  
11 numbers of people if it's a very big risk  
12 difference. So, by definition, once you start  
13 slicing and dicing the study subjects into smaller  
14 and smaller subgroups the power becomes a problem,  
15 but it doesn't mean that power is necessary  
16 inadequate.

17          Q.       Isn't it a fact that the peer  
18 reviewer cited inadequate power as one of the  
19 issues with your interaction analysis to determine  
20 impacts on subgroups?

21          A.       Why don't you point me to that  
22 statement?

23          Q.       It's going to take a second.

24          A.       Are you talking maybe about question

1 16?

2 Q. D10 and it's item 10 from chapter  
3 four.

4 MS. TIPSORD: Could you repeat that  
5 again, please?

6 MS. ALEXANDER: This is in appendix  
7 D10 and it's item 10.

8 BY THE WITNESS:

9 A. About skin rash?

10 BY MS. ALEXANDER:

11 Q. Yes. Specifically, the statement,  
12 "Keep in mind that these have low statistical  
13 power and some others advocate P is less than 0.2  
14 to describe heterogeneity."

15 A. Yes, a peer reviewer made that  
16 comment about heterogeneity. That's not -- I  
17 mean, that -- I think the comment said some  
18 authors and that's true. That's not the general  
19 recommendation. If, let's say, 100 people went  
20 out and used the CAWS now and we measured a lot of  
21 meaningless things about these people, what color  
22 socks they're wearing, how many digits are in  
23 their last name, what is the last number of their  
24 Social Security number, something like that, by



1 chance alone, we would find if we had 100 of these  
2 predictors, we would find by chance alone five of  
3 them who would be related to -- who gets it from  
4 the CAWS. That's the P equals 0.5. If you say P  
5 equals 0.2, you're opening the door to finding  
6 even more sort of meaningless, random  
7 associations.

8                   There's an opposite view that  
9 there are parallel in subgroups, sub analysis,  
10 what some epidemiologists call subgroup  
11 subterfuge. You can cherry-pick the data and find  
12 subgroups that are associated with the particular  
13 outcome either a protective effect or increased  
14 risk and that the -- if anything, using lower P  
15 values is recommended, not higher P values. So I  
16 get what the reviewer is saying. I think that was  
17 a minority opinion.

18                   And I think if we open the doors  
19 to variables that are weakly associated with the  
20 outcome, we'd be finding all kinds of random stuff  
21 and it would be harder to differentiate the wheat  
22 from the chaff when we use the more restrictive  
23 criteria.

24                   Q.       Okay. But setting aside for a

1 moment that P is less than 0.2 he was raising a  
2 concern, was he not, with the statistical power of  
3 your interaction analysis?

4 A. I mean, it seems the comment was  
5 about skin rash in relation to water with  
6 exposure. So I don't think this is a blanket  
7 statement about this study didn't have an adequate  
8 power of to do interaction analysis. This is  
9 about a specific finding.

10 Q. But it was specifically about  
11 heterogeneity tests, correct?

12 A. No, it was about a specific  
13 heterogeneity test.

14 Q. Okay.

15 A. You're asking about something  
16 general like did the study not have enough people  
17 to find heterogeneity and this is saying in  
18 particular analysis you may want to be less  
19 conservative, but that's not a statement about the  
20 study or the study's power in general.

21 Q. As a general matter, is it a fair  
22 statement that in order to draw conclusions about  
23 the risks to a particular subgroup, your study has  
24 to be powered for that subgroup?

1           A.       It doesn't have to be powered, but  
2       if you don't identify something then it raises the  
3       question was it powered.  If you do find an  
4       association, then you're back to the, well, was it  
5       the one out of 20 that was just due to chance?  So  
6       it's not necessarily the case.  It depends on if  
7       you don't find something, the question comes up  
8       was the difference really there, but you failed to  
9       detect it or because there really is no  
10      difference.

11                   MR. ANDES:  If I can follow up on  
12      that for a minute.  If we can go back for a  
13      second, and I won't put the figures back up in  
14      terms of the acute GI, you found two associations,  
15      right?  I mean, one was in terms of the CAWS  
16      recreators you found an association where they  
17      were more likely in a given amount to have acute  
18      GI illness than non-recreators, correct?

19                   THE WITNESS:  Correct.

20                   MR. ANDES:  And then for the general  
21      use recreators, you also found an association of  
22      around 13 excess cases per 1,000 compared to  
23      non-recreators?

24                   THE WITNESS:  Correct.

1 MR. ANDES: So the point then is  
2 when you compare the two, correct me when I'm  
3 wrong, they're basically almost identical in terms  
4 of the increased risk of water recreation.

5 THE WITNESS: Correct.

6 BY MS. ALEXANDER:

7 Q. And that was for overall users as  
8 opposed to the subgroups, is that correct?

9 A. Well, I guess we're getting a little  
10 into semantics, but CAWS and general use are -- I  
11 don't know if you're calling those groups or  
12 subgroups?

13 Q. That's not what I meant.

14 A. No, those numbers are assuming that  
15 the CAWS group and the general use group are  
16 identical in terms of the distribution of  
17 participants by age and gender and prone to  
18 infection and anything else.

19 After making all of that equal  
20 statistically, we found a difference between the  
21 CAWS group and the non-water recreators between  
22 the general use group and the non-water  
23 recreators, but no difference between the CAWS  
24 group and the general use group.

1 Q. Okay. I am close to done. I have a  
2 follow-up question on an earlier line of  
3 questioning, which is regarding, again, this issue  
4 of the validation of the water ingestion  
5 questions. Why wasn't any of that information  
6 included in the CHEERS study report?

7 A. The CHEERS study report was on this  
8 timeline that we needed to get it in when we did.  
9 If I had more time, I would have included it, but  
10 it only completed its peer review after the August  
11 31st deadline. I can pass out what I found or --

12 MR. ANDES: We have an exhibit,  
13 which documents what Dr. Dorevitch was talking  
14 about.

15 THE WITNESS: This comes from the  
16 manuscript that -- it's a modified table from the  
17 manuscript that's under review.

18 MS. TIPSORD: I've been handed  
19 validation ingestion info. It's a table. If  
20 there's no objection, I will enter this as Exhibit  
21 403. It's admitted as Exhibit 403.

22 (Document marked as IL EPA  
23 Exhibit No. 403 for  
24 identification.)

1

2 BY THE WITNESS:

3

4 A. So what this summarizes is when  
5 somebody reported swallowing water how much water  
6 did we calculate that they truly swallowed in the  
7 swimming pool study based on measuring the  
8 cyanuric acid in their urine. So this shows that  
9 the less water somebody says they swallowed, the  
10 less water they truly did swallow.

10 BY MS. ALEXANDER:

11

12 Q. Okay. In these results, was the  
13 difference in the amount ingested by those who  
14 self-reported a drop or a tea spoon and the amount  
15 ingested by those who swallowed a mouthful, was  
16 that statistically significant?

16

17 A. I can't answer that. I have to look  
18 at the -- there is a statistically significant  
19 difference across the three groups. I don't  
20 remember off the top of my head what, you know,  
21 none versus drop teaspoon, drop teaspoon versus  
22 mouthful to mouthful versus none. These were all  
23 compared to each other. I believe they were all  
24 significant, but I don't know. I need to go back  
to the computer output.

1 Q. Okay.

2 MS. ALEXANDER: All right. I have  
3 no further questions at this time.

4 MS. TIPSORD: All right. Let's take  
5 an hour for lunch and we'll start with EPA's  
6 questions after lunch.

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

10 MS. TIPSORD: I think we're ready to  
11 go back on the record and we're going to begin now  
12 with the Illinois EPA's questions for  
13 Dr. Dorevitch.

14 MS. WILLIAMS: Good afternoon,  
15 Dr. Dorevitch.

16 MR. DOREVITCH: Good afternoon.

17 E X A M I N A T I O N  
18 BY MS. WILLIAMS

19 Q. Pre-filed question number one starts  
20 with a quote from your testimony. Dr. Dorevitch  
21 states the following on page seven of his  
22 pre-filed testimony, quote, the CHEERS study also  
23 contains information concerning development of a  
24 relationship between microbial water quality

1 parameters and the incidents of illness for  
2 recreational uses proposed for the cause, which  
3 will eventually be needed to develop a  
4 scientifically-based bacterial water quality  
5 standard for the cause. As was noted above, a  
6 supplemental report reflecting completed analysis  
7 of the water quality illness relationship will be  
8 submitted to the Board by December 6th, 2010, end  
9 quote.

10 When was it determined that the  
11 supplemental report would be necessary?

12 A. It was determined at the peer review  
13 meeting in Chicago held on May 25th, 26th, 2009 --  
14 2010.

15 Q. What was determined at that meeting?

16 A. That it would be necessary -- based  
17 on how far along the different portions of the  
18 data analysis were, there was concern among the  
19 research team and among the peer reviewers that  
20 if, in fact, it wouldn't be possible to sort of  
21 wait until all the analysis is done before the  
22 report could be filed with the Pollution Control  
23 Board that it would be better to, sort of, package  
24 the elements that are closest to being ready and



1 filing that as soon as possible and then  
2 completing the remaining analyses and submitting  
3 that as a supplement.

4 Q. Who made that determination that you  
5 would go forward with the final report that didn't  
6 contain all the analysis?

7 A. Well, we had -- I had a discussion  
8 with the peer reviewers about what is a reasonable  
9 timeline for them. In the peer review process, I  
10 prepared a document. I sent it to them. These  
11 documents like the CHEERS final report, August  
12 31st, are pretty large and take a lot of time for  
13 them to go through. Then they provide feedback.  
14 Then I review their comments, make modifications,  
15 send it back to them to identify, okay, here's the  
16 change that has been made, that's been  
17 incorporated based on your comments and that takes  
18 a couple of months just to go through these back  
19 and forth's.

20 So when I -- the peer  
21 reviewers -- the comment kept coming up from them  
22 "Are you sure that the Pollution Control Board  
23 can't, you know, extend the deadline so that you  
24 can submit one report when it's all done?" The

1 folks from the Water Reclamation District  
2 suggested that the timeline is pretty limited and  
3 we don't have a lot of flexibility and that's when  
4 the peer reviewers and I and this statisticians  
5 and the other people that worked on the report  
6 concluded that maybe the best option is to get  
7 everything that's close to being ready peer  
8 reviewed now and that the analyses that are least  
9 far along will -- you know, we'll pick those up  
10 after the initial report is filed and continue  
11 doing the data analyses and then send those for  
12 peer review and together with the peer reviewers I  
13 kind of came up with a timeline and, okay, if  
14 we're going to do it that way what are the  
15 elements that can be reviewed sooner and the  
16 analyses that were least far along were those of  
17 the relationship between water quality and health.

18 All the other analyses required  
19 sort of one data set. Let's say for water quality  
20 chapter two of the report what are the water  
21 quality measures and then for chapters five  
22 through nine what is the relationship between  
23 study group and health outcomes, but to analyze  
24 the relationship between water quality and health,

1 the data of each individual's water quality  
2 exposure, meaning the water quality at the time  
3 and place that they enrolled in the study, need to  
4 be linked to their health data and that's  
5 complicated.

6 So, at that point, that linkage  
7 was just being finalized and I knew that it would  
8 take a couple of months to analyze that data. So  
9 that's what I suggested that this is what's least  
10 ready. How soon could -- how long would it take  
11 the peer reviewers to kind of turn it around? If  
12 I send them a report, how long would it take them  
13 to review it, to reply, to finalize and that was  
14 the process by which the original idea of one  
15 final report came to become a final report as a  
16 supplement.

17 Q. So would it be accurate to summarize  
18 that you and the peer reviewers made this  
19 determination together based on the timelines that  
20 you were given by the District?

21 A. Yes.

22 Q. Okay. Thank you. Who are the  
23 authors of this supplemental report and question A  
24 asks "Identify any variations in authorship from

1 the CHEERS report submitted on August 31, 2010,  
2 and the report to be submitted by December 6th,  
3 2010"?

4 A. There's no difference.

5 Q. Identify any variation in funding  
6 between the final report submitted to the Board on  
7 August 31st, 2010, and the final supplement  
8 report?

9 A. There's no change in funding.  
10 There's no additional funding. It's the same  
11 project.

12 Q. I'm not sure. Have we answered  
13 number three? Will the supplemental report  
14 undergo peer review and describe the process?

15 A. Yes, we answered it.

16 Q. And the answer is, yes, it will?

17 A. Yes, it will undergo peer review and  
18 it's the process I described earlier of sending  
19 it, out, getting comments, incorporating the  
20 comments into a revised version.

21 Q. Can the report be completed any  
22 sooner than December 6th, 2010?

23 A. Not a whole lot sooner. I mean,  
24 maybe we're talking about days, but not a big

1 difference.

2 Q. Will the supplemental report  
3 recommend an indicator organism on which to base  
4 ambient water quality standards to protect  
5 recreational uses in the CAWS and lower Des Planes  
6 River?

7 A. The supplemental report will provide  
8 information about six measures of water quality,  
9 six microbial measures of water quality; e-coli,  
10 enterotoxin, somatic coliphages, female specific,  
11 plus coliphages, giardia and cryptosporidia and  
12 each of those six microbes is being evaluated as a  
13 predictor of each of the five health outcomes;  
14 acute gastrointestinal illness, acute respiratory  
15 illness, ear symptoms, eye symptoms and skin rash.

16 So the report is going to layout  
17 for the Board what we found in terms of which  
18 microbes are predictive of which health outcomes  
19 and there will be discussions that would sort of  
20 highlight differences or reasons that one method  
21 has advantages over another, but the report isn't  
22 going to say this is the microbe that ought to be  
23 used.

24 Q. This question is going to betray my

1 ignorance, but are these all forms of bacteria or  
2 are some of them viruses?

3 A. Two of them are bacteria. E-coli  
4 and enterotoxin are bacteria. The coliphages are  
5 viruses and giardia and cryptosporidia are  
6 protozoan parasites.

7 Q. Thank you. Can you tell us as we  
8 sit here today whether there's going to be a  
9 recommendation at least of the three classes of  
10 what will serve as a better indicator of illness?

11 A. That will be in the supplement. I  
12 mean, this hasn't been through the peer review  
13 process.

14 Q. Right.

15 A. So it wouldn't be appropriate.

16 Q. So what are your conclusions,  
17 Dr. Dorevitch?

18 A. That's what I'm saying. I'm not  
19 sure I'd be doing anybody a service if before it's  
20 been peer reviewed I present final reports.

21 Q. Okay. Is the answer to question  
22 five then no? Will the supplement report  
23 recommend an indicator organism on which to base  
24 water quality standards? You didn't really say

1 yes or no.

2 A. Right. The answer is no. We'll  
3 provide the kind of information that will be  
4 useful to the Pollution Control Board to make that  
5 judgment, but, no, I'm not going to say it should  
6 be e-coli and this is the level of e-coli that is  
7 the one to pay attention to.

8 Q. Will the supplemental report  
9 identify an acceptable number of illnesses  
10 attributable to incidental contact recreational  
11 activities per 1,000 users?

12 A. The supplement won't advise what the  
13 acceptable level of risk is. I think that  
14 determining what is acceptable is a policy  
15 decision or ideally something that took into  
16 account state holder perspectives on that. We had  
17 some exchange this morning, Ms. Alexander and I,  
18 about even the EPA had a difficult time coming up  
19 with -- the US EPA has had a difficult time  
20 determining what is an acceptable risk for  
21 swimmers at beaches. So, no, that's beyond what  
22 the study is going to do.

23 Q. Will the supplemental report provide  
24 the information necessary to equate eight

1 illnesses per 1,000 recreators to a level of  
2 indicator organisms in the water column?

3 A. Yes.

4 Q. Thank you.

5 A. And there's sort of a handout that  
6 Mr. Andes has that sort of explains what this is  
7 going to look like.

8 MS. TIPSORD: I've been handed a  
9 chart example of the type of information about the  
10 water quality and health outcomes that will appear  
11 in the CHEERS supplement. Just for clarification,  
12 is this actual data or is this just for --

13 THE WITNESS: This actually is  
14 actual data, but it's not intended to be  
15 specific -- you know, there isn't information  
16 about what the health outcome is or what the  
17 microbe is here. It's really just meant to  
18 demonstrate that the supplement will have graphs  
19 like this that show for a change in -- over a  
20 range of microbe concentrations, what are the  
21 attributable number of cases of illness that would  
22 be expected and that would be for the Board to  
23 decide. Let's say a certain number is acceptable  
24 or the target of 10 or 20 or 8 or whatever graphs



1 like this would be a resource to be able to say  
2 this is what the microbe level ought to be in  
3 order to keep risk below that level.

4 MS. TIPSORD: If there's no  
5 objection, I'll mark this as Exhibit 404 just for  
6 purposes of the record. Seeing none, it's Exhibit  
7 404.

8 (Document marked as IL EPA  
9 Exhibit No. 404 for  
10 identification.)

11 BY MS. WILLIAMS:

12 Q. Does the CHEERS final report  
13 submitted to the Board -- I'm on question seven  
14 now if that helps. I'm sorry.

15 A. Thanks.

16 Q. Does the CHEERS final report  
17 submitted to the Board on August 31, 2010,  
18 determine the total rate of illness for CAWS  
19 recreators? And in subpart A I say, does the 12  
20 to 13 in 1,000 risk of gastrointestinal illness  
21 need to be added to the 15 to 16 in 1,000 risk of  
22 eye infection to the pain -- the risk of getting  
23 either a gastrointestinal illness or an eye  
24 infection?

1           A.       No, the report does not summarize  
2 the relationship between study group and the  
3 development of any illness. It's specific to GI  
4 illness, respiratory, skin, eye and ear. It  
5 wouldn't be appropriate to sum the number of  
6 attributable cases for a couple of health outcomes  
7 or all health outcomes in that, first of all,  
8 these were measured during different time  
9 intervals. Some of them it was day zero to three.  
10 Some of it was day zero to seven. Respiratory and  
11 ear symptoms were measured at day seven. The  
12 others were measured at day three. The other  
13 thing is that some people had more than one. So  
14 we'd be double counting the people who experienced  
15 one -- two -- you say respiratory and GI in  
16 concluding that there were more people concluded  
17 than were and last to -- the mathematical models  
18 we used to identify this attributable rate of  
19 illness was specific to each outcome. So, for  
20 example, we dealt -- I dealt with confounders for  
21 the development of GI illness and it turned out if  
22 somebody ate fresh fruits and vegetables prior to  
23 enrollment in the study, that affected their risk  
24 of getting GI illness. So that was in the GI

1 model.

2                   That doesn't have anything to do  
3 with getting a skin rash or getting eye symptoms,  
4 but there were other variables in those models  
5 that are specific to those outcomes. So to -- it  
6 is possible to come up with an any illness  
7 category, but that would take some time --

8           Q.        You haven't done that?

9           A.        -- to think through. Right. That  
10 was never part of the plan. That's not how any of  
11 the EPA epidemiologic studies report.

12          Q.        Can I try to summarize again?

13          A.        Yes.

14          Q.        We haven't obtained the total risk  
15 of getting any illness in your study and we  
16 can't -- it wouldn't be scientifically accurate to  
17 add -- mathematically just add them together?

18          A.        Correct.

19          Q.        Okay. But would you agree that  
20 certainly the risk of getting any illness is going  
21 to have to be higher than the risk of 15 to 16 in  
22 1,000 to get the eye infection? It's going to  
23 have to be something higher than that?

24          A.        Yes.

1 Q. We just don't know how much higher?

2 A. No. And, like I said, that could be  
3 done, but it's a little unconventional to analyze  
4 rate of any illness as opposed to specific  
5 outcomes.

6 Q. Okay. And I guess I'll ask subpart  
7 B. Would inclusion of respiratory illness, skin  
8 infections or ear infections impact this total  
9 risk?

10 A. Yes.

11 Q. But we don't know how?

12 A. Right.

13 Q. Would it make it go up, though? It  
14 would have to make it go up.

15 A. It depends. These attributable risk  
16 differences are calculated as differences. It's  
17 the CAWS group rate of illness minus the unexposed  
18 group or the general use waters group. So it's  
19 not just what is happening in the CAWS group.  
20 It's what is happening in the comparison group as  
21 well.

22 So, conceivably, if the general  
23 use waters group had a higher rate for the  
24 specific outcome to the CAWS, it's possible that

1 the combined rate difference would go down  
2 subtracting general use waters from the CAWS. So  
3 it would increase the total number of cases of any  
4 illness, but it's hard to predict what it would do  
5 to the difference in risk between groups.

6 Q. Right. Question eight, does the  
7 CHEERS final report assume the general use  
8 recreators are recreating in water that attain the  
9 general use or Lake Michigan Basin water quality  
10 standards?

11 A. No.

12 Q. Did the water quality in the general  
13 use and Lake Michigan Basin water studies attain  
14 the water quality standards applicable to each  
15 waterbody?

16 A. Not always, no. There were days of  
17 exceedances.

18 Q. And do you know if any of these  
19 waters are listed as impaired for primary contact  
20 recreational uses?

21 A. I don't know off the top of my head.  
22 I know your agency posts every couple of years the  
23 303(d) list. I don't know which --

24 Q. You didn't look specifically whether

1 the waters you studied were on that list or not?

2 A. Correct. The process for deciding  
3 where to recruit people was based on where does  
4 recreation take place. So if recreation takes  
5 place on limited contact activities in the Chicago  
6 area, that's where we recruited people and it was  
7 independent of listing or attainment.

8 Q. But it is relevant for setting the  
9 water quality standards whether the water quality  
10 levels in the general use waters you studied met  
11 the desired condition, isn't it?

12 A. Well, going back to the graph. What  
13 is it, 404?

14 MS. TIPSORD: 404.

15 BY THE WITNESS:

16 A. Exhibit 404. What matters is that  
17 there's a range of water quality values that some  
18 people are using water below microbe levels, some  
19 are using waters with high microbe levels, some  
20 are using waters with intermediate water quality  
21 levels. That's what is important. If everybody  
22 was using water quality -- using waters with the  
23 same water quality, it would be impossible to  
24 differentiate risk of the function of water

1 quality. So what is important is that there be a  
2 range. It isn't important to whether -- say what  
3 percent of the samples came from locations that  
4 were in attainment or out of attainment.

5 BY MS. WILLIAMS:

6 Q. But the goal will have to be to  
7 establish for a range of levels of risk what water  
8 quality correlates to that level of risk, correct?  
9 Will that be the goal?

10 A. Yes.

11 Q. So regardless -- well -- Strike  
12 that. I think I didn't specifically designate  
13 questions for Dr. Granato versus Dr. Dorevitch,  
14 but I think this is basically where -- will  
15 Dr. Dorevitch be available or will he be leaving?

16 MR. ANDES: He's here. So I assume  
17 we would --

18 MS. WILLIAMS: In case there's a  
19 follow up related to some of these others, but I  
20 suspect the rest of these will be for Dr. Granato.

21 MS. TIPSORD: All right. Let's move  
22 onto the people then and the people did the same  
23 thing. They filed their questions together and  
24 they'll try to separate out and then we'll go to

1 Dr. Granato. Whenever you're ready.

2 MR. ARMSTRONG: Good afternoon. My  
3 name is Andrew Armstrong. I'm with the Illinois  
4 Attorney General's Office.

5 MS. WALLACE: Good afternoon. I'm  
6 Elizabeth Wallace with the Illinois Attorney  
7 General's Office.

8 E X A M I N A T I O N

9 BY MR. ARMSTRONG

10 Q. Starting with pre-filed question  
11 number one, do you believe that human exposure to  
12 the pathogens in water can cause gastrointestinal  
13 illness within exposed individuals.

14 A. Yes.

15 Q. What scientific literature supports  
16 that belief?

17 A. There are scientific reports of  
18 outbreaks of disease relating to drinking water  
19 where pathogens in drinking water have caused  
20 illness in people that drink that water. There  
21 have also been reports of outbreaks of what  
22 recreational waterborne illness that are  
23 summarized in the Center for Disease Control's  
24 waterborne disease outbreaks, surveillance system



1 reports, which come out every two years.

2 There's also been an  
3 epidemiologic study that reported pathogen -- the  
4 levels of one pathogen in two waters and the one  
5 with the higher pathogen level has the higher rate  
6 of illness and that's been submitted a couple  
7 years ago as an exhibit. That's Futrell 1992.

8 Q. And that's the only scientific  
9 literature that you're aware of that human  
10 exposure to pathogens can cause gastrointestinal  
11 illness -- waterborne pathogens can cause  
12 gastrointestinal illness?

13 A. The epidermotic studies of  
14 recreational waterborne illness focus on  
15 indicators rather than pathogens. There have been  
16 a few studies that have included pathogens. They  
17 generally test negative and are not associated  
18 with illness. So there is a lot more information  
19 out there about indicators -- pathogen indicators  
20 than about pathogens. It's kind of surprising how  
21 little is out there about pathogens and illness.

22 Q. What is a pathogen exactly?

23 A. A microbe that causes illness.

24 Q. In humans?

1           A.       In humans.

2           Q.       And it causes illness when humans  
3 are exposed to the pathogen?

4           A.       Not always. The person has to be  
5 exposed by the appropriate route and for  
6 gastrointestinal illness, that's ingestion. So  
7 skin contact wouldn't be generally the relevant  
8 route. There could be hand-to-mouth transfer from  
9 skin, but ultimately it's ingestion. So there has  
10 to be an internal dose and on a population level  
11 there should be an infectious dose. So that,  
12 let's say, somebody needs to swallow a hundred  
13 bacteria, you know, a hundred of this particular  
14 pathogenic bacteria to get sick. They might  
15 swallow ten. An individual might swallow ten and  
16 not get sick, but on a population level there's an  
17 estimate of an infectious dose. So a person would  
18 have to ingest the infectious dose in order to  
19 become sick.

20          Q.       So for gastrointestinal illness one  
21 might expect then that if you ingest more  
22 pathogens causing gastrointestinal illness, your  
23 risk of developing gastrointestinal illness  
24 generally would rise?

1           A.        You might be getting closer to the  
2       infectious dose, yeah. The more you ingest, the  
3       more likely you are to exceed the infectious dose.

4           Q.        So we've kind of talked about this,  
5       but just for the sake of asking it, question  
6       number two, do you believe in general increased  
7       exposure to pathogens in water increases one's  
8       risk of developing gastrointestinal illness?

9           A.        Yes, we did talk about it and, yes,  
10       I believe that greater ingestion of pathogens  
11       through recreating increases the risk of illness.

12          Q.        What scientific instrument would  
13       support that belief?

14          A.        Like I mentioned, the studies by  
15       Futrell 1992 and the Centers for Disease Control  
16       and Prevention's waterborne disease outbreak  
17       surveillance system reports.

18          Q.        So both of the propositions I asked  
19       you about in questions one and two are well  
20       supported by the literature?

21          A.        Like I said, well supported is  
22       probably an overstatement because there's so  
23       little out there about pathogens that almost  
24       everything that's known is about indicators, but

1 there is information out there that supports the  
2 idea that recreational water exposure can lead to  
3 illness acquired by ingestion of pathogens.

4 MS. TIPSORD: Yes?

5 MS. MEYERS-GLEN: Just a real quick  
6 follow up. You're talking about ingestion versus  
7 actually having something on your hands? Are you  
8 saying then that you wouldn't recommend that CAWS  
9 users wash their hands to avoid illnesses like GI  
10 illnesses?

11 THE WITNESS: I don't think I said  
12 that at all.

13 MS. MEYERS-GLEN: I'm asking whether  
14 or not because I'm confused by that statement.  
15 Would you then not recommend that people wash  
16 their hands in order to avoid GI illnesses in the  
17 CAWS?

18 THE WITNESS: I recommend washing  
19 hands often as well as possible and I would not  
20 want anybody to think that Dr. Dorevitch said  
21 "Don't wash your hands."

22 MS. MEYERS-GLEN: And that's because  
23 of the risk that exists of potentially having  
24 something on your hands and getting it in your

1 mouth?

2 THE WITNESS: Exactly.

3 MR. ANDES: And that would be the  
4 case for water recreation in general, am I right?

5 THE WITNESS: Yes.

6 BY MR. ARMSTRONG:

7 Q. Okay. I just want to go back really  
8 quickly. I asked you about the level of support  
9 for the propositions in the first two questions.

10 A. Yes.

11 Q. The first question is, do you  
12 believe that human exposure to pathogens can cause  
13 gastrointestinal illness to exposed individuals  
14 and you said -- you hesitated. However, a  
15 pathogen is an agent of disease. So wouldn't it  
16 be fairly self-evident and well-supported that  
17 exposure to pathogens, generally speaking, will  
18 cause disease?

19 A. There is loads of evidence of  
20 exposure to pathogens causing gastrointestinal  
21 illness, but there is little in the way of  
22 recreational water studies so most of the  
23 literature comes from food related born illness  
24 and very little comes from recreational water

1 exposure.

2 I don't question, at all, that  
3 pathogens cause disease or that greater exposure  
4 to greater ingestion of pathogens increases the  
5 risk. It's just that these principals of  
6 infectious disease transmission don't have a real  
7 strong basis in the arena of recreational water  
8 exposure, but I don't question that it occurs or  
9 the principal is sound.

10 Q. Moving onto question number three  
11 then. The CHEERS final report indicates the  
12 levels of bacteria and parasites that cause  
13 disease were much higher at CAWS locations than in  
14 other waters, do you agree with that statement?

15 A. Yes.

16 Q. In addition, the concentration of  
17 indicator viruses were about 10 to 100 times  
18 higher at CAWS locations than at general use water  
19 locations, do you agree with that statement?

20 A. Yes.

21 MR. ANDES: We can assume if it's in  
22 the report, he agrees with it.

23 MR. ARMSTRONG: Fair enough.

24

1 BY MR. ARMSTRONG:

2 Q. These differences were found to be  
3 statistically significant, however, on page V-8  
4 the report states "If the magnitude of water  
5 exposure were the same in CAWS and general use  
6 waters, there would be no statistical evidence of  
7 the incidents of acute gastrointestinal illness  
8 differs between CAWS and general use waterway  
9 recreators." Subpart A, do these results imply  
10 that recreators ingesting equal amounts of water  
11 from the CAWS and general use waters to have equal  
12 risk of developing acute gastrointestinal illness  
13 despite the fact that there are higher levels of  
14 pathogens in the CAWS?

15 A. That is what we're seeing in  
16 objective, too, in the rate of illness in relation  
17 to the study group. That what you read is correct  
18 that after sort of equalizing the amount of  
19 exposure in study groups, the rate of  
20 gastrointestinal illness in the CAWS and in  
21 general use waters were the same.

22 Q. So, in other words, according to  
23 that finding, there's no correlation between an  
24 increase in incidents of illness and an increase

1 in concentration of pathogens in the water, is  
2 that correct?

3 A. That is correct. There's a strong  
4 association between ingesting water and being  
5 exposed to water and having one's head or face  
6 emersed in water. That's strongly associated with  
7 the development of gastrointestinal illness. The  
8 difference between the CAWS group and the general  
9 use group, though, was not significant.

10 So, to me, that says that water  
11 exposure, things that promote water ingestion or  
12 self-reported water ingestion is strongly  
13 associated with the development of illness, but  
14 differences between the groups aren't apparent.  
15 Now that doesn't include measures of microbes. So  
16 what's coming in the supplement is that it's the  
17 relationship between measures of water quality and  
18 health outcome.

19 Q. The studies -- that findings, I  
20 guess, implication that there is no correlation  
21 between the incident of illness and the  
22 concentration of pathogens in the water, is that  
23 consistent with earlier studies of primary contact  
24 recreation water?



1           A.       Well, just to sort of keep things  
2 straight, the CHEERS final report from August 31st  
3 doesn't say anything about the correlation between  
4 microbes in the water and the development of  
5 illness. That's still coming in the supplement.  
6 But the fact that the CAWS group and the general  
7 use group had comparable risks despite higher  
8 levels of microbes in the CAWS and indicators and  
9 some pathogens, that is not obvious, you know.  
10 That's not what I would have expected from the  
11 literature.

12           Q.       But is it consistent with the  
13 literature or is it inconsistent?

14           A.       It's consistent with the idea of  
15 infectious dose. People during limited contact  
16 recreation report swallowing water infrequently.  
17 When they do swallow water, they report swallowing  
18 small quantities. So, let's say, for somebody on  
19 the CAWS to ingest an infectious dose, they would  
20 have to swallow ten teaspoons of water and  
21 somebody on general use waters might have to  
22 swallow 30 teaspoons of water to reach that same  
23 infectious dose. If people in the both groups are  
24 swallowing two or three teaspoons worth, they're

1 not reaching the infectious dose either way.

2 So it's not inconsistent with  
3 the idea of infectious doses and transmission of  
4 disease. I think it's the dose part that's the  
5 relevant part.

6 MS. WALLACE: Dr. Dorevitch, just to  
7 follow up on that. So the idea is that the  
8 literature says there's a relationship between  
9 ingestion of these pathogens and the high  
10 incidents of AGI as a result depending on levels  
11 of pathogens in the water?

12 THE WITNESS: Not ingestion, but,  
13 yeah, concentrations of pathogens in water, yeah.

14 MS. WALLACE: And because you didn't  
15 find that here in this study the recreation of the  
16 CAWS without the same incidents of AGI as you did  
17 on the G UW, the difference is exposure to the  
18 water?

19 THE WITNESS: Yes. Ingestion of the  
20 water is uncommon and occurs in small volumes. So  
21 that people aren't reaching -- this isn't  
22 something that I can directly prove from the data,  
23 but my understanding of this, you know, the way I  
24 understand it is that people are not ingesting an

1 infectious dose and although it would take less  
2 cc's of water ingested in the CAWS than in the  
3 general use waters, people aren't getting there.

4 MS. WALLACE: So do you think if  
5 somebody were to be in the CAWS that they then  
6 would be much more likely to get some AGI illness?

7 THE WITNESS: Yeah, that's in the  
8 report. That's in chapter five of the report. If  
9 you'd like, I can point you to the table, but --

10 MS. WALLACE: No. That's okay.

11 THE WITNESS: It's clear that people  
12 who swallow a mouthful or more of water are at  
13 more risk than the people who swallow a teaspoon  
14 and the people who swallow a teaspoon are at  
15 greater risk than those who swallow less and the  
16 same thing with head/face emersion. That people  
17 who emersed -- submerge their head and face are  
18 more likely to get sick than people that don't.

19 MS. WALLACE: So the folks who are  
20 recreating in the CAWS are just avoiding getting  
21 emersed in this water, could you draw that  
22 conclusion?

23 THE WITNESS: They may be avoiding  
24 it. They do end up with head emersion less

1 frequently than in the general use waters. So  
2 they may be avoiding it or it may be because of  
3 the flow -- the low flow state, the lack of a lot  
4 of turbulence, that they're not capsizing.

5 MS. WALLACE: Thank you.

6 BY MR. ARMSTRONG:

7 Q. Pre-filed question four. Perhaps  
8 another counterintuitive finding. The CAWS-North  
9 area was found to have the highest level of  
10 pathogens, but the lowest rate of illness. Would  
11 you agree with that statement?

12 A. It has high levels of pathogens.  
13 The rate of illness is something that was reported  
14 as an unadjusted rate. It doesn't take into  
15 account anything. It's just the percent of people  
16 who got sick and that's not really the way to  
17 characterize risk.

18 Q. What would be some of the things  
19 that you'd want to adjust for?

20 A. Activity, age, gender, underlying  
21 medical conditions, amount of exposure, ingestion.  
22 The things that I didn't account for in the  
23 complete analysis.

24 Q. Do we have some idea for what types

1 activities were going on in the CAWS-North area?

2 A. Definitely. Canoeing, kayaking,  
3 rowing, are the main activities. Hang on a  
4 second. Yeah, the predominant activities on the  
5 CAWS-North system are canoeing, kayaking and  
6 rowing. Much more so than motorboating and  
7 fishing.

8 Q. Relative to motorboating and  
9 fishing, do canoeing and kayaking generally cause  
10 greater levels of exposure to water or less?

11 A. Greater.

12 Q. So someone who canoes or kayaks is  
13 going to be exposed to more water on average than  
14 someone who fishes or motorboats?

15 A. Correct.

16 Q. And this ties into our pre-filed  
17 question 13. Do you agree with the statement that  
18 motorboating was found to be associated with one  
19 of the highest risks of acute gastrointestinal  
20 illness across both waterways -- well, both types  
21 of waterways I should say compared -- compared  
22 with other recreational activities?

23 A. Well, not compared to fishing, but  
24 boating and fishing had higher rates of illness

1 compared to canoeing, kayaking and rowing.

2 Q. So what the CHEERS study found then  
3 with respect to the CAWS-North area was that there  
4 was, again, not adjusting for the other variables,  
5 the other factors, but what it did find was  
6 CAWS-North area had the lowest rates of illness,  
7 the highest levels of waterborne pathogens and  
8 activities that were among the most exposing to  
9 the recreators to water, is that correct?

10 A. That is correct.

11 Q. Do you have any explanation for that  
12 finding?

13 A. I have a partial explanation for  
14 that finding. For the fishers, at least, they  
15 have exposure to recreational water, but they also  
16 have exposure to bait and to fish and, again, this  
17 is just my explanation, not something that comes  
18 out of the data, but that handling of the bait and  
19 the fish is transferring microbes to their hands  
20 that they end up ingesting and there have been  
21 published studies about Altamar urban anglers  
22 getting cryptosporidium cysts on their hands and  
23 they are at risk of ingesting. The motorboaters  
24 is more problematic for me to explain.

1                   A couple of possibilities. A  
2 lot of the motorboaters go through the CAWS and  
3 out to Lake Michigan and we ask people "Do you  
4 plan on swimming on the lake" if they're going out  
5 boating on the CAWS and if they say "yes, we  
6 intend to swim," then they're not eligible to be  
7 in the study.

8                   It's possible that there are  
9 people that didn't swim in the lake who aren't  
10 reporting it when they returned. I know when I've  
11 asked boaters, you know, here's what I found in  
12 this study, but how do you understand this. They  
13 point to something that we didn't ask about and  
14 that's alcohol intake. And that on boats there's  
15 alcohol and alcohol causes gastrointestinal  
16 symptoms and had I known I would have wound up  
17 with results like this I would have added  
18 questions about alcohol intake, but that's not  
19 part of the survey and I'm really not able to  
20 differentiate alcohol associated illness from  
21 other causes.

22                   MR. ANDES: Would alcohol induce  
23 nausea?

24                   THE WITNESS: Yes.

1 MR. ANDES: And other  
2 gastrointestinal symptoms?

3 THE WITNESS: Yes.

4 MR. ANDES: And even if you ask  
5 people people might not tell the truth whether  
6 they were consuming alcohol in the water, I  
7 assume?

8 THE WITNESS: They might not, but  
9 the question wasn't asked.

10 BY MR. ARMSTRONG:

11 Q. Do you have any data indicating that  
12 alcohol use is more greater correlated with  
13 powerboat usage than kayaking?

14 A. I don't have data on that beyond my  
15 observations, personal observations, but, no, I  
16 don't have data.

17 Q. Moving onto question number five.  
18 The CHEERS final report found that the youngest  
19 age, zero to ten and oldest ages 65 and over,  
20 participants have a statistically significant  
21 lower odds of acute gastrointestinal illness than  
22 the age 11 to 64 year-old participants. Do you  
23 believe that children and senior citizens are less  
24 likely to be ill from recreating on the CAWS than



1 other individuals in other age groups?

2 A. That is what the study showed that  
3 they are less likely to report illness after  
4 recreating on the CAWS and there's a handout going  
5 around. I guess Exhibit 405.

6 MS. TIPSORD: I've been handed a  
7 chart, table, age categories across the top  
8 swallowed water less than 11 years, 11 to 64 and  
9 65 plus years. If there's no objection, we'll  
10 mark this as Exhibit 405. Seeing none, it's  
11 Exhibit 405.

12 (Document marked as IL EPA  
13 Exhibit No. 405 for  
14 identification.)

15 BY THE WITNESS:

16 A. This is an analysis of the data  
17 regarding water ingestion and head emersion by age  
18 category and the top table there shows that under  
19 the age of 11, 0.8 percent of participants  
20 reported swallowing water. 4.2 percent of the 11  
21 to 64 years olds did and 2.2 percent of the 65  
22 plus group did. So this shows differences that  
23 are statistically significant in ingesting water  
24 and the bottom half shows something similar for

1 head emersion. The middle age -- the mid group  
2 had a much higher rate of head emersion.

3 It wasn't common in any group,  
4 age groups, but it was more common in that mid age  
5 group. So I think, again, it boils down to  
6 exposure and that maybe parents of small children  
7 are not, you know, they're taking care that their  
8 kids don't fall in the water or don't jump in the  
9 water and if they do get wet they wash their hands  
10 and things like that and same thing with the 65  
11 plus they appear to be -- they are less likely to  
12 end up emersing their head or swallowing water.  
13 So I think the age -- the real difference in age  
14 may boil down to exposure rather than immunity or  
15 anything else.

16 MS. TIPSORD: Yes?

17 MS. MEYERS-GLEN: Is there a  
18 possibility that you may not be getting the same  
19 kind of reporting from, say, a three year-old than  
20 you would somebody who is 25 as far as how much  
21 water they've swallowed or how wet they get?

22 THE WITNESS: The three year-olds  
23 wouldn't be answering the question. That would  
24 come from their parents.

1 BY MR. ARMSTRONG:

2 Q. Moving onto question seven, skipping  
3 question six. The CHEERS study asks participants  
4 on a scale of zero to ten where zero is not at all  
5 risky and ten is very risky, can you tell me how  
6 much of a health risk you think it is to do water  
7 sports on the Chicago River and I believe you  
8 testified earlier that general use water  
9 recreators were not asked about their perception  
10 of health risks of recreating in the general use  
11 waters?

12 A. That's correct.

13 Q. And I also believe you testified  
14 before about, I believe, it was a 1998 study from  
15 Fleischer?

16 A. Yeah. I know it was Fleischer. I  
17 don't have the article in front of me, but I think  
18 it was 1998. It could have been 1996. About  
19 somebody's preconceived notion about health risk  
20 as related to their ultimate reporting of the  
21 development of gastrointestinal illness after  
22 swimming.

23 Q. Then in terms of determining whether  
24 a general use waters recreator would have -- would

1 be effected at all by their perception of risk,  
2 wouldn't you want to ask that recreator about  
3 their perceptions of risk in the waterway they're  
4 actually using at that time?

5 A. That would have been better.

6 MS. TIPSORD: Excuse me. Could you  
7 spell Fleischer for the court reporter?

8 THE WITNESS: F-L-E-I-S-C-H-E-R, I  
9 believe.

10 MS. TIPSORD: Thank you.

11 THE WITNESS: You're welcome.

12 BY MR. ARMSTRONG:

13 Q. Just to finish off the question with  
14 subpart C then. Would the information regarding  
15 general use waters recreators perceptions of the  
16 health risks of using general use waters, would  
17 that information have been useful in assessing the  
18 potential for increased water exposures or recall  
19 bias among the GUW group?

20 A. It may. Their impressions about  
21 CAWS risks were related to their health risks as  
22 well. It wasn't only -- the CAWS recreators were  
23 their perceived risk of CAWS recreation was  
24 predictive of their development of GI illness. So

1 I suspect that there's a strong correlation  
2 between somebody's perceived risk of water  
3 recreation on the CAWS and perceived risk on water  
4 recreation on general use waters. I'm not saying  
5 that they would be the same for an individual, but  
6 they're related for both groups.

7           The two water exposed groups,  
8 the perceived risk of water recreation on the CAWS  
9 was lower than the unexposed group and that's --  
10 in other words, they perceived less risk than the  
11 people who don't use the CAWS or general use  
12 waters and that's consistent with general use of  
13 risk perception that the unfamiliar risk is --  
14 what is unfamiliar is riskier than what is  
15 familiar. So I do think there was useful  
16 information in that question, but having asked  
17 specifically about GU would have been a good thing  
18 as well.

19           Q.       It certainly -- if somebody says  
20 that I am more scared of the CAWS than somebody  
21 else both on the GU that would certainly show  
22 which among those two is risk averse, but that  
23 wouldn't necessarily show you how they feel in  
24 terms of how dangerous the CAWS is relative to the

1 general use waters, though, would it?

2 A. No.

3 Q. Pre-filed question number eight.

4 The CHEERS final report does not appear to  
5 indicate that the study asks participants whether  
6 they wash their hands and/or bodies following  
7 recreation on the CAWS or general use waters.  
8 Subpart A, did you ask participants whether they  
9 washed their hands and/or body following  
10 recreation on the CAWS or general use waters?

11 A. Yes.

12 Q. And, for my benefit, where in the  
13 report is that?

14 A. That isn't in the report. That's in  
15 the -- you're right. The final report doesn't say  
16 that, but in 2008 I submitted the QAPP, Quality  
17 Assurance Program Plan, listing all the CHEERS  
18 protocols and outlines -- it contains the  
19 questionnaires we used and there are questionnaire  
20 items that say, first of all, did you eat during  
21 or after the recreational activity at the blank  
22 river or lake today and then if they say yes then  
23 we ask did they clean their hands or not. We  
24 assumed that people could have eaten or drank

1 multiple times so we asked did you always, never  
2 or sometimes clean your hands and we asked about  
3 how they cleaned their hands. Did they use  
4 sanitizers or soap and water and I have summaries  
5 of that. So that will be passed around now as  
6 well.

7 MS. TIPSORD: Before you begin,  
8 Dr. Dorevitch. I've been handed another set of  
9 tables at the top ate during/after recreation. If  
10 there's no objection, we will have this marked as  
11 Exhibit 406. Seeing none, it's Exhibit 406.

12 (Document marked as IL EPA  
13 Exhibit No. 406 for  
14 identification.)

15 BY THE WITNESS:

16 A. So to walk everybody through this on  
17 the top half are questions relating to eating and  
18 the bottom half are questions relating to  
19 drinking. The first question is did you eat or  
20 drink, the second question is did you wash your  
21 hands and what this shows is that the CAWS  
22 recreators were less likely to eat. They were  
23 also less likely to drink than the general use  
24 water recreators and the general use recreators

1 were more likely not to clean their hands after  
2 eating and after drinking.

3 MS. WILLIAMS: Can I ask a quick  
4 follow up?

5 MS. TIPSORD: Actually,  
6 Ms. Alexander had her hand up first.

7 MS. ALEXANDER: Would I be correct  
8 in understanding that this data was not  
9 incorporated into the final study results?

10 THE WITNESS: This data was not part  
11 of those -- it wasn't reported in the August 31st  
12 report, but I have since reanalyzed data taking  
13 this into account and the short answer is that  
14 including handwashing didn't change the results.

15 MS. ALEXANDER: Okay. Why was it  
16 not incorporated into the first iteration of your  
17 report?

18 THE WITNESS: It -- when I developed  
19 the conceptual model and identified variables of  
20 interest and presented it to the peer review, it  
21 wasn't identified by anybody as something to  
22 include, but I, like I said, reanalyzed the data  
23 and it didn't make any impact. Among those who  
24 did wash their hands among CAWS recreators --



1 among those who ate or drank, once you take into  
2 account handwashing, the association between eye  
3 symptoms and CAWS use disappears.

4 So with that in the model the  
5 eye symptoms being linked to CAWS recreation is no  
6 longer significant. That's only for the subset  
7 who did eat or drink. When you add -- when you  
8 look at all study participants, it doesn't change  
9 the results.

10 MS. ALEXANDER: Are you planning on  
11 presenting this data to the Board?

12 MR. ANDES: He just did.

13 MS. ALEXANDER: The reanalysis of  
14 your data?

15 THE WITNESS: If the Board wants  
16 something additional, I can certainly add --  
17 generate another supplement or something.

18 MS. TIPSORD: That would be great.

19 THE WITNESS: Okay.

20 MS. TIPSORD: Okay. Ms. Williams,  
21 you had a follow up?

22 MS. WILLIAMS: I would just be  
23 curious to understand, Dr. Dorevitch, whether you  
24 looked at differences within what you're calling

1 the general use waters group between Lake Michigan  
2 users and the other users. Were these numbers  
3 consistent across or did you always just lump  
4 everyone together that wasn't in the CAWS?

5 THE WITNESS: I lumped everybody  
6 together that was in the CAWS and I lumped  
7 everybody together that wasn't in the CAWS.

8 MS. WILLIAMS: So you didn't look  
9 for any differences between behavior in Lake  
10 Michigan beach recreators and inland water  
11 recreators?

12 THE WITNESS: I did. I don't think  
13 that that made it into the final report. It was a  
14 pretty arcane question I thought, but, no, that's  
15 not in the report. How exposure varied by type of  
16 general use, what I would call general use waters.

17 MS. WILLIAMS: That's all.

18 MS. TIPSORD: Mr. Armstrong?

19 BY MR. ARMSTRONG:

20 Q. Well, it's difficult to ask about  
21 analysis the details of which aren't in force, but  
22 would you agree with the statement that recreators  
23 tended to be more fastidious than recreators on  
24 the general use waters?

1           A.       More likely to clean their hands  
2 after eating or drinking, yes.

3           MR. ANDES:   When you control for  
4 handwashing, it didn't change your results, am I  
5 right?

6           THE WITNESS:  It did not change the  
7 effects -- the results regarding the  
8 gastrointestinal illness.  Among the subset, it  
9 changed the results about the eye symptoms.

10          MR. ANDES:  So among people that  
11 washed their hands, there was no difference in eye  
12 symptoms between CAWS recreators and GU  
13 recreators?

14          THE WITNESS:  Among those who ate  
15 and drank.

16          MR. ANDES:  Among those who ate and  
17 drank and washed their hands, the difference in  
18 eye symptoms went away?

19          THE WITNESS:  Correct.

20          MS. WALLACE:  Just to be clear.  So  
21 those people who ate or drank and it looks like  
22 mostly ate and not drank?

23          THE WITNESS:  Mostly drank.

24          MS. WALLACE:  It looks like the

1 people who -- most of the people didn't wash their  
2 hands after they drank?

3 THE WITNESS: Right.

4 MS. WALLACE: Which makes sense.

5 THE WITNESS: More people ate than  
6 drank.

7 MS. WALLACE: But those that ate and  
8 not washing their hands in that category of people  
9 had a higher incident of eye illness?

10 THE WITNESS: No, that's not what I  
11 said. What I said is there was an analysis done  
12 of people in the CAWS group and in the GU group  
13 comparing rates of eye symptoms. That analysis  
14 whether you do or don't include handwashing,  
15 adjust for handwashing, the CAWS group has higher  
16 rates of eye symptoms.

17 If I restrict that analysis only  
18 to the people who ate or drank, then taking into  
19 account handwashing makes the difference between  
20 the CAWS group and the general use group  
21 disappear. They're incomparable rates of eye  
22 symptoms among that subgroup.

23 MS. WALLACE: So if I'm  
24 understanding you right, I'm not sure that I am,

1 but if I went kayaking and got my hands wet in the  
2 CAWS and then came out and ate something, would  
3 use my hands without washing and someone did the  
4 same thing in the general use waters, did you  
5 compare those two types of groups, those two  
6 groups, one in the CAWS eating without washing  
7 their hands, one in the G UW eating without washing  
8 their hands and who would have higher incidents of  
9 any of the illnesses?

10 THE WITNESS: Yes.

11 MS. WALLACE: And did you find that  
12 any of these -- what did you find?

13 THE WITNESS: What I found is that  
14 the results are the same. The results didn't  
15 change, meaning that the CAWS group has a higher  
16 likelihood of getting gastrointestinal illness --  
17 I'm sorry. The CAWS group and the general use  
18 group have comparable risks of gastrointestinal  
19 illness. They have comparable risks of acute  
20 respiratory illness. They have comparable risks  
21 of ear symptoms. They have comparable risks of  
22 skin rash. However, if I don't take into account  
23 handwashing, the CAWS group has a higher risk of  
24 eye symptoms. If I do take into account

1 handwashing, the two groups are comparable in  
2 terms of the risk of eye symptoms.

3 MR. ANDES: Let me follow up and try  
4 to clarify that. You say you take into account  
5 handwashing. If you look at people who have eaten  
6 in CAWS and GU and then they both don't wash their  
7 hands and they both answer the survey and say I  
8 ate and I didn't wash my hands, is their eye risk  
9 comparable?

10 THE WITNESS: Yes.

11 MR. ANDES: And by the same token if  
12 they both ate and washed their hands, their eye  
13 symptom risk would be comparable?

14 THE WITNESS: Yes.

15 MR. ANDES: Thank you.

16 MS. WALLACE: I guess I keep asking  
17 and I'm confused because it doesn't really fit  
18 with the whole issue of higher exposure leads to  
19 higher rate of illness.

20 MS. TIPSORD: Is there a question?

21 MS. WALLACE: Do you agree?

22 MS. TIPSORD: Thank you.

23 THE WITNESS: No, I don't agree. I  
24 think that if you equalize exposure and you say

1 that everybody washes their hands or nobody washes  
2 their hands in the CAWS group and the general use  
3 group, the risks would be comparable. If you  
4 don't take into account this difference in  
5 handwashing, then you see elevated risks among the  
6 subset of CAWS users who ate and drank.

7 MS. WALLACE: Okay. Thank you.

8 THE WITNESS: You're welcome.

9 BY MR. ARMSTRONG:

10 Q. Pre-filed question -- I'm going to  
11 skip pre-filed question number nine. Number 10,  
12 is it possible that the time window between  
13 symptom onset and sample collection could effect  
14 the ability to detect pathogens in the stool  
15 samples?

16 A. I think it's unlikely to influence  
17 the detection of pathogens in stool samples. The  
18 interval was between symptom onset and receipt of  
19 the sample of the laboratory. It's not end of  
20 symptoms and receipt of the sample in the  
21 laboratory. So somebody might have reported  
22 developing symptoms on July 1st and they had  
23 symptoms to July 5th and we collected a sample on  
24 July 7th and it got to the laboratory on July 8th.

1 So there's eight days between symptom onset and  
2 sample receipt in the laboratory, but two days  
3 between -- I'm sorry. Sample collection may have  
4 occurred during the time of symptom. So it's  
5 not -- it would be best to look at end of symptoms  
6 and sample collection data rather than onset of  
7 symptoms. In general, people shed bacteria  
8 viruses, parasites in their stool for weeks after  
9 being infected, for some infections, for months.

10 So the fact that one-third of  
11 the people had an interval between onset and  
12 receipt in the laboratory of ten days doesn't make  
13 it likely that we're losing positive results  
14 because of that interval.

15 BY M. ARMSTRONG:

16 Q. Moving onto question 11. This  
17 references a comment from the peer review. It's  
18 at Appendix D3 of the final CHEERS report. In  
19 response to a comment from the peer review of the  
20 CHEERS study stating that, quote, the stool  
21 results are at best inconclusive due to  
22 noncompliance differences in compliance across  
23 groups, days between illness and stool collection,  
24 lower recovery rates and failure to sample



1 asymptomatic people, end quote. You indicated  
2 that you had removed mention of these results from  
3 the study abstract. However, they are discussed  
4 elsewhere in the report. Are the findings of the  
5 stool analyses in the CHEERS final report accurate  
6 and reliable?

7 A. Yes.

8 Q. Do you believe the comment to have  
9 any weight to it insofar as you did remove some  
10 references in the abstract based in response to  
11 the comment?

12 A. I didn't want to overstate, you  
13 know, any conclusions from those analyses and, you  
14 know, if the peer reviewer had thought that this  
15 is -- I don't think the peer reviewer thought that  
16 these results shouldn't be reported or anything,  
17 but they were taken out of the -- sort of if  
18 somebody is going to read pages about the study,  
19 it's not there, but it belongs in the report. I  
20 don't really agree with everything that reviewer  
21 said. The days between illness and stool  
22 collection stays between onset of stool symptoms  
23 and receipt in laboratory.

24 Low recovery rate, again, I

1 disagree. This is actually a very high rate of --  
2 well, I'm not a hundred percent sure of what that  
3 specifically meant, but we collected stool samples  
4 from a pretty high percent of symptomatic study  
5 participants compared to work that the Centers for  
6 Disease Control does when they try to collect  
7 stool samples from people with symptoms.

8                   And the failure to sample  
9 asymptomatic people, I stand by that decision to  
10 not collect stool samples from asymptomatic people  
11 in part because I anticipated something like this  
12 that most stool samples come back showing nothing  
13 and it's true that had we collected stool samples  
14 from asymptomatic people and some of them may have  
15 pathogens in them, that they mean we are  
16 overstating our rate of positive stool samples.  
17 That some of these, let's say ten percent of  
18 people, had something in their stool. Maybe one  
19 percent of the general population, asymptomatic  
20 people, have something in their stool. So really  
21 instead of it being ten percent, it should be nine  
22 percent, but I think it would have been a poor use  
23 of resources to collect stool samples from people  
24 who aren't sick.

1 MR. ANDES: It might be helpful also  
2 to clarify. Were the stool results used in any  
3 way in the chart that we've gone through  
4 predicting rates of illness?

5 THE WITNESS: No.

6 MR. ANDES: Can you explain a little  
7 bit about why the stool results were there and  
8 what they were intending to be used for?

9 THE WITNESS: Well, this -- the  
10 chapter ten of the August 31st report addresses  
11 study objective number three. What are the -- to  
12 characterize pathogens responsible for illness  
13 among study participants. Characterizing  
14 pathogens responsible for illnesses is descriptive  
15 and it has nothing to do with the calculations of  
16 rates of illness as a function of study group. If  
17 somebody in the study group was determined to have  
18 acute gastrointestinal illness, that was based on  
19 their symptoms, not based on their stool culture  
20 results.

21 The idea there was that if there  
22 is a particular microbe or class of microbe that  
23 is preferentially found in stool samples from CAWS  
24 participants or general use waters participants

1 that would point to those waters being a source of  
2 that pathogen or that group of pathogens.

3 So that's why that was done. In  
4 the end, we didn't find differences between the  
5 groups and there was also a concern at the  
6 beginning, are people getting sick with  
7 gastrointestinal illness that's caused by very  
8 scary pathogens, the e-coli or 15787 or salmonella  
9 or things that cause big public health scares. So  
10 the idea was to see if any of that was going on  
11 and we didn't find any of that. We primarily  
12 found common viral infections and incomparable  
13 rates across the three study groups.

14 BY MR. ARMSTRONG:

15 Q. Okay. We're going to skip 12 and 14  
16 and move onto question 15.

17 A. Okay.

18 Q. In the analysis of acute  
19 gastrointestinal illness, the CHEERS final report  
20 indicates that use of the body of water five to  
21 ten days in the past year was associated with  
22 higher risk than use of it zero to four days.  
23 However, recreating more than ten days was not  
24 statistically different from the use of the water

1 for zero to four days. How would you explain that  
2 result?

3 A. It's -- I think it probably struck  
4 me the same way it struck you. It was contrary to  
5 my expectations as well. All I can -- you know, I  
6 can only speculate that maybe when people first  
7 used the water they're very cautious. They avoid  
8 hazardous exposures. After they feel comfortable,  
9 they become a little more lax and that the people  
10 who use the water all the time may have immunity  
11 or they may be sort of the professional rowers who  
12 are not horsing around in the water and  
13 submerging, but I don't -- it's not what I  
14 expected and what I told you is just my  
15 speculation.

16 Q. Skip 16 as well. Finish up with 17  
17 and 18. These both refer to your testimony on  
18 June 29th, 2010. 17, you indicate in your June  
19 29th, 2010, testimony that the final report would  
20 indicate the proportion of the study participants  
21 who enrolled in CHEERS only once versus those that  
22 enrolled repeatedly. Subpart A, did you assess  
23 differential risks to those repeat participants?

24 A. I did.

1 Q. And where would that information be  
2 reported?

3 A. It's not in the final report.  
4 There's a soon-to-be exhibit being passed around  
5 with how frequently we observed repeat  
6 participation.

7 MS. TIPSORD: I been handed a table  
8 with number times enrolled, frequency and percent  
9 across the top. If there's no objection, we will  
10 mark this as Exhibit 407. Seeing none, it's  
11 Exhibit 407.

12 (Document marked as IL EPA  
13 Exhibit No. 407 for  
14 identification.)

15 BY THE WITNESS:

16 A. What this shows is about six percent  
17 of CHEERS participants were in the study more than  
18 once and their analysis of the data looking at  
19 these people separately, excluding these people,  
20 didn't change any of the results. It's a pretty  
21 small percent. There would have to be very strong  
22 effect, repeat moment, for it to be apparent, but  
23 it had no influence on the results of the study.

24

1 BY MR. ARMSTRONG:

2 Q. Question 18, you indicated in your  
3 June 29th, 2010, testimony that within the time  
4 window of interest, quote, we can look at whether  
5 people who did or did not reuse the waters since  
6 we spoke to them last have a different health risk  
7 than others, end quote. Did you perform that type  
8 of analysis?

9 A. Yes.

10 Q. And where would that information be  
11 reported?

12 A. That is not in the final report, but  
13 I have that information and that will soon be an  
14 exhibit.

15 MS. TIPSORD: I've been handed table  
16 associate -- a table of associations between  
17 health outcomes and subsequent water recreation.  
18 If there's no objection, we'll mark this as  
19 Exhibit 408. Seeing none, it's Exhibit 408.

20 (Document marked as IL EPA  
21 Exhibit No. 408 for  
22 identification.)

23 BY THE WITNESS:

24 A. So what this document summarizes is

1 the influence -- the relationship between the  
2 development of symptoms and recreation in water  
3 subsequent to participation in the CHEERS field  
4 study. So if somebody enrolled in the field study  
5 they were in the CAWS group and then two days  
6 later they swam in a pool or they went back to the  
7 CAWS. What did that repeat participation -- what  
8 was that repeat participation phenomena associated  
9 at all with the development of health outcomes and  
10 what this shows is that the development of skin  
11 rash was associated with repeat participation.  
12 I'm sorry. Not repeat participation. Subsequent  
13 water recreation during the follow-up interval.  
14 GI symptoms, eye symptoms, respiratory and ear  
15 symptoms were not associated with subsequent water  
16 recreation during the follow-up period. The  
17 middle portion of the document demonstrates that  
18 among people who did use the water -- use water  
19 for recreation during the follow-up period their  
20 likelihood of 5.3 percent of them developed a skin  
21 rash compared to 3.8 percent of people who did  
22 not.

23 The bottom part is what we found  
24 in relation regarding the primary study questions



1 about is CAWS recreation associated with the  
2 development of health outcomes and in this case  
3 specifically skin rash whether we do or don't  
4 include repeat participation -- I'm sorry. Repeat  
5 recreational water use in the model. We get the  
6 same results. That is it's not statistically  
7 significant. It doesn't approach statistical  
8 significance. There's no association. There's no  
9 difference in risk between the CAWS group and the  
10 unexposed group and there's no difference in the  
11 GU group. There's no -- I'm sorry. There's no  
12 GU, general use water, unexposed difference. When  
13 you do take into account subsequent use -- I'm  
14 sorry. When you don't take into account  
15 subsequent use, it does become statistically  
16 significant when I did include subsequent use in  
17 that model. So you can see where it says GUW  
18 versus unexposed. When subsequent use is included  
19 in the model, it became protective. It became  
20 statistically significant. The confidence  
21 interval does not include one without subsequent  
22 use in the model. The confidence interval does  
23 include one. It's not statistically significant.  
24 And I guess the take away message is that there is

1 a lower likelihood of skin rash in the GU group  
2 than the unexposed group. This is something I  
3 mentioned before in the blowup handout -- the  
4 blowup chart and it isn't for any reason that I  
5 can explain. It does shift just a little bit from  
6 nonsignificant to significant, but the primary  
7 findings of GI illness and eye symptoms are  
8 unrelated to subsequent recreation.

9 MR. ARMSTRONG: That's all we have.  
10 Thank you very much.

11 MS. WALLACE: Thank you.

12 MS. TIPSORD: Let's --

13 MS. BAUER: I have one follow-up  
14 question. Candice Bauer, B-A-U-E-R. When we're  
15 looking at all these exhibits that you provided,  
16 there's a box around a set of study results and  
17 then below there is a P value recorded for  
18 significant test. Did each of these significant  
19 tests relate directly to the comparison that's in  
20 the box? So this --

21 THE WITNESS: Right. The P value is  
22 related to that specific comparison. So at the  
23 top of it there, skin rash is associated with  
24 subsequent water recreation and it's in a box just

1 because it was statistically significant. The P  
2 value is 0.1. So there's a one in 100 chance that  
3 that was random. That there really isn't the  
4 difference in skin rash in relation to subsequent  
5 water recreation. So that is considered  
6 statistically significant.

7 MS. BAUER: Then the next one, the  
8 pie square would be the pie square in the  
9 second --

10 THE COURT REPORTER: I'm sorry. I  
11 can't hear you.

12 MS. TIPSORD: I'm sorry. You're  
13 going to have come forward. We're not hearing  
14 you.

15 MS. BAUER: I'm looking at Exhibit  
16 408, there's a pie square P equals 0.01 under the  
17 second figure. That pie square of P equals 0.01  
18 then is the P square that was derived looking at  
19 the difference between rashes, you know, yes,  
20 there is a rash versus, no, subsequent water use  
21 versus subsequent water recreation?

22 THE WITNESS: Right.

23 MS. BAUER: That's what that box is?

24 THE WITNESS: The box is just

1 highlighting. The box is just making it easier to  
2 see what we found, but the box, per se, isn't the  
3 statistical significance test wasn't limited to  
4 what was in the box. The box was just a way of  
5 highlighting what was found.

6 MS. BAUER: Thank you.

7 MS. TIPSORD: Ms. Meyers-Glen?

8 MS. MEYERS-GLEN: I have two more  
9 for you. Did the study consider any other uses  
10 assessing the risk of people in the CAWS aside  
11 from recreation such as educational class  
12 activities?

13 THE WITNESS: I'm sorry. Can you  
14 repeat the question?

15 MS. MEYERS-GLEN: Did the -- we're  
16 talking about looking at the risk to people out on  
17 the CAWS, correct?

18 THE WITNESS: We're talking about  
19 comparisons of risk in the CAWS and out of the  
20 CAWS, yes.

21 MS. MEYERS-GLEN: And I was  
22 wondering aside from the recreational uses whether  
23 or not you looked at a crossover of educational  
24 activities that were occurring out on the CAWS

1 whether the study captured those?

2 THE WITNESS: No, the study didn't  
3 inquire about educational activities.

4 MS. MEYERS-GLEN: So are you aware  
5 that there are instances such as the 7th grade  
6 class that MWRD cosponsored where 7th graders  
7 paddled out in canoes and reportedly one 7th  
8 grader sampled for bugs right at the outfall of  
9 the North Side Waste Water Treatment Plant?

10 THE WITNESS: I wasn't aware of it  
11 until you mentioned it.

12 MS. MEYERS-GLEN: So that kind of  
13 activity then that I mentioned was not captured?

14 THE WITNESS: If those kids were at  
15 a recruiting station when we were recruiting, they  
16 might have participated in the study, but I don't  
17 know specifically about a bug expedition.

18 MS. MEYERS-GLEN: Thank you.

19 THE WITNESS: You're welcome.

20 MS. TIPSORD: All right. Let's take  
21 a ten-minute break and we'll come back with  
22 Dr. Granato.

23

24

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

4 MS. TIPSORD: Let's go ahead and go  
5 back on the record. I understand Mr. Harley that  
6 we have some additional exhibits to admit at this  
7 point?

8 MR. HARLEY: Before we begin with  
9 the presentation, the Southeast Environmental Task  
10 Force has two exhibits it would like to enter into  
11 the record. The first is existing NPDES permit  
12 for the Calumet Waste Water Treatment Plant and  
13 the second is the draft we issued NPDES permit for  
14 the Calumet Waste Water Treatment Plant.

15 MS. TIPSORD: If there's no  
16 objection to these, we will admit the existing  
17 permit as Exhibit 409 and the draft permit as  
18 Exhibit 410. Seeing none, they're so admitted.

19 (Documents marked as IL EPA  
20 Exhibit No. 409-410 for  
21 identification.)

22 MR. HARLEY: Thank you.

23 MS. TIPSORD: With that, I think  
24 we're ready for Dr. Granato. With that, could we

1 have him sworn in, please.

2 WHEREUPON:

3 THOMAS GRANATO

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

6 MS. TIPSORD: Since he's reading it  
7 in, I don't need to enter it as an exhibit, but  
8 thank you.

9 MR. ANDES: Sure.

10 MS. TIPSORD: Go ahead. Whenever  
11 you're ready.

12 MR. GRANATO: My name is Thomas  
13 Granato, and I am the Deputy Director of  
14 Monitoring and Research at the Metropolitan Water  
15 Reclamation District of Greater Chicago. I'll  
16 refer to that as the District. A statement of  
17 my qualifications, including my curriculum vitae,  
18 previously has been filed with the Board in  
19 this proceeding.

20 I have been employed by the  
21 District for over 22 years and have held  
22 progressively responsible positions, including  
23 head of the Biosolids Utilization and Soil Science  
24 Section, Coordinator of Technical Services, and

1 Assistant Director of Monitoring and Research. I  
2 have been the Deputy Director of M&R for one year.

3 Over the past five years, I have  
4 been directly involved in the planning,  
5 development, management and administration of the  
6 many research studies that the District has  
7 undertaken to support the Chicago Area Waterways  
8 Use Attainability Analysis.

9 I hold a Bachelor of Science  
10 degree in Agricultural Science and a Master of  
11 Science degree in Soil Chemistry from the  
12 University of Illinois at Urbana-Champaign and a  
13 Doctor of Philosophy degree in Environmental Soil  
14 Science from North Carolina State University. I  
15 am a member of the Water Environment Federation,  
16 the American Chemical Society, the Soil Science  
17 Society of America and the American Society of  
18 Agronomy. I have been a managing editor of  
19 Water Environment Research for the past four  
20 years, a member of the Water Environment  
21 Research Foundation's Research Council for nearly  
22 two years, and vice-chair of the Water  
23 Environment Federation's Microconstituents  
24 Community of Practice.



1 I have published over 50  
2 research articles and reports pertaining to  
3 biosolids management, risk assessment, water  
4 quality, and other areas of environmental science.  
5 In my prior testimony in this proceeding, I  
6 summarized the District's testimony on  
7 recreational use issues for the Chicago Area  
8 Waterways System, CAWS. The District  
9 believes that the Illinois Environmental  
10 Protection Agency, IEPA, has relied upon incorrect  
11 assumptions and incomplete information to reach  
12 faulty conclusions regarding recreational use  
13 designations and associated standards for the  
14 CAWS.

15 As I stated in my prior  
16 testimony, instead of pursuing this rulemaking  
17 when it did, the District believes that the IEPA  
18 should have waited for the completion of the  
19 Chicago Health, Environmental Exposure, and  
20 Recreation Study, CHEERS study, which was  
21 conducted by Dr. Samuel Dorevitch at the  
22 University of Illinois at Chicago, because the  
23 CHEERS Study provides essential information to  
24 make scientifically supported decisions regarding

1 the appropriate water quality standards for the  
2 CAWS. Testimony of Thomas Granato, at 125 (Oct.  
3 28, 2008).

4 The District funded the CHEERS  
5 Study in part at the request of IEPA, and believes  
6 that the agency should use the results of that  
7 study to develop appropriate, science-based  
8 recreational criteria for the CAWS. My prior  
9 testimony also stated that, based upon the expert  
10 testimony and documents presented during the  
11 rulemaking, the District does not believe there is  
12 significant risk of gastrointestinal illness  
13 associated with incidental and non-contact  
14 recreational use of the CAWS in either dry or wet  
15 weather conditions. As a result, disinfection of  
16 the effluent from the water reclamation plants  
17 will have minimal effects on overall illness  
18 rates. Pre-Filed Testimony of  
19 Thomas Granato, at 4-8 (Aug. 4, 2008).

20 The CHEERS Report was filed with  
21 the Board on August 31, 2010. This is the first  
22 epidemiological study of the health risks of  
23 fishing, boating, rowing and paddling in the CAWS.  
24 The CHEERS Study design was developed by a

1 multidisciplinary team of experienced researchers,  
2 with backgrounds in infectious disease medicine,  
3 environmental medicine, epidemiology,  
4 biostatistics, industrial hygiene and  
5 environmental science. A panel of recognized  
6 leaders in the fields of water microbiology and  
7 health from the U.S. Centers for Disease Control  
8 and Prevention, the U.S. Environmental Protection  
9 Agency, and several universities reviewed and  
10 endorsed the designs and protocols of the  
11 research, and monitored the quality of the data  
12 collected and its analysis and interpretation.

13           The CHEERS Study was designed to  
14 investigate the occurrence of illness associated  
15 with secondary contact recreation on the CAWS and  
16 presented two findings. The first objective was  
17 to determine the rates of acute gastrointestinal  
18 and nongastrointestinal illness attributable to  
19 CAWS recreation. The second objective was to  
20 identify pathogens responsible for acute  
21 infections among recreators, and to explore  
22 sources of those pathogens on the CAWS.

23           A third objective - to  
24 characterize the relationship between

1 concentrations of microbes in the CAWS and  
2 rates of illness among recreators - will be  
3 addressed in a supplement to the CHEERS Report  
4 that will be submitted to the Board in December of  
5 2010. With respect to the first specific aim of  
6 the CHEERS Study, the study concluded that  
7 rates of gastrointestinal illness are not higher  
8 among CAWS recreators as compared to recreators  
9 doing the same activities on general use waters  
10 that do not receive undisinfected wastewater  
11 treatment plant effluent.

12 About 12-13 cases of  
13 gastrointestinal illness per 1,000 uses can be  
14 Electronic Filing - Received, Clerk's Office,  
15 September 20, 2010 attributed to limited contact  
16 recreation on the CAWS. This rate is  
17 statistically indistinguishable from the rate of  
18 gastrointestinal illness attributable to limited  
19 contact recreation on general use waters. After  
20 taking into account differences among the groups,  
21 the CHEERS Study found that the odds of developing  
22 acute gastrointestinal illness were 41% higher in  
23 the CAWS group as compared to the unexposed group.  
24 However, the odds were 44% higher in the general

1 use waters group as compared to the unexposed  
2 group.

3           Although the CHEERS Study did  
4 find a significantly different incidence of eye  
5 symptoms among CAWS recreators than those on  
6 general use waters, the symptoms reportedly  
7 were very minor in most cases, generally not  
8 requiring any medication or requiring only the use  
9 of over-the-counter medications. The study could  
10 not discern whether the eye symptoms were  
11 the result of infection, chemical irritation, or  
12 allergic reaction. The incidence of more severe  
13 eye symptom that did require medical attention,  
14 prescription medication, or hospitalization,  
15 occurred more frequently in the general use waters  
16 or unexposed group than the CAWS.

17           Finally, the CHEERS Study found  
18 that there is no difference among recreators on  
19 the CAWS, recreators on the general use waters,  
20 and the unexposed group for respiratory, skin and  
21 ear symptoms. With respect to the third aim of  
22 the CHEERS Study, pathogens responsible for  
23 illness, the vast majority of pathogens identified  
24 from stool samples from study participants in all

1 of the study groups with gastrointestinal symptoms  
2 were viruses. Pathogens that often result in  
3 severe water borne disease were not identified in  
4 stool samples. There was no suggestion that water  
5 recreation, CAWS use, or water ingestion was  
6 associated with gastrointestinal illness.  
7 The CHEERS Study also contains information  
8 concerning development of a relationship  
9 between microbial water quality parameters and the  
10 incidence of illness for recreational uses  
11 proposed for the CAWS, which will eventually be  
12 needed to develop scientifically-based  
13 Electronic Filing - Received, Clerk's Office,  
14 September 20, 2010 bacterial water quality  
15 standards for the CAWS. As was noted above, a  
16 supplemental report reflecting a completed  
17 analysis of the water quality illness relationship  
18 will be submitted to the Board by December 6,  
19 2010.

20 The CHEERS Study makes it clear  
21 that disinfection is not necessary for the  
22 District's wastewater treatment plant effluent  
23 discharged into the CAWS. The risk to recreators  
24 in the CAWS, where effluents are not disinfected,

1 are no greater than the risks to recreators in  
2 other nearby waters where effluents are  
3 disinfected or where no effluent is discharged.  
4 The District has concluded that disinfection will  
5 not provide a public health benefit. The total  
6 costs associated with disinfection are  
7 extraordinary, particularly considering the lack  
8 of benefit. For example, installation and  
9 operation of UV disinfection technology, which  
10 currently represents the most likely choice for  
11 implementation at the District's North Side,  
12 Calumet and Stickney plants, is estimated at a  
13 20-year total present worth cost of \$919.6  
14 million. Chlorination/dechlorination would result  
15 in similar costs to the District.

16 Based upon the District's  
17 limitations and restrictions on generating  
18 revenues to fund programs, funding such an  
19 expenditure would require legislative action, a  
20 voter referendum, or significantly reducing  
21 funding of the District's existing capital  
22 improvement plan which is designed to maintain and  
23 upgrade the District's aging infrastructure.  
24 Finally, effluent disinfection would result in

1 substantial environmental impacts in the  
2 form of energy usage, air emissions from power  
3 generation and transportation of raw and waste  
4 materials, and land usage.

5           These environmental impacts must  
6 be weighed when considering the appropriateness of  
7 disinfection requirements. As established by the  
8 preceding testimony and in light of the CHEERS  
9 Study, IEPA's conclusions are not supported by  
10 sound science and are arbitrary, speculative, and  
11 not rationally related to the information  
12 necessary to establish appropriate recreational  
13 uses and supporting criteria. For these reasons,  
14 the District strongly recommends that, after  
15 appropriate recreational uses are established  
16 through sub docket A, the Board direct IEPA to use  
17 the results of the CHEERS study, including the  
18 supplemental report that will be filed shortly  
19 concerning the statistical link between microbe  
20 concentration in the CAWS and actual illness  
21 rates, to establish appropriate, science-based  
22 criteria to support recreational uses.

23           At the October 28, 2008 hearing,  
24 the IEPA, specifically asked me if CHEERS would



1 provide information that would enable them to  
2 identify an appropriate indicator organism and set  
3 ambient criteria that would be protective of  
4 incidental contact and non-contact recreation and  
5 I informed them that it would. Testimony of  
6 Thomas Granato, at 186 and 189.

7 If, despite this recommendation,  
8 the Board decides to proceed with this rulemaking,  
9 the District recommends that the requirement to  
10 disinfect be removed as unsupported. Respectfully  
11 submitted, Thomas Granato,

12 MS. TIPSORD: Ms. Alexander, we'll  
13 start with you.

14 E X A M I N A T I O N

15 BY MS. ALEXANDER

16 Q. Good afternoon, Dr. Granato. My  
17 name is Ann Alexander with the Natural Resources  
18 Defense Counsel.

19 A. Good afternoon.

20 Q. And I would like to start off with  
21 pre-filed request one which is whether you have  
22 any kind of academic or professional or any other  
23 background in the field of epidemiology?

24 A. One second. I'm getting my notes in

1 order. I don't have any formal training in  
2 epidemiology. I'm not an expert in epidemiology.  
3 My educational background includes some course  
4 work in statistics, biochemistry, chemical  
5 classes. Most of my exposure to the field of  
6 epidemiology has been through professional  
7 experience probably most pertinent is the  
8 experience I've gained over the last three to four  
9 years from managing the CHEERS study from the  
10 District side and interacting with all the  
11 professional experts that we retained to testify  
12 and participate in the rulemaking, including the  
13 risk assessment team.

14 I also have a fair amount of  
15 experience with risk assessment, environmental  
16 risk assessment. I was a member of the peer  
17 review team that reviewed the EPA's Part 5.03 rule  
18 for bio-solids and participated in the revision of  
19 the risk assessment algorithms for that rule.  
20 I've also participated in a project with the  
21 Chicago Department of Environment whereby we did a  
22 site specific risk assessment for bio-solids use  
23 at parks in the Chicagoland area.

24 Q. Okay. So just to summarize, would

1 it be fair to say that most of your direct  
2 experience with epidemiology specifically has come  
3 from working on the CHEERS study?

4 A. Yes.

5 Q. What specifically was your role with  
6 respect to the CHEERS study? Can you describe  
7 what you did?

8 A. Sure. I was -- I guess I was the  
9 overall manager of the project for the District.  
10 I was tasked with working with UIC to establish --  
11 we talked a little bit this morning about the  
12 agreement between the two agencies. I was tasked  
13 with delivering that agreement. Convey it to the  
14 school of public health. The research need the  
15 District had, liaison with their staff and getting  
16 the project kicked off and I also was responsible  
17 for -- overall for managing the administration of  
18 the project on the District's end and supervising  
19 or coordinating all the support function that the  
20 District provided to the CHEERS team all along the  
21 conduct of the study.

22 Q. Can you elaborate what you mean by  
23 that support function? What did you do?

24 A. Well, it was really a variety of

1 things. We worked with CHEERS. We had staff  
2 members who had previous experience with -- more  
3 previous experience with public health,  
4 microbiology, environmental microbiology than the  
5 CHEERS staff had initially and we conveyed some of  
6 the knowledge and experience we had in terms of  
7 previously conducted study information, scientific  
8 literature, review of protocols and the generation  
9 of the QAPP that the team undertook. We assisted  
10 the CHEERS team in gaining access to various sites  
11 that they wanted to use in the study to group  
12 participants. We provided them with operations  
13 data and information regarding operation of the  
14 waterways, the pumping systems, CSO discharges.  
15 We loaned them some equipment, rafts and other  
16 things they needed to sample with.

17           It's hard to remember everything  
18 we did, but we did a lot of reviewing things and  
19 commenting providing -- as Dr. Dorevitch mentioned  
20 this morning, provided our comments and feedback  
21 on things. I guess that's mainly what we did. We  
22 also -- excuse me. We also arranged the peer  
23 review. We initiated that through WERF for  
24 CHEERS.

1           Q.       Just to back up a little bit. You  
2 mentioned that you played a role in reviewing  
3 protocol. Can you describe what you meant by that  
4 a little more.

5           A.       Well, in the beginning phases of the  
6 study, the CHEERS team had to develop an extensive  
7 set of -- Quality Assurance Project Plan and SOP's  
8 for all the procedures and analysis that they were  
9 going to conduct and our microbiologist and our  
10 in-house experts reviewed that and provided their  
11 feedback and advice in terms from their  
12 experience.

13                       Some of the water sampling we  
14 had gained a lot of experience from the risk  
15 assessment study that we had recently completed.  
16 We conveyed some of the sampling techniques to  
17 CHEERS for their information, made them aware of  
18 how certain things were done and just provided  
19 general review and feedback on what they were  
20 generating.

21           Q.       Did there come a time when you  
22 reviewed a draft study protocol of any kind,  
23 something in writing from the CHEERS team?

24           A.       A draft study protocol?

1 Q. A set of study protocols.

2 A. Yes, we reviewed a whole set of  
3 QAPP's.

4 Q. And did you provide substantive  
5 comments on those?

6 A. What do you mean by substantive?

7 Q. Any kind of comments other than  
8 catching typos?

9 A. It's hard for me to remember what  
10 the comments consisted of because it was about  
11 three years ago.

12 MR. ANDES: Can you describe what is  
13 in a Quality Assurance Project Plan?

14 BY MS. ALEXANDER:

15 Q. First, can you answer my question  
16 and then you can describe that.

17 A. I would say to the extent that they  
18 were appropriate, yes, we probably did. I don't  
19 remember the comments at this point. I would have  
20 to go back and look -- I'd have to go back and see  
21 what I conveyed.

22 Q. Okay.

23 MS. ALEXANDER: Mr. Andes, would you  
24 still like to ask your question?

1 MR. ANDES: Yes. So explain what a  
2 QAPP is.

3 THE WITNESS: A QAPP is really  
4 basically an outline of the entire study, how  
5 you're going to conduct it, how everything from  
6 the procedure you're going to use to sample and  
7 analyze either chemically or microbiologically or  
8 statistically. It also lists the measures you're  
9 going to undertake to ensure all the data are  
10 appropriate and acceptable quality for use in  
11 reporting and drawing inferences.

12 MS. TIPSORD: We used QAPP a couple  
13 of times. That's QAP, correct?

14 MR. ANDES: QAPP.

15 BY MS. ALEXANDER:

16 Q. Behind the QAPP, were there other  
17 aspects of the study design that you commented on  
18 for the CHEERS team?

19 A. About the study design probably.

20 Q. Do you recall whether the CHEERS  
21 team adopted any of your comments, took your  
22 advice?

23 A. Well, it was entirely at their  
24 discretion. In some cases, they did and in some

1 cases they didn't.

2 Q. You mentioned you provided  
3 information concerning previous studies. Could  
4 you please be more specific?

5 A. Well, we provided them, first of  
6 all, with copies of any pertinent studies that we  
7 had undertaken that would help inform their design  
8 of the epidemiological study. That could include  
9 the risk assessment study as I mentioned, the  
10 CHEERS/Syntec study maybe we could call it for  
11 familiarity in this rulemaking.

12 We also had conducted an  
13 indicator study, water quality study on the  
14 waterways. We made that available to them. We  
15 made the UAA report available to them that had  
16 information about uses on the waterways, observed  
17 uses. Probably a number of other things that I'm  
18 not remembering.

19 Q. You mentioned the Geosyntec study.  
20 Did you ever specifically discuss that study with  
21 Dr. Dorevitch?

22 A. Yeah. I believe we did, yes.

23 Q. What was the nature of that  
24 discussion?



1           A.       A lot of that discussion was  
2           regarding water sample techniques, you know, how  
3           water sampling was conducted in that study and to  
4           kind of give the CHEERS team sort of a running  
5           start so they didn't have to reinvent the wheel  
6           and they didn't adopt everything that was done in  
7           that study, but I think it helped to give them  
8           kind of a starting context for figuring out how to  
9           best go about water sampling to characterize water  
10          quality during their study.

11          Q.       You also mentioned that you  
12          commented on drafts. Can you elaborate on that a  
13          little bit, please?

14          A.       Commented on drafts?

15          Q.       You commented on drafts?

16                   MR. ANDES: Drafts of? What  
17          document are we referring to?

18                   MS. ALEXANDER: I'm referring to his  
19          statement earlier in his testimony that he  
20          commented on drafts. And I would like elaboration  
21          on what drafts he commented on and what kind of  
22          comments were made.

23          BY THE WITNESS:

24          A.       Well, we commented on certainly the

1 draft QAPP's. We commented on draft reports that  
2 were generated for the peer review. Most of those  
3 reviews we conducted were concurrent with the  
4 reviews of the peer review committee and we  
5 provided our input and our comments just like the  
6 peer reviewers did. We have also reviewed two of  
7 the draft manuscripts that were referred to this  
8 morning. I think that's basically it.

9 BY MS. ALEXANDER:

10 Q. When you say you provided comments  
11 just like the peer reviewers, do you mean the same  
12 type of comments in the sense that you were  
13 commenting on study analysis and study results the  
14 way the peer reviewers did?

15 A. Not exactly that way, no. I would  
16 say more looking at what was presented and to the  
17 extent that our expertise allowed -- first of all,  
18 as Dr. Dorevitch pointed out looking at the  
19 presentation, were there any typographical errors  
20 or -- I don't know. Improvements in the way  
21 things could be presented more clearly or  
22 concisely and then also looking at accuracy and  
23 correctness of data presentation.

24 Q. What do you mean by that?

1           A.       Well, we never had the -- we never  
2 had access to the, say, the raw data or the  
3 untabulated or the unanalyzed data. So we were  
4 never able to go back and fully check the project  
5 team's analysis from scratch, but to the extent  
6 the data was presented in tables and analysis of  
7 the data was presented in the courts, there might  
8 have been computations of liens or other  
9 statistics that could be checked based on what was  
10 presented. We would check those things and  
11 provide feedback to the CHEERS team as to whether  
12 we found any errors.

13           Q.       Did you ever discuss application of  
14 the study or any part of it with Dr. Dorevitch?

15           A.       Very recently I did, yes.

16           Q.       Was that the first time when you say  
17 very recently?

18           A.       It's the first time I can recall any  
19 substantive discussion of it. I think it was  
20 assumed all along as any study that's conducted,  
21 manuscripts would be developed and published at  
22 some point. I would say that was understood and  
23 Dr. Dorevitch recently has started generating  
24 draft manuscripts. So, at that point, we started

1 discussing it.

2 Q. You also said you arranged the peer  
3 review. Can you explain what you did to arrange  
4 the peer review?

5 A. Yes. I contacted the Water  
6 Environment Research Foundation and actually they  
7 were aware of the study prior to that because an  
8 effort was made originally to try to develop  
9 interest among WERF subscribers in expanding the  
10 interest in the study beyond the Chicago area in  
11 the hope of finding additional support for the  
12 project and also maybe leveraging it into a bigger  
13 study that would speak to more than the local  
14 situation.

15 As we started developing the  
16 project, we approached WERF. I approached WERF  
17 and indicated that we felt it was important to  
18 have an independent peer review of the project  
19 both in terms of providing the CHEERS team access  
20 to the expertise of an expert panel which would  
21 help to guarantee the best possible project that  
22 we could deliver and also to, you know, I'd say  
23 address the concerns that maybe the state holders  
24 might have -- that the protocols and procedures

1 and the analysis that were being conducted were  
2 correct and reliable.

3 Q. So you talked to WERF about the peer  
4 review and did WERF itself conduct the peer review  
5 or how did that work?

6 A. Well, WERF at the time was  
7 initiating what they called their pathogen  
8 challenge, which was a -- WERF was making a  
9 transition from project driven research where they  
10 would kind of fund individual projects to more of  
11 a program directed research where they wanted to  
12 dedicate money to funding a series of projects  
13 that could focus on a programatic area and bring  
14 about a more in-depth treatment of that issue or  
15 that topic.

16 So WERF was interested under  
17 their pathogen challenge including the peer review  
18 of this project and they funded the peer review  
19 and they recruited the panel members and they  
20 organized -- managed and organized the peer  
21 review. So any meetings that were held, they made  
22 the arrangements. They were responsible for  
23 getting information from the CHEERS team and  
24 distributing it to the panel members. They were

1 responsible for getting the peer reviewer comments  
2 and tabulating those and conveying them to the  
3 CHEERS team, et cetera, and that type of thing.

4 Q. Who funds WERF?

5 A. WERF is funded by -- I don't know  
6 exactly how many subscribers, but they consist of  
7 really a variety of entities from municipalities  
8 such as the District, consulting agencies,  
9 companies in the waste water industry. I think  
10 there are regulatory agencies that are subscribers  
11 to WERF. I'm not aware of all of who it is, but  
12 it's not just -- I think the perception is it's  
13 just municipal POTW's and waste water agencies,  
14 but that's no longer the case at WERF.

15 MR. ANDES: Also, correct me if I'm  
16 wrong, but they also have some project where US  
17 EPA participates in the funding?

18 MS. TIPSORD: US EPA?

19 MR. ANDES: US EPA.

20 MS. ALEXANDER: Are you suggesting  
21 that US EPA is a member of WERF?

22 MR. ANDES: No. The question was my  
23 understanding which I'm asking Dr. Granato to  
24 confirm is there were WERF projects that EPA

1 participates in the funding.

2 MS. ALEXANDER: That was your  
3 question?

4 MR. ANDES: Yes.

5 BY MS. ALEXANDER:

6 Q. Would it be fair to say that WERF is  
7 predominantly funded by POTW?

8 A. I really don't know.

9 Q. Okay. Moving onto pre-filed  
10 question two. Regarding your statement that IEPA  
11 relied upon, quote, incomplete information in  
12 making its decision to require disinfection.  
13 That's at page two of your testimony. Is that  
14 information now complete in your view?

15 A. Well, I think it's complete with  
16 regard to IEPA reevaluating their technology-based  
17 effluent limitation proposal. I think the risk  
18 assessment study, the CHEERS study, and other  
19 studies that are in the record have demonstrated  
20 that there's really no benefit to be derived to  
21 the imposition of that limit, coupled with the  
22 cost analysis that was put into the record and the  
23 environment impact that is likely to result from  
24 infection. It does not appear that that is a

1 reasonable proposal.

2                   Regarding the development of  
3 water quality base limits or standards, the record  
4 is not complete yet and it will require submittal  
5 of the supplemental report that we have discussed  
6 this morning.

7           Q.       You're referring to the document  
8 that the District has indicated will be filed on  
9 or before December 6th?

10           A.       That's correct.

11                   MS. TIPSORD: I have a question. Do  
12 you believe the water quality standards for  
13 bacteria should be established before there is an  
14 effluent requirement for bacteria? Do we need  
15 water quality standards first before we do an  
16 effluent standard?

17                   THE WITNESS: I believe there should  
18 be, yes.

19                   MS. TIPSORD: Do you know if US EPA  
20 has any proposals or plans to establish water  
21 quality standards or implement guidelines for what  
22 we have referred to as secondary guideline waters?

23                   THE WITNESS: US EPA?

24                   MS. TIPSORD: Yes.



1 THE WITNESS: I don't believe they  
2 have any immediate plans for limited contact  
3 inland flowing waters, no.

4 MS. TIPSORD: Okay. US EPA has  
5 something on its website concerning the update of  
6 the 1986 Recreational Water Quality Criteria.  
7 They've already discussed provisions to  
8 recreational water quality standard for bacteria  
9 at a webinar that was held on October 12th, 2010.  
10 Are you aware of that? Did you have --

11 THE WITNESS: The webinar?

12 MS. TIPSORD: Yes.

13 THE WITNESS: I was aware they held  
14 a webinar. I was unable to participate in it or  
15 view it.

16 MR. ANDES: Dr. Granato, does that  
17 EPA effort resolve around primary contact  
18 criteria, in other words for swimming waters?

19 THE WITNESS: Yes.

20 MR. ANDES: So are you aware of any  
21 US EPA initiative on secondary contact waters?

22 THE WITNESS: No, I'm not aware of  
23 any.

24 MS. TIPSORD: I'm going to let Alisa

1 ask because I'm lost now.

2 MS. LIU: It's been a while since  
3 either the Agency or the District has updated us  
4 on US EPA's process towards developing any sort of  
5 water quality criteria for bacteria whether in  
6 primary contact or secondary contact type waters  
7 and we were wondering if it would be possible  
8 given now that it's been three years since your  
9 proposal was first initially filed with us if you  
10 could -- either the Agency or the District or both  
11 provide us with an update for the record on US  
12 EPA's activities concerning recreational water  
13 quality standards and its implication, if any, on  
14 the current rulemaking and whether or not anything  
15 is being done at this time to begin to investigate  
16 secondary contact criteria or implementation  
17 guidelines?

18 MR. ANDES: The District would be  
19 glad to provide an update.

20 MS. ALEXANDER: Would it be  
21 acceptable if the agency addresses that issue in  
22 its comments?

23 MS. TIPSORD: Absolutely.

24 Mr. Harley, you had a follow up?

1 MR. HARLEY: Keith Harley, Southeast  
2 Environmental Task Force. Mr. Granato, are you  
3 familiar with any water quality standards that  
4 presently exist in Illinois law that might apply  
5 to the CAWS?

6 THE WITNESS: Water quality  
7 standards?

8 MR. HARLEY: Yes.

9 THE WITNESS: That apply to the  
10 CAWS?

11 MR. HARLEY: Yes.

12 THE WITNESS: Are you referring to  
13 bacteria standards?

14 MR. HARLEY: Yes.

15 THE WITNESS: Well, there's portions  
16 of the CAWS that currently are designated as  
17 general use.

18 MR. HARLEY: Those portions that are  
19 not presently designated as general use in light  
20 of the Board's decision in sub docket A that the  
21 CAWS flow through recreational areas through parks  
22 and residential areas, are you familiar with the  
23 standards that apply to protective waters under  
24 Illinois law?

1 MR. ANDES: First, I'll object.  
2 You're characterizing the Board's first notice and  
3 sub docket A and I would object to the  
4 characterization. If we want to get into a legal  
5 argument about protective waters, we can do that,  
6 but I don't know if you want to go there.

7 MS. TIPSORD: I would note for the  
8 record that the Board has proposed for first  
9 notice recreational use designations and with that  
10 caveat I think you can -- is Mr. Granato aware?

11 THE WITNESS: The protected  
12 waters -- I'm somewhat familiar with it, yes.

13 MR. HARLEY: Are you familiar with  
14 the fact that protected water designation requires  
15 seasonal disinfection?

16 THE WITNESS: Can you repeat the  
17 question, please?

18 MR. HARLEY: Are you familiar with  
19 the fact that the designation of protected waters  
20 would require seasonal disinfection?

21 THE WITNESS: Yes, I'm familiar with  
22 that fact.

23 MR. HARLEY: Has the District come  
24 to a conclusion based on the Board's decision

1 whether or not the CAWS is properly characterized  
2 as protected waters?

3 THE WITNESS: It's our position that  
4 they are not -- should not be characterized as  
5 protected waters.

6 MR. HARLEY: Why not?

7 MR. ANDES: Are we asking for a  
8 legal opinion here? That's really a legal  
9 determination.

10 MS. TIPSORD: Mr. Granato is here --  
11 Dr. Granato is here speaking on behalf of the  
12 District and he is asking for the District's  
13 position. If Dr. Granato can't answer to the  
14 District's position, that's fine, but the District  
15 obviously has a position. He just said what their  
16 position was.

17 THE WITNESS: So it's our position  
18 that they don't meet the outline requirements in  
19 the part 304 -- I can't remember where it is now.  
20 They don't meet the criteria outlined in the  
21 regulations.

22 MR. HARLEY: Can you describe in  
23 what way?

24 MR. ANDES: Can I ask for the

1 District to be able to submit a memorandum on that  
2 legal issue rather than Dr. Granato -- there have  
3 been no questions that have been asked of  
4 Dr. Granato asking to state a legal conclusion on  
5 these issues. We would like the opportunity to  
6 submit our explanation of the issues.

7 MS. TIPSORD: You --

8 MR. HARLEY: As a hearing officer,  
9 he is testifying that there is no applicable water  
10 quality standards for the CAWS and is saying this  
11 rulemaking should be delayed until such time that  
12 there are legally applicable water quality  
13 standards for the CAWS.

14 I am positing my question that  
15 based on the Board's decision there may be  
16 actually legally applicable presently decisive  
17 water quality standards for the CAWS. It's  
18 entirely appropriate for me to ask this question.

19 MS. TIPSORD: And, again, I think  
20 that Mr. Harley is asking for a position that  
21 Dr. Granato says is the District's position. I'm  
22 not asking for his legal opinion, but he is asking  
23 if you'll explain the District's position. If the  
24 District feels that requires a legal position,

1 they can certainly address it.

2 MR. ANDES: We'll do that.

3 THE WITNESS: I would have to take a  
4 look at this and think about it for a few minutes.  
5 I'm not prepared to answer that question at this  
6 time.

7 MR. HARLEY: One follow-up question.  
8 Until water quality standards are developed under  
9 the District's approach, isn't it the District's  
10 position that its facilities should be able to  
11 emit any level of pathogens in their waste water?

12 THE WITNESS: Emit any level of  
13 pathogens?

14 MR. HARLEY: Any level of pathogens  
15 in their waste water?

16 THE WITNESS: Well, no, I wouldn't  
17 say any level of pathogens. I would say that the  
18 systems should be operated optionally as they  
19 always are and that the residual level of  
20 pathogens that are not removed by the secondary  
21 treatment, which are not producing any difference  
22 in incidents of illness from waterways that are  
23 receiving disinfected effluents should be  
24 acceptable.

1 MR. HARLEY: And is there a numeric  
2 boundary that goes along with that position of the  
3 District or is it the District's position simply  
4 that on any given day any concentration of  
5 pathogens could be emitted by a facility without  
6 legal restriction?

7 THE WITNESS: I mean, I wouldn't  
8 agree that it's our position that any level of  
9 pathogens can be emitted. It's our position that  
10 we would continue to operate our treatment plants  
11 to the best level of treatment they're capable of  
12 providing with the existing infrastructure and  
13 that -- you know, that appears to be adequate  
14 treatment for the level of exposure and activity  
15 that's occurring on the waterways.

16 MR. HARLEY: So the District is not  
17 willing to accept any numeric limit on pathogens?

18 THE WITNESS: There is no reason to  
19 believe that the pathogen levels are going to  
20 skyrocket just because the District continues with  
21 the practice that it's been -- it's had in place  
22 for the last several decades.

23 MR. HARLEY: So your answer is no?

24 MR. ANDES: He just answered the



1 question.

2 MR. HARLEY: I asked him a direct  
3 question if they were willing to accept any  
4 numeric limits and he did not answer that  
5 question.

6 THE WITNESS: Any numeric limits on  
7 effluents?

8 MR. HARLEY: Yes, on pathogen levels  
9 in effluents.

10 THE WITNESS: How would you derive  
11 it? How would you derive an effluent limit on  
12 pathogens?

13 MR. HARLEY: I believe I'm asking a  
14 question.

15 THE WITNESS: Well, I need to know  
16 that in order to answer your question.

17 MR. HARLEY: I'm having a great  
18 difficulty getting a straight answer to a straight  
19 question. Is the District willing to accept any  
20 numeric limitation whatsoever on the levels of  
21 pathogens in its effluent?

22 THE WITNESS: Yes, we are.

23 MR. HARLEY: Can you give us some  
24 idea of what that numeric limit might be?

1 THE WITNESS: You mean tell you a  
2 number?

3 MR. HARLEY: Yes.

4 THE WITNESS: No, I can't.

5 MR. HARLEY: Thank you.

6 MR. ANDES: How would those numbers  
7 be determined?

8 THE WITNESS: Those numbers should  
9 be determined by setting protective water quality  
10 standards and then basing effluent limitations on  
11 them.

12 MS. TIPSORD: Ms. Alexander?

13 BY MS. ALEXANDER:

14 Q. I'm going to move onto pre-filed  
15 question three, which is regarding your statement  
16 and testimony that Illinois EPA, quote, should  
17 develop appropriate science-based recreational  
18 criteria for the CAWS. That's page two. What  
19 specific information in your view should form that  
20 scientific basis to which you refer?

21 A. That basis -- the basis of that  
22 should be the CHEERS water quality survey health  
23 outcome, clinical pathological data, as well as  
24 climatological and wet weather operational data

1 water quality data and the District's fecal  
2 coliform study and, if necessary, output from the  
3 Duflow amount, water quality model.

4 Q. When you refer to the risk  
5 assessment, you're referring to the wet and dry  
6 risk assessment Geosyntec study?

7 A. Yes.

8 MS. ALEXANDER: Are we up to 409?

9 MS. TIPSORD: No. 411.

10 MS. ALEXANDER: I would like to have  
11 marked as 411 a document under cover of a letter  
12 dated July 22nd, 2010, of the US EPA to the  
13 Illinois Pollution Control Board.

14 MS. TIPSORD: If this is a letter to  
15 the Illinois Pollution Control Board --

16 MS. ALEXANDER: It's a comment  
17 submitted. I wanted to ask him about the comment.

18 MS. TIPSORD: No. It's Public  
19 Comment 304. You can ask him about it. It's sub  
20 docket A, correct?

21 MS. ALEXANDER: Yes, I believe that  
22 was in sub docket A.

23 MS. TIPSORD: No, this is B. We  
24 don't need to put that in the record as an

1 exhibit.

2 MS. ALEXANDER: I'll give you this  
3 as a courtesy copy then.

4 MS. TIPSORD: As long as you have a  
5 copy, if we could borrow a copy.

6 MS. ALEXANDER: Absolutely.

7 BY MS. ALEXANDER:

8 Q. Referring to the document I just  
9 handed out, Public Comment 304, have you seen this  
10 document, Dr. Granato?

11 A. Yes, I have.

12 Q. Now, at any time since US EPA  
13 determined and I quote from this document. "It is  
14 EPA's view that the dry and wet weather risk  
15 assessments were deficient and do not adequately  
16 describe the potential risk of exposures on  
17 undisinfected sewage effluents to persons engaged  
18 in limited contact recreational activities on the  
19 CAWS." Since that statement was made in this  
20 document, have you had any discussions with  
21 anybody at US EPA about the Geosyntec study?

22 A. No, I haven't.

23 Q. Have you or anyone at the District  
24 reviewed the Geosyntec study again in light of the

1 comments contained in Public Comment 304?

2 A. We're in the process of doing that,  
3 yes.

4 Q. So your plan is to submit a written  
5 response to US EPA?

6 A. Yes, it is.

7 Q. Do you have an estimate of when that  
8 will be completed?

9 A. I would say it's, what, sometime  
10 early next month I would say.

11 Q. Okay. Who is participating in  
12 preparing that response?

13 A. Who is participating?

14 Q. Who is participating?

15 A. Primarily our staff and perhaps to  
16 some extent the Geosyntec team.

17 MS. TIPSORD: Ms. Williams, you have  
18 a follow up?

19 MS. WILLIAMS: Are you done asking?

20 MS. ALEXANDER: Yes, you can go  
21 ahead with your follow up.

22 MS. WILLIAMS: Dr. Granato, would  
23 you agree that based on the results of the CHEERS  
24 study that the District's dry and wet weather risk

1 assessment underestimated the rate of illness to  
2 recreators in the CAWS?

3 MS. TIPSORD: Did you say rate of  
4 illness?

5 MS. WILLIAMS: Underestimated the  
6 rate of illness, yes.

7 THE WITNESS: No, I wouldn't agree  
8 with that, no.

9 MS. WILLIAMS: Why not?

10 THE WITNESS: Well, for a number of  
11 reasons. I would say, first of all, the risk  
12 assessment study is based on modeling actual  
13 infection from pathogens that were detected in the  
14 water in the CAWS and the rates of illness were  
15 attributed to -- they would be illness directly  
16 attributed to pathogen infection.

17 In the CHEERS study, the  
18 incidents of illness are not entirely due to  
19 infection from pathogens. There are a number of  
20 reasons why these illnesses can be -- can occur.  
21 Infection from pathogen being only one of those  
22 possible causes. And if you look at the -- we're  
23 talking a lot today about all the counterintuitive  
24 observations in the study, that the stool samples

1 90 percent of them lack in identifying a pathogen.  
2 There's no difference in pathogen levels in the  
3 stool between CAWS, GU and unexposed. There's no  
4 relationship between pathogen presence in stool  
5 samples and self-reported water ingestion.  
6 There's a higher level of incidents of illness  
7 where there's lower levels of pathogen in the  
8 water.

9 All of these things are  
10 consistent with the premise that pathogens are not  
11 necessarily the causal agent of the illness that  
12 are being observed. There's no evidence in the  
13 CHEERS study that proves that pathogens are  
14 causing the illnesses.

15 MS. WILLIAMS: Dr. Granato, I  
16 thought that Dr. Dorevitch's testimony earlier in  
17 this proceeding was that this CHEERS's study would  
18 be helpful in calibrating the accuracy of the  
19 model? Are you suggesting here that the model is  
20 more accurate than the actual epidemiologic study?

21 THE WITNESS: I'm not suggesting  
22 that. I'm just not surprised there's a difference  
23 between them and the difference is not really  
24 great.

1 MS. WILLIAMS: And you wouldn't say  
2 that the CHEERS study shows that your model  
3 underestimates risk even though it came up with  
4 the lower risk of illness number?

5 THE WITNESS: That's right.

6 MS. WILLIAMS: Thank you.

7 MS. TIPSORD: Mr. Armstrong?

8 MR. ARMSTRONG: Yes. Andrew  
9 Armstrong with the Illinois Attorney General's  
10 Office. I have a couple of follow-up questions.

11 Dr. Granato, what is a pathogen?

12 THE WITNESS: A pathogen is a  
13 microorganism that causes disease.

14 MR. ARMSTRONG: Did you just testify  
15 that the CHEERS report shows there's no connection  
16 between pathogens and the incidents of illness?

17 THE WITNESS: That's right.

18 MR. ARMSTRONG: There is no  
19 connection between disease causing agents and the  
20 incidents of disease or illness?

21 THE WITNESS: Based on the stool  
22 samples, that's correct.

23 MR. ARMSTRONG: Thank you.

24 MS. TIPSORD: I believe we're back



1 to you, Ms. Alexander.

2 BY MS. ALEXANDER:

3 Q. Yes. Just to put a number on it.

4 Would I be correct in understanding that the risk  
5 assessment found the number of illnesses per 1,000  
6 to be less than three, I believe, it was in the  
7 range of two even during wet weather?

8 A. Yeah, I don't have it in front of  
9 me, but that sounds correct.

10 Q. As opposed to the 12, 13 number  
11 found in the CHEERS study?

12 MR. ANDES: Wait a minute. Can you  
13 clarify what those two numbers are?

14 THE WITNESS: Yeah. The risk  
15 assessment is looking at actual cases of illness  
16 resulting from exposure to CAWS water from  
17 recreation. The 12 to 13 number that you just  
18 cited is a relative risk of recreating in the CAWS  
19 compared to the background illness rate in  
20 unexposed individuals.

21 BY MS. ALEXANDER:

22 Q. But, Doctor, one of the study  
23 results that there would be in excess of 12 to 13  
24 depending on CAWS or GUW per 1,000 illnesses?

1 A. I'm sorry. Say that again.

2 Q. Wasn't the CHEERS study finding or  
3 one of the findings that in the CAWS there would  
4 be 12 excess illnesses as it was attributable to  
5 CAWS recreation per 1,000?

6 A. Yes. Relative to unexposed study  
7 groups, yes.

8 Q. What do you mean by relative to  
9 unexposed study group?

10 A. The 12 to 13 isn't the total illness  
11 rate that was found amongst CAWS recreators.  
12 That's how many more cases of illness they had  
13 then their unexposed counterparts.

14 Q. Right.

15 MR. ANDES: And to go back, so if  
16 the CAWS numbers -- I'm sorry. The CHEERS numbers  
17 are risk due to water recreation generally, is the  
18 risk assessment looking at water recreation  
19 generally or is it looking at risks specifically  
20 due to bacterial levels?

21 THE WITNESS: Only bacteria  
22 assessment.

23 BY MS. ALEXANDER:

24 Q. But wasn't the risk assessment

1 looking at risk from bacteria due to recreation?

2 A. Yes.

3 Q. Okay.

4 MR. ANDES: Is bacteria the only  
5 part of recreation that could pose risks?

6 THE WITNESS: No.

7 BY MS. ALEXANDER:

8 Q. Explain that answer. What do you  
9 mean that it's not -- are you referring to other  
10 types of pathogens?

11 A. You can -- let's say you're doing --  
12 clearly the CHEERS study shows that there's an  
13 increased incidents of illness from water  
14 exposure. The CHEERS study does not prove what  
15 causes that increased incidents of illness. So  
16 people are ingesting water and there's an increase  
17 incidents of illness associated with that water  
18 ingestion, but the water contains a myriad of  
19 things besides pathogens.

20 Q. Such as?

21 A. Name the chemical that's in there.

22 Q. Given that you're a water expert I  
23 will ask you to name an example of the kind of  
24 chemical that you're referring to that could be

1 making people sick?

2 A. I can't off the top of my head name  
3 one, but there could be chemicals in there that  
4 we're not even aware of that could be making  
5 people sick.

6 Q. Do you have any basis for saying or  
7 speculating that chemicals that we're not aware of  
8 and you can't name could have been the cause of  
9 the increased illness rate observed in the CHEERS  
10 study?

11 A. Yes, I'm saying that.

12 Q. What is your basis?

13 A. My basis is it doesn't appear that  
14 the data are not consistent with the fact that  
15 pathogens are causing the illness.

16 Q. Okay. So, in other words, you're  
17 saying because the data are so anonymous that it  
18 must be something else in there or it could easily  
19 be something else?

20 A. It could very well be, yes.

21 MS. TIPSORD: Mr. Armstrong, you had  
22 a follow-up question?

23 MR. ARMSTRONG: I have a follow-up  
24 question. Are aware of any previous epidemiologic

1 studies of recreation water that have shown  
2 illnesses resulting from chemicals in the water?

3 THE WITNESS: I can't say that I am  
4 right off the top of my head, no.

5 MR. ARMSTRONG: Have you -- do you  
6 recall reading any in the past that you just can't  
7 put your finger on?

8 THE WITNESS: I'm not an expert on  
9 the epidermotic literature. So I would say my  
10 lack of awareness is not an indication that they  
11 don't exist.

12 MS. TIPSORD: Ms. Williams, did you  
13 have something else?

14 MS. WILLIAMS: Just one quick follow  
15 up. My recollection from the earlier testimony  
16 that the risk assessment, and it's been a long  
17 time so I hope I'm not confusing the issue, looked  
18 at the available literature on secondary contact  
19 activities that was out there and you said that in  
20 the model, is that correct?

21 THE WITNESS: Mm-hmm.

22 MS. WILLIAMS: Is there a plan to  
23 update the District's risk assessment with this  
24 much higher quality, more specific epidemiological

1 information that came out of the CHEERS study and  
2 regraph those models with the results of the  
3 CHEERS study?

4 THE WITNESS: There's not currently  
5 a plan, but a plan could be developed.

6 MS. TIPSORD: Mr. Armstrong?

7 MR. ARMSTRONG: Yes. One more  
8 follow up on the risk assessment. As I  
9 understand, it was submitted to US EPA for  
10 comment, the risk assessment?

11 THE WITNESS: I wouldn't say it was  
12 submitted for comment, but it was submitted for  
13 their information, yes.

14 MR. ARMSTRONG: Have you submitted  
15 the CHEERS study for the US EPA's information?

16 THE WITNESS: We have not submitted  
17 it directly to EPA, but they have several members  
18 from EPA that are on the peer review committee.

19 MR. ARMSTRONG: Thank you. I'm  
20 sorry. One more question. Does the District  
21 intend to submit anything to US EPA in the CHEERS  
22 study?

23 THE WITNESS: I'm not aware of a  
24 plan to submit it to them at this point in time,

1 but it's not complete yet.

2 BY MS. ALEXANDER:

3 Q. Referring back, again, to your  
4 statement that IEPA should develop science-based  
5 recreational criteria. Is it your view that  
6 existing epidemiologic knowledge other than the  
7 CHEERS study should form any part of that  
8 scientific basis?

9 A. I'm sorry. Can you repeat that  
10 question again?

11 Q. Should epidemiology studies and  
12 epidemiologic knowledge other than the CHEERS  
13 study form part of this scientific basis to which  
14 you referred that EPA should have?

15 A. I wouldn't exclude that as something  
16 that could be looked at.

17 MR. ANDES: Are you asking  
18 specifically as to the CAWS or are you asking from  
19 a broader standpoint?

20 MS. ALEXANDER: I'm referring to his  
21 statement. What he says is that IEPA should  
22 develop appropriate science-based recreational  
23 criteria for the CAWS and I'm trying to understand  
24 what science-based means and what the sciences are

1 we're talking about and I believe he has answered  
2 my question as to whether other epidemiologic  
3 studies and information should be part of that  
4 body of science.

5 BY MS. ALEXANDER:

6 Q. Along those lines, should existing  
7 medical knowledge about waterborne pathogens and  
8 infectious disease generally form part of that  
9 scientific basis?

10 A. Sure.

11 Q. Okay. And should the fact that the  
12 CHEERS study identify higher levels of eye  
13 symptoms in the CAWS form part of that scientific  
14 basis?

15 A. It should be considered, yes. I  
16 mean, it's not something that is normally  
17 considered in developing criteria that I'm aware  
18 of.

19 Q. Okay. Are you familiar at all with  
20 the process US EPA is undergoing to set revised  
21 recreational water quality criteria?

22 A. Somewhat familiar with it, yes.

23 Q. Okay. Is there anything  
24 inappropriate about that process in your view?



1 A. Anything inappropriate?

2 Q. Yes. Do you know of anything wrong  
3 with it that you would criticize?

4 A. I'm not particularly crazy about  
5 national based criteria. I mean, we're looking at  
6 this epidemiologic study on the CAWS and you can  
7 hear all the complications and questions that  
8 arise just from the very specific study on one --  
9 focused on one system. There's going to be a lot  
10 of, let's say, difficulty applying national  
11 criteria everywhere. That's the case with the  
12 current criteria as well.

13 Q. So would it be your view as a  
14 general matter that before any kind of  
15 disinfection is required there should be a site  
16 specific epidemiologic study?

17 A. You mean anywhere?

18 Q. As a general matter.

19 A. That would be ideal, yeah.

20 MR. ANDES: If I can follow up, is  
21 it your position that the CAWS is a fairly unique  
22 waterbody?

23 THE WITNESS: Certainly.

24 MR. ANDES: And then when an

1 epidemiological study has been done on that  
2 waterbody it should be used in studying water  
3 quality standards?

4 THE WITNESS: Yes.

5 BY MS. ALEXANDER:

6 Q. What in your view is unique about  
7 the CAWS with respect to health risks?

8 A. With respect to health risks?

9 Q. With respect to health risks, what  
10 is unique about the CAWS?

11 A. The CAWS is effluent dominated. So  
12 there is a very different relationship that also  
13 has very unique hydrologic controls and very  
14 intense fluctuation of its hydrology and its  
15 source water based on climatological conditions.  
16 So there's a very different relationship between  
17 traditional indicators and actual pathogens in  
18 this system that might be the case at, say, at  
19 beaches or other sites where they're really not  
20 effluent dominated, but might receive impacts from  
21 occasional impacts from raw or untreated sewage.

22 Q. How would the factors you just  
23 described effect the relationship between  
24 indicators and pathogens?

1           A.       How would it effect the  
2 relationship?

3           Q.       Yes.

4           A.       If you have a situation where you  
5 have say -- I don't know what to call it. A  
6 natural area that's not -- whether it's a beach or  
7 flowing system that is not dominated by waste  
8 water effluent inputs and the pathogen sources may  
9 be -- may derive from a number of things --  
10 wildlife agricultural runoff. It might be septic  
11 systems. Several sources of raw or untreated  
12 waste entering the waterbody. There's a very  
13 different -- if you want to call it ratio of  
14 indicators and pathogens in that type of waste and  
15 in sewage that undergoes waste water treatment  
16 process you have a differential removal of various  
17 organisms through that process and you obscure the  
18 original relationship between indicators and  
19 pathogens when that occurs.

20          Q.       Obscured in what way? Would there  
21 be more pathogens per unit of indicators in the  
22 effluent or the other way around?

23          A.       The other way around.

24          Q.       What are you basing that on?

1           A.        I'm basing that on data specifically  
2           generated in our systems and also general  
3           knowledge of the effects of waste water treatment  
4           on microorganisms.

5           Q.        Are you basing that on any  
6           scientific study?

7                   MR. ANDES:  I believe we've already  
8           had testimony submitted by other witnesses on that  
9           issue and we'll certainly list those tomorrow.

10                   MS. ALEXANDER:  Okay.  So testimony  
11           in the record?

12                   MR. ANDES:  Yes.  .

13           BY MS. ALEXANDER:

14           Q.        All right.  Let's move onto  
15           pre-filed question four, which is regarding your  
16           statement that the District, quote, does not  
17           believe there is a significant risk of  
18           gastrointestinal illness associated with  
19           incidental and noncontact recreational use of CAWS  
20           in either dry or wet weather conditions.  That's  
21           on page two.  Can you summarize what that  
22           statement is based on?

23           A.        That statement was reiterating the  
24           statement I made in my original testimony

1 regarding the risk assessment study. It's based  
2 on the risk assessment study.

3 Q. So, in other words, would it be  
4 essentially your view is that there is no  
5 significant risk to going out in a kayak after a  
6 rainstorm when the CSO's are discharging?

7 A. I think that's something that we  
8 would like to look at a little closer given the  
9 CHEERS study and we currently are awaiting that  
10 supplemental report that we'll look at that a  
11 little more carefully.

12 Q. Okay. But you did make the  
13 statement in your testimony that the District does  
14 not believe there is a significant risk of GI  
15 illness associated with incidental and noncontact  
16 recreational use, which would include kayaking as  
17 incidental use, in either dry or wet weather  
18 conditions?

19 A. Yes.

20 Q. So are you saying that I can't  
21 conclude from that statement that there would be  
22 no risk to go kayaking after a rainstorm?

23 A. I'm saying that back in 2008 when my  
24 testimony was filed we didn't have the CHEERS

1 study. We had the risk assessment study and based  
2 on the results of the risk assessment study that  
3 is the case, but I'm also saying that before we  
4 definitively conclude that we now have more  
5 information and we want to take a look at it.

6 Q. So what does the CHEERS study tell  
7 you about the risks of kayaking that is different  
8 in the risk assessment?

9 A. I don't know. I haven't seen the  
10 analysis yet of wet weather impacts.

11 Q. Okay. So you've reviewed the CHEERS  
12 study, but you're saying there's nothing in the  
13 CHEERS study that you've reviewed that would shed  
14 light on wet weather impacts?

15 A. Dry versus wet, no.

16 Q. Okay. Do you know of any other  
17 analysis of wet weather impacts that -- you said  
18 you haven't reviewed them. Does it exist?

19 A. It will exist by December 6th.

20 MS. WILLIAMS: Can you, please,  
21 explain to us what about the workup Dr. Dorevitch  
22 is doing in his supplemental report that will be  
23 so different that it will include the weather  
24 impacts?

1 THE WITNESS: I can't elaborate  
2 because I haven't seen his supplemental report.

3 MS. WILLIAMS: What he said this  
4 morning indicated to me that that's what may be in  
5 there. So explain to me how you believe that's  
6 going to be in there.

7 THE WITNESS: He did explain this  
8 morning that he has a manuscript that will be  
9 submitted in the near future that will address  
10 that issue and I believe that work will also be  
11 cited in the supplement, but he's here right now  
12 so I would ask him.

13 DR. DOREVITCH: The supplement  
14 focuses on the question of the relationship  
15 between things you measure in the water, microbes,  
16 indicators of pathogens and the health outcomes.  
17 The analysis does include an evaluation of whether  
18 that relationship is different in wet weather  
19 versus dry weather and the manuscript that  
20 Dr. Granato mentioned does specifically address  
21 the indicator pathogen relationship in dry  
22 weather, wet weather without CSO discharge and wet  
23 weather with CSO discharge.

24 MS. WILLIAMS: And that will be

1 based upon your data collection?

2 THE WITNESS: Yes.

3 MS. WILLIAMS: So if I'm  
4 understanding you correctly, your testimony is  
5 that the jury is currently out on the question of  
6 whether it would be significantly risky to go out  
7 on a kayak during wet weather, but you're  
8 testifying during dry weather is you don't think  
9 there's a significant risk?

10 THE WITNESS: That's correct.

11 MS. WILLIAMS: Okay. So is it your  
12 testimony that the 12 additional illnesses per  
13 1,000 do not reflect the significant risk?

14 THE WITNESS: I didn't say that. I  
15 said that based on the risk assessment study there  
16 was not a significant risk.

17 MS. WILLIAMS: But based on the  
18 CHEERS study, do you think that there's a  
19 significant risk?

20 THE WITNESS: There's an elevated  
21 risk relative to unexposed recreation.

22 MR. ANDES: And is it accurate to  
23 say then that you expect the supplement to address  
24 and tell you more about to what extent that



1 elevated risk is due to bacteria levels and wet  
2 weather conditions?

3 THE WITNESS: Yes, I have that  
4 expectation.

5 MR. ANDES: Now -- and when we talk  
6 about bacteria levels and wet conditions using the  
7 CSO's, for example, are we distinguishing that  
8 from the disinfection from the treatment plants,  
9 not the CSO's, correct?

10 THE WITNESS: Disinfection does not  
11 change levels of microbes in CSO's, no.

12 MR. ANDES: So to the extent that  
13 any bacteria levels are due to CSO's, they would  
14 not be effected in any way by the sub docket B  
15 rulemaking on disinfection, am I right?

16 THE WITNESS: That's right.

17 BY MS. ALEXANDER:

18 Q. I'm going to move onto pre-filed  
19 question number five.

20 MS. TIPSORD: You know what,  
21 Ms. Alexander, since we're getting into economics  
22 it's already five after five. We should probably  
23 go ahead and take a break and start over in the  
24 morning.

1 MS. ALEXANDER: Okay.

2 MS. TIPSORD: Remember, we're across  
3 the street in the morning and we're off the  
4 record. Thank you.

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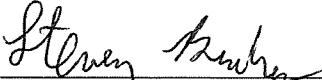
24

1 STATE OF ILLINOIS )  
2 ) SS.  
3 COUNTY OF COOK )  
4

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

13 Witness my official signature in and for  
14 Cook County, Illinois, on this 24<sup>th</sup> day of  
15 October, A.D., 2010.

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