

ILLINOIS POLLUTION CONTROL BOARD  
JANUARY 23, 2019

IN THE MATTER OF: )  
 ) R18-32  
AMENDMENTS TO THE GENERAL ) (Rulemaking - Water)  
USE WATER QUALITY STANDARDS )  
FOR CHLORIDES )

REPORT OF THE PROCEEDINGS held in the  
above entitled cause before Hearing Officer  
Martine Klein, called by the Illinois Pollution  
Control Board, taken by Steven Brickey, CSR, for  
the State of Illinois, 100 West Randolph Street,  
Chicago, Illinois, on the 23rd day of January,  
2019, commencing at the hour of 10:06 a.m.

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A P P E A R A N C E S

MR. MARTINE KLEIN, Chairman  
MS. CARRIE ZALEWSKI, Board Member  
MS. CYNTHIA SANTOS, Board Member  
MS. TETYANA RABCZAK, Attorney Advisor  
MS. KATIE PAPADIMITRIU, Board Member  
MS. ALISA LIU, Technical Unit  
MR. ANAND RAO, Technical Unit  
MR. TIMOTHY FOX, Attorney Advisor  
MS. U-JUNG CHOE, Board Member  
MS. BRENDA CARTER, Board Member

ALSO PRESENT:

MR. JAMES HUFF  
MR. ROGER KLOCEK  
MR. DAVID SOUCEK  
MR. ALBERT ETTINGER  
MS. STACY MEYERS  
MS. LAURA BARGHUSEN  
MS. VIRGINIA YANG  
MS. STEFANIE DIERS  
MR. BRIAN KOCH  
MR. SCOTT TWAIT  
MS. MELISSA BROWN  
MR. DANIEL PAULY

1 HEARING OFFICER KLEIN: Good  
2 morning, everyone. We're on the record. My name  
3 is Martine Klein. I am the hearing officer for  
4 this rulemaking entitled Amendments to General Use  
5 Water Quality Standards for Chloride.

6 Also present from the Board are  
7 Board members Carrie Zalewski and Cynthia Santos  
8 will be with us shortly. To my left is Anand Rao  
9 and Alisa Liu from the Board's Technical Unit and  
10 Tim Fox over to my right is with us who is the  
11 attorney advisor for Cynthia -- Board member  
12 Cynthia Santos. We also have Daniel Pauly here in  
13 the audience who is an attorney advisor for Member  
14 Choe.

15 On May 21st, 2018, Huff & Huff,  
16 Inc. filed a rulemaking proposal to amend Section  
17 302.208(g) of the Board's water pollution  
18 regulations and add a new Section 302.214. The  
19 proposed amendments concern the Board's general  
20 use water quality standards for chloride.

21 On June 21st, 2018, the Board  
22 accepted Huff & Huff's proposal for public comment  
23 without sending it to first notice. On the same  
24 day, the Board requested an Economic Impact Study

1 from the Department of Commerce and Economic  
2 Opportunity by letter. The Board has not received  
3 a response from the DCEO.

4 I scheduled the first hearing in  
5 this proceeding for today January 23rd, 2019. The  
6 second hearing is scheduled for March 6th, 2019.  
7 Notice of the hearings were published in the  
8 Chicago Tribune on November 14th, 2018. The  
9 hearings are to address the merits and economic  
10 impacts of the proposal.

11 Today, we begin with the first  
12 hearing that, if necessary, will continue tomorrow  
13 at 10:00 a.m. By hearing officer order, I  
14 directed interested persons to file their  
15 pre-filed testimony for this hearing by January  
16 2nd, 2019. The hearing officer order also set  
17 January 16th as the deadline for pre-filing  
18 questions. The Board timely received pre-filed  
19 testimony with attachments from James E. Huff,  
20 Roger Klocek and David Soucek on behalf of the  
21 rulemaking proposal; Laura Barghusen, on behalf of  
22 Openlands; and Cindy Skrukrud on behalf of the  
23 Sierra Club.

24 Pre-filed questions were timely

1 submitted by Huff & Huff; Illinois Environmental  
2 Protection Agency, whom I'll refer to as the IEPA;  
3 the Illinois Department of Natural Resources, whom  
4 I'll refer to as IDNR; Openlands; the Sierra Club  
5 and the Board. I will also note that the Board  
6 received written public comments from the DuPage  
7 River and Salt Creek Workgroup, Trotter &  
8 Associates, Inc. and IDNR.

9 Today's hearing is governed by  
10 the Board's procedural rules. Under Section  
11 102.424(f), all testimony and questions filed  
12 prior to this hearing are entered into the record  
13 as if read. In addition, all information that is  
14 relevant and not repetitive or privileged will be  
15 admitted into the record. Please bear in mind  
16 that any question posed today by the Board or  
17 staff are intended solely to help develop a clear  
18 and complete record for the Board's decision and  
19 do not reflect any prejudgment or conclusions on  
20 any testimony, comment or other questions.

21 Today's hearing will be  
22 dedicated to the pre-filed testimony and  
23 questioning. All witnesses will be asked to swear  
24 in. If after the five witnesses have had their

1 opportunity to testify and answer questions and  
2 time permits, I will allow any other person  
3 wishing to provide public comment to speak. We  
4 have placed a sign-up sheet in the front of the  
5 hearing room in Chicago and I understand in  
6 Springfield. Please sign your name if you wish to  
7 provide oral comment. I will also remind members  
8 of the public that the Board accepts written  
9 public comments on its website and are given equal  
10 weight to spoken, public comment at hearing and  
11 they can be submitted at any time until the  
12 deadline is set -- or after the deadline that is  
13 set.

14                   The Board received a filing from  
15 Huff & Huff at the end of the day yesterday titled  
16 Document Production Requested and Pre-Filed  
17 Questions with seven attachments. Because this  
18 hearing is held via video conference, the Board's  
19 rules require that any document to be offered  
20 today as a hearing exhibit that was not included  
21 with pre-filed testimony must have been filed 24  
22 hours before the hearing. These documents were  
23 filed after the deadline so they will not be  
24 admitted into the record during this hearing.

1 Huff & Huff may resubmit those filings as comments  
2 after today's hearings or include them as  
3 attachments to pre-filed testimony for the second  
4 hearing. Otherwise, no additional filings were  
5 received by the 24-hour deadlines.

6 We will begin today's hearing  
7 with Huff & Huff's testimony starting with the  
8 proponent's witnesses and then we can continue  
9 with Ms. Barghusen, followed by Dr. Skrukrud,  
10 which follows the order in which their testimony  
11 was filed. I will remind you all that your  
12 testimony is entered into the record as if it was  
13 read.

14 So you all -- so I remind you  
15 that your -- you may give a brief opening  
16 statement, if you wish, and then we can proceed  
17 with questions. I ask all other participants when  
18 you speak to please state your name, spell your  
19 name for the court reporter and state who you  
20 represent. Also, please try to speak slowly,  
21 clearly and loudly for our court reporter. The  
22 Board will ask its questions first. Then  
23 questions will be asked in the order that they  
24 were received starting with IEPA, IDNR, Sierra

1 Club and Openlands.

2 Then the Board -- if any person  
3 has any follow-up question to a question asked,  
4 please raise your hand and I will call on you and  
5 then you may identify yourself and then you may  
6 ask your question.

7 Are there any questions before  
8 we proceed? Mr. Huff, I see two of you here. Is  
9 Roger Klocek coming today? And is David Soucek  
10 here? In Springfield? Great.

11 MS. ZALEWSKI: Before we begin, I'm  
12 wondering should we mute Springfield because  
13 there's a lot of background noise? Is that --

14 HEARING OFFICER KLEIN: No. Because  
15 one of the --

16 MS. ZALEWSKI: Can we turn it back  
17 on when they -- or is it just too hard to turn it  
18 on and off?

19 HEARING OFFICER KLEIN: So Member  
20 Zalewski was asking if we should mute the  
21 microphone in Springfield. Because I think one of  
22 the witnesses is in Springfield, I think we should  
23 leave it open in the event that he wishes to  
24 respond to a question.



1 MS. ZALEWSKI: Okay. All right.

2 HEARING OFFICER KLEIN: So,  
3 Mr. Huff, you may provide an opening statement, if  
4 you wish.

5 MR. HUFF: I just want to thank the  
6 Board for setting the hearing date on this. The  
7 primary focus of the work that we have completed  
8 was to look at cold temperature effects on the  
9 toxicity of chlorides and that's really what the  
10 focus of our testimony was, the focus on the  
11 winter chloride standard.

12 MS. ZALEWSKI: Can you hear,  
13 Springfield?

14 MS. DIERS: No, we cannot. He is  
15 going to have to speak up or get closer to the  
16 mic.

17 MR. RAO: There is no microphone  
18 here.

19 MR. FOX: That's what --

20 HEARING OFFICER KLEIN: I'm going to  
21 see if I can move the microphone to a central  
22 location.

23 I'm going to stress that  
24 everyone speak up. Mr. Klocek, if you can repeat

1 your opening statement for the folks in  
2 Springfield.

3 MR. HUFF: Mr. Huff.

4 HEARING OFFICER KLEIN: Mr. Huff.  
5 Sorry.

6 MR. HUFF: I just want to thank the  
7 Board for setting the hearing. Our primary focus  
8 in presenting this petition was to address whether  
9 chlorides in colder temperatures are less toxic  
10 and based on the research that we have completed,  
11 that's, indeed, the case. So that's our primary  
12 focus is on the winter chloride standard. Thank  
13 you.

14 HEARING OFFICER KLEIN: Can everyone  
15 in Springfield hear now?

16 MS. DIERS: Yes. Thank you.

17 HEARING OFFICER KLEIN: Mr. Klocek?

18 MR. KLOCEK: I have nothing further  
19 to add.

20 HEARING OFFICER KLEIN: All right.  
21 Mr. Soucek, do you have anything?

22 MR. SOUCEK: No.

23 HEARING OFFICER KLEIN: All right.

24 So we'll begin with the Board's questions for --

1 to try to make this as efficient as possible, the  
2 Board will not read its preamble. The questions  
3 are in the record as if read. So we will read the  
4 questions without the preamble leading up to in  
5 order to try to get this to a speedy ending.

6 So Question 1A. Can you -- we  
7 will be reading the question.

8 So Question 1A. Can you provide  
9 a complete list of the regulated entities you had  
10 included in your outreach efforts?

11 MR. HUFF: A list of organizations  
12 that we initially reached out to will be submitted  
13 to the Board.

14 HEARING OFFICER KLEIN: Question 1B.  
15 Please provide a list of all regulated entities  
16 that will be impacted by this proposed rulemaking.

17 MR. HUFF: In general terms, the  
18 Illinois Department of Transportation, the  
19 Illinois Tollway, the Skyway, the City of Chicago,  
20 all county and highway departments in northeast  
21 Illinois, municipalities and counties throughout  
22 Illinois where there are smaller streams that  
23 receive runoff, which is likely most of the  
24 counties. In addition, industry, schools,

1 commercial areas, anyone with parking lots and/or  
2 private roadways. Basically, anyone that uses  
3 de-icing salts in Illinois.

4 HEARING OFFICER KLEIN: Question 1C.  
5 Please comment and provide support for whether  
6 these entities agree with your statement that the  
7 "regulated community" is "striving to achieve an  
8 unachievable standard."

9 MR. HUFF: I think there is genuine  
10 concern about achieving a not-to-exceed 500 mg/L  
11 by the regulated community and to the extent they  
12 supported this research, it is consistent with  
13 this belief. In a Technical Support Document, I  
14 presented chloride data on Salt Creek, the east  
15 branch of the DuPage River and the west branch of  
16 the DuPage River. The DuPage River Salt Creek  
17 Workgroup has worked hard on implementation of  
18 BMP's in these watersheds for over the past  
19 decade, yet they are far away from the 500 mg/L  
20 standard despite widespread use of BMP's by the  
21 Public Works Department.

22 MR. RAO: Moving onto language of  
23 the proposed rule. Question 2. The language of  
24 the proposed rule differs from the language for

1 acute and chronic standards at 35 Ill. Adm. Code  
2 302.208(a) Subsection's A and B.

3 2A. Please explain what is  
4 meant by, and the difference between, "on the  
5 average" and "arithmetic average" as used in the  
6 proposed language. Should just one of these terms  
7 be used consistently?

8 MR. HUFF: There is no difference  
9 intended. So, yes, they should be consistent.

10 MR. RAO: 2B. For the addition of  
11 "more than once every three years," please discuss  
12 how the departure from the language for acute and  
13 chronic standards at 35 Ill. Adm. Code 302.208(a)  
14 and (b) is consistent with US EPA's reasoning for  
15 the 1988 US EPA Chloride Criterion.

16 MR. HUFF: My intent was to  
17 acknowledge that we are having more intense storm  
18 events and there will be snow events with dropping  
19 temperatures and/or freezing rain that will  
20 require salt applications for longer duration than  
21 the typical storm event and I was trying to  
22 provide an accommodation for these events.

23 MS. LIU: Good morning, Mr. Huff.

24 MR. HUFF: Good morning.

1 MS. LIU: Thank you for coming on a  
2 snowy day. Question 3.

3 Would you please explain if the  
4 proposed sections 302.214(a)(ii) and (b)(ii) for  
5 the chronic summer and winter standards should  
6 more closely mirror the mixing zone provisions  
7 provided in Section 302.208(b).

8 MR. HUFF: Yes, they should.

9 MR. RAO: Question 4. Please  
10 explain if the proposed sections 302.214(a)(ii)  
11 and (b)(ii) for the chronic summer and winter  
12 standards should more closely mirror the  
13 attainment status provisions provided in Section  
14 302.208(b).

15 MR. HUFF: Yes, they should.

16 HEARING OFFICER KLEIN: Question 5.  
17 In pre-filed testimony, Mr. Huff indicated that he  
18 inadvertently did not include two changes to the  
19 Board's Section 302.407(g)(2) and (g)(3) and  
20 Section 303.449.

21 Can you please provide draft  
22 language for these proposed changes.

23 MR. HUFF: I will do that prior to  
24 the next round of hearings.

1 MS. ZALEWSKI: Good morning.  
2 Question six. The Illinois Natural History Survey  
3 (INHS) Report explains the test methods in detail  
4 but does not appear to cite to a specific US EPA  
5 method.

6 Please indicate if the test  
7 methods used in the INHS Report correspond to or  
8 are derived from particular US EPA methods.

9 MR. SOUCEK: This is Dave Soucek,  
10 David, S-O-U-C-E-K, from Illinois Natural History  
11 Survey and I will respond to this question.

12 As stated on page 87 of the  
13 pre-trial testimony of Huff & Huff and in  
14 attachment two of my pre-filed testimony, static,  
15 non-renewal, 96-hour acute toxicity tests were  
16 conducted generally according to guidelines  
17 detailed in American Society for Testing  
18 Materials, abbreviated ASTM, E729-96 in 2014 and  
19 ASTM E2455-06 (2014).

20 For chronic toxicity testing,  
21 the amphipod tests "were generally conducted  
22 according to recommendations detailed in the US  
23 EPA sediment toxicity testing methods from 2000,  
24 but with modifications to suit the particular

1 experimental conditions of these tests, that is  
2 test temperatures, shorter test duration and  
3 modifications to feeding regimes as detailed in a  
4 paper by Soucek, et. al, 2016. There are no US  
5 EPA or ASTM methods for chronic toxicity testing  
6 with mayflies or fingernail clams so we use  
7 methods developed in our laboratory.

8 MS. ZALEWSKI: Did you first say  
9 page 86 of your testimony? Is that what you --

10 MR. SOUCEK: Eighty-seven.

11 MS. ZALEWSKI: Eighty-seven. Thank  
12 you.

13 MR. RAO: Question 7. The 1988 US  
14 EPA Chloride Acute Criteria is based on the  
15 one-hour average concentration, and the Chronic  
16 Criteria is based on the four-day average  
17 concentration.

18 7A. Please explain what the  
19 "standard US EPA acute and chronic test periods"  
20 are and how they are different from the time  
21 periods used in the language of a criterion.

22 MR. SOUCEK: Again, I'll respond.  
23 US EPA and the ASTM recommend 48 to 96-hour tests  
24 for acute tests depending on the species. In most



1 cases, with a notable exception of ceriodaphnia  
2 dubia and other daphnids, 96-hour tests are used.  
3 Chronic tests ideally begin with early life stage  
4 and continue to reproduction according to the 1985  
5 guidelines, Stephan, et al, 1985. However, this  
6 is not always possible, for example, the case of  
7 fresh water mussels for which the ASTM manual  
8 recommends a 28-day chronic toxicity test. We  
9 just divide our chronic test durations into  
10 attachment two of the Soucek pre-filed testimony.  
11 I can read through that quote, if necessary, or if  
12 you rather a briefer answer, I can end there.

13 MS. LIU: No. Please go ahead and  
14 read through it.

15 MR. SOUCEK: Okay. Quote, in two  
16 cases for the chronic toxicity testing, we chose  
17 to conduct somewhat shortened tests. The standard  
18 chronic test duration for hyalella is 42 days  
19 according to US EPA in 2000 and in our laboratory  
20 in a publication by Soucek and Dickson from 2015  
21 we have conducted chronic toxicity testing with  
22 neocloeon, the mayfly, until emergence, which is  
23 approximately 30 days.

24 However, development time for

1 both species would be delayed at 10°C. For  
2 example, Sweeney and Vannote from 1984 show that  
3 neocloeon triangulifer, larval development at the  
4 adult stage took 179 days at 10°C compared to 27  
5 days at 25°C.

6 In the case of this mayfly and  
7 the amphipod, in evaluating the reproductive  
8 endpoints these longer tests capture, would not be  
9 practical at 10°C. Furthermore, recent testing in  
10 our laboratory, unpublished data, indicated that  
11 for the mayfly a dry mass endpoint at 14 days was  
12 as sensitive to nickel and zinc toxicity as the  
13 most sensitive endpoints in full-life tests that  
14 incorporate emergence and preproduction.

15 Therefore, we conducted tests of  
16 identical duration at both temperatures for all  
17 three species, 14 days with neocloeon and 28 days  
18 for hyalella and sphaerium, end quote.

19 MR. RAO: 7B. Please explain how  
20 data from the 48 to 96-hour tests and the 7, 14  
21 and 21-day tests translate into standards that are  
22 based on one hour and four days.

23 MR. HUFF: The standard tests of  
24 48-hour and 96-hour were used to derive the

1 suggested acute water quality standards, as  
2 described in Section 6 of the Technical Support  
3 Document. As chronic effects at 10°C were not  
4 observed the test durations were extended to see  
5 if the toxic effects were simply delayed. Then  
6 the third round of testing where the chloride was  
7 elevated for seven days, then the chloride brought  
8 back to a controlled concentration to better  
9 mirror what occurs in the stream.

10                   These longer test results were  
11 used as part of the sensitivity analysis in  
12 Section 7 of the Technical Support Document  
13 basically comparing these results to the proposed  
14 standards which were derived using the acute  
15 chronic ratio.

16                   MR. RAO: Question 8. In the INHS  
17 Report, for the fingernail clam, sodium chloride  
18 acute and chronic data at 25°C, please elaborate  
19 why the values in the tables at nominal chloride  
20 (100) are denoted as "unreliable."

21                   MR. SOUCEK: The question is  
22 referring to preliminary data from a preliminary  
23 report. The final report, including all data, is  
24 included as attachment two to my pre-filed

1 testimony. To answer that specific question,  
2 quote, unreliable in this case refers not to the  
3 nominal chloride concentration, but to the 95  
4 percent confidence limit surrounding the 96-hour  
5 and 28-day LC50's. If insufficient, partial  
6 mortality is observed in a test, an effect level  
7 can be generated but confidence limits are too  
8 wide to be reliable.

9 MR. RAO: Thank you. Question 9.  
10 In the INHS report for mayfly chronic data, what  
11 does "NA" and "NC" stand for?

12 MR. SOUCEK: Again, the question is  
13 referring to preliminary data from a preliminary  
14 report. The final report, including all data, is  
15 included as attachment two under my pre-filed  
16 testimony. To answer the question, NA in this  
17 case means nonapplicable. There are no weight  
18 data because all the organisms died in that  
19 particular test. So a weight -- a weight  
20 measurement is not applicable. NC means not  
21 calculated.

22 The 10°C mayfly test in the  
23 original proposal was a preliminary test. A  
24 second definitive test at 10°C was included in the

1 final report in my pre-filed testimony and Table  
2 11 from that report, not calculated, is spelled  
3 out with an explanation that no trend in weight  
4 was observed.

5 MR. RAO: Question 10. In the INHS  
6 Report, no chronic data was provided for amphipods  
7 at 10°C. The INHS Report for amphipods notes, "We  
8 will attempt to use older organisms derivative 14  
9 day to start a test to allow young amphipods to  
10 grow stronger prior to acclimation to cold  
11 temperature and testing."

12 Please clarify if data was  
13 obtained using older organisms. If so, provide an  
14 update.

15 MR. SOUCEK: Again, the question is  
16 referring to the preliminary data from the  
17 preliminary report. The final report, including  
18 all the data, is included in my pre-filed  
19 testimony. The amphipod chronic toxicity test at  
20 10°C are included in Table 13. As stated on page  
21 89 of the pre-filed testimony, "organisms were  
22 adults at the beginning of the test with one  
23 individual added to each test chamber. Adults  
24 were used because repeated attempts to use seven

1 to nine-day old organisms resulted in control  
2 failures at 10°C. It was surmised that adults,  
3 which are more robust than juveniles, might be the  
4 life stage that overwinters in this species."

5 MR. RAO: Moving onto question 11.  
6 In the November 13, 2017, New England Bioassay  
7 Report, Tables 12 and 13, the values in the column  
8 for the Survival LC50 are almost consistently  
9 greater than the values in the column Survival  
10 NOEC.

11 Please explain why the NOEC  
12 concentration is greater than the LC50  
13 concentration.

14 MR. HUFF: The LC50 is an estimation  
15 based on the dataset where 50 percent of the  
16 organisms will die. The NOEC highest  
17 concentration with no statistical effect is run on  
18 both survival and reproduction on the  
19 ceriodaphnia. If there is some mortality at lower  
20 concentrations, this brings down the LC50  
21 estimation to a point lower than the NOEC for  
22 survival.

23 MS. ZALEWSKI: Question 12. Under  
24 hardness of test waters, looking at A, please

1 confirm the hardness of the test waters in the NEB  
2 and INHS tests.

3 MR. SOUCEK: For the INHS tests,  
4 measure hardness values for all tests are reported  
5 on page 91 for the acute test and the chronic  
6 tests and page 92 for the post-exposure. The  
7 measure hardness values of 97 to 100 mg/L as  
8 calcium carbonate placed in test waters in the  
9 moderately hard category according to US EPA  
10 methods.

11 MS. ZALEWSKI: B. Please elaborate  
12 on the hardness scale and where the test waters  
13 fall in terms of moderately hard water.

14 MR. SOUCEK: I'm sorry. I jumped  
15 the gun and answered that already.

16 MS. ZALEWSKI: You did. Sorry.  
17 Number 13. Sulphate concentration of test waters.  
18 Please confirm the sulfate concentration of the  
19 test waters in the NEB and the INHS tests.

20 MR. SOUCEK: For the INHS test,  
21 using the recipe detail in Table 1 of my pre-filed  
22 testimony results in a nominal sulfate  
23 concentration of 58.5 mg/L. We did not measure  
24 sulfate concentrations analytically in the test

1 waters but measured chloride concentrations which  
2 were typically close to 100 percent of nominal  
3 concentrations as were measured hardness levels.  
4 So it is safe to assume that sulfate  
5 concentrations were similar to nominal as well.

6 MR. HUFF: Same answer on the NEB as  
7 well.

8 MS. ZALEWSKI: Okay. Can you  
9 explain the safe to assume. You said it was not  
10 tested, is that accurate?

11 MR. SOUCEK: We didn't measure  
12 sulfate analytically, but when we measured  
13 chloride and hardness and we had a recipe that we  
14 used for all these tests, we make the water in the  
15 lab, it's deionized water and adding salt back to  
16 it and the recipe has a measured nominal sulfate  
17 concentration and because chloride and hardness  
18 were essentially 100 percent -- measured chloride  
19 and hardness were essentially 100 percent of the  
20 measured concentrations, we can safely assume that  
21 sulfate is also at 58 or thereabouts, plus or  
22 minus a mg/L.

23 MS. ZALEWSKI: Thank you for the  
24 clarification.



1 MR. ETTINGER: Excuse me.

2 Mr. Klein? I don't know how you want to do this.  
3 In some hearings in the past, we've had people ask  
4 questions during other questions to form a more  
5 complete --

6 HEARING OFFICER KLEIN: Yeah, if you  
7 have additional questions, just raise your hand.

8 MR. ETTINGER: I've been sort of  
9 waiting because some of them are going to overlap  
10 with other questions, but can I go back then  
11 briefly to Question 11?

12 HEARING OFFICER KLEIN: Sure.

13 MR. ETTINGER: I'm a little  
14 confused.

15 Shouldn't the no observable  
16 effects concentration always be lower than the  
17 LC50?

18 MR. HUFF: Yeah.

19 MS. ZALEWSKI: Can you hear,  
20 Springfield?

21 MS. DIERS: We can hear.

22 MR. HUFF: Not -- not in the case  
23 where there was some death at smaller  
24 concentrations.

1 MR. ETTINGER: Well, isn't that an  
2 observable effect?

3 MR. HUFF: But statistically it  
4 wasn't valid and statistics don't apply in the  
5 case of the NOEC.

6 MR. ETTINGER: Okay. So death of  
7 some of the organizations would not be an  
8 observable effect if it was not statistically  
9 valid, is that --

10 MR. HUFF: I'll have to get back to  
11 you on that.

12 MR. ETTINGER: Thank you.

13 HEARING OFFICER KLEIN: Moving onto  
14 Board Question 14.

15 The Board asked for copies of 19  
16 documents that were referenced in the initial  
17 filing and pre-filed testimony of Huff & Huff.  
18 Can you provide them for the record?

19 MR. HUFF: Yes, we will.

20 MS. ZALEWSKI: Okay. Moving onto  
21 15. Under 1988 US EPA Chloride Criteria and  
22 Stephan 2009 updates, just moving onto subparts,  
23 Subpart A.

24 Have you -- are you aware of any

1 US EPA -- any work rather US EPA may be currently  
2 doing to reassess the 1988 Chloride Criteria or to  
3 propose new chloride criteria.

4 MR. HUFF: I am not aware of any.

5 MS. ZALEWSKI: B. Have you tried  
6 contacting Charles E. Stephan or someone else in  
7 his lab at US EPA about exploring the temperature  
8 variable in chloride toxicity with you?

9 MR. HUFF: Charles Stephan retired  
10 quite a few years ago. He is no longer there.

11 MS. ZALEWSKI: Have you tried to  
12 contact anyone else?

13 MR. HUFF: I have not.

14 MS. ZALEWSKI: C. When Iowa DNR  
15 worked with US EPA in hiring ENVIRON 2009 to  
16 conduct the additional toxicity tests, do you know  
17 how the work was funded?

18 If so, do you think a similar  
19 source of funding would be available for toxicity  
20 tests focused on the temperature variable?

21 MR. HUFF: The chloride project  
22 Dr. Soucek did for the Iowa standard was funded  
23 through Region 5 US EPA funds, but they were  
24 directly to the Great Lakes Environmental Center

1 and INHS was a subcontractor to Great Lakes  
2 Environmental Center. When Region 5 had funded  
3 Dr. Soucek on chloride toxicity, I approached  
4 Candice Bauer of Region 5. That was the primary  
5 reason I reached out to her initially.

6 Cold temperature chloride  
7 toxicity is clearly an issue in nearly all  
8 northern states, not just Illinois. So in a  
9 perfect world, federal dollars should be applied.  
10 With the manpower efforts Illinois is spending on  
11 watershed variances, that, in my opinion, will  
12 continue until the cold temperature toxicity of  
13 chloride is factored into the regulations. I saw  
14 taking on this work as an important contribution.

15 MS. ZALEWSKI: Okay. Thank you.  
16 16. Under Iowa water quality standards for  
17 chloride, looking at Subpart A.

18 Given this statement from Iowa  
19 DNR about the similarities between the landscape  
20 and waterbodies of Iowa and Illinois along with  
21 the fact that the Iowa chloride water quality  
22 standard was approved by US EPA, please comment on  
23 developing a chloride water quality standard  
24 similar in structure to Iowa's.

1 MR. HUFF: Our focus was on the  
2 effect of colder temperatures on chloride  
3 toxicity. We utilized the Iowa method as it  
4 provided a straightforward approach that could be  
5 easily modified to add in our new data. Hardness,  
6 and to a lesser extent sulfate, are important  
7 factors. More refined standards will result in  
8 incorporation of these two parameters. So I would  
9 say yes to the --

10 MS. ZALEWSKI: Can you repeat the  
11 last phrase? There was a cough. I couldn't hear  
12 you.

13 MR. HUFF: Yes, I believe a similar  
14 approach to what Iowa has done could be factored  
15 into the colder temperature approach.

16 MS. ZALEWSKI: You may have  
17 addressed this -- go ahead.

18 HEARING OFFICER KLEIN: Sorry.  
19 Mr. Ettinger, do you have a follow-up?

20 MR. ETTINGER: But part of your  
21 proposal does cover a statewide standard that's a  
22 365 -- covers 365 days a year, is that not  
23 correct?

24 MR. HUFF: I'm sorry. Could you

1 repeat that question?

2 MR. ETTINGER: You've said  
3 repeatedly that you focused on cold weather  
4 standards, however, your petition includes a  
5 proposal for 365 days a year.

6 MR. HUFF: Yes, I used the 1988 EPA  
7 chloride water quality criteria to be reflective  
8 of the summer standard.

9 MR. ETTINGER: And why did you use  
10 the 1988 EPA standard as opposed to the more  
11 recently approved Iowa standard for the summer?

12 MR. HUFF: My understanding was that  
13 US EPA Region 5 no longer believes the Iowa  
14 standard is an approvable approach.

15 MR. ETTINGER: And why is that?

16 MR. HUFF: I don't know.

17 MS. ZALEWSKI: I'm going to ask 16B.  
18 You may have answered, but just in case you  
19 didn't.

20 Please comment on whether  
21 chloride issues in Illinois could be addressed by  
22 a standard similar to Iowa's that included  
23 provisions for site specific hardness and sulfate  
24 concentration with the addition of a temperature

1 component.

2 MR. HUFF: If I understood the  
3 question correctly, could we have a standard that  
4 allowed for site specific data input on hardness  
5 and chlorides as an Illinois standard? Yes, I  
6 believe that would be appropriate.

7 MS. LIU: Question 17. Under the  
8 topic of water quality characteristics affecting  
9 chloride toxicity for temperature, the Technical  
10 Support Document in Appendix A contains a  
11 literature survey on the toxicity of chlorides  
12 with a focus on temperature effects.

13 17A. Was the literature survey  
14 able to identify the majority of the temperatures  
15 used in the studies that US EPA and Iowa DNR  
16 compiled in the Stephan 2009c updated list?

17 MR. HUFF: We -- we conducted a  
18 broad search on chloride toxicity with an emphasis  
19 on any articles that had a temperature effect  
20 beyond the standard tests that were run on those.  
21 I believe most of the 2009 references were  
22 included in that and their default temperatures to  
23 a large extent would be in the 23 to 25°C.

24 MS. LIU: Question B. Would you

1 please comment on creating a new table based on  
2 the table in Stephan 2009c and including a column  
3 for temperature values from all the referenced  
4 studies available.

5 MR. HUFF: As we amend Table 1, we  
6 will do that and put temperatures in there.

7 MS. ZALEWSKI: Question 18. Still  
8 under temperature.

9 The proposal would replace the  
10 current single value chloride water quality  
11 standard with acute and chronic values split into  
12 two seasons.

13 Subpart A. Has US EPA approved  
14 water quality standards in the past based on  
15 temperature rather than season?

16 MR. HUFF: The Illinois EPA in its  
17 pre-filed questions to me, Question 14,  
18 highlighted the ammonia water quality standards  
19 that are temperature-based. So I believe the  
20 answer to your question is yes. I confused  
21 effluent limits to water quality standards when  
22 making the statement that US EPA has always pushed  
23 for seasonal limits.

24 MS. ZALEWSKI: Subpart B. If new



1 studies could be performed to evaluate other  
2 temperatures besides 10°C, would it be possible to  
3 provide chloride water quality standards based on  
4 temperature rather than season to account for  
5 variability and temperatures throughout the year  
6 and throughout the State of Illinois?

7 MR. HUFF: Yes, that would be a good  
8 approach in moving forward. However, I would  
9 recommend not delaying a winter standard until  
10 that research is done.

11 MR. RAO: Moving onto hardness and  
12 sulfate. Question 19.

13 Mr. Klocek's pre-filed testimony  
14 stated "Iowa adopted new chloride standards in  
15 2009 with Pennsylvania, Missouri and Wisconsin  
16 currently in the process of adopting similar  
17 standards as Iowa. Indiana adopted new chloride  
18 standards in 2012.

19 19A. Please provide citations  
20 to and summaries of the new chloride standards  
21 adopted or proposed for Pennsylvania, Missouri,  
22 Wisconsin and Indiana.

23 MR. KLOCEK: Indiana effective May  
24 20th, 2015, had chloride limits set dependent on

1 sulfate and hardness tables. This is referenced  
2 in Illinois -- Indiana Administrative Code Article  
3 2. It was online accessed on 1/19/19 at -- do I  
4 need to read the --

5 MR. RAO: If you have something you  
6 can submit in writing, that will be acceptable.

7 MR. HUFF: We'll submit those.

8 MR. KLOCEK: Yeah.

9 MR. ETTINGER: I'm sorry.

10 HEARING OFFICER KLEIN: Go ahead.

11 MR. ETTINGER: Again, I'm -- you say  
12 Indiana changed its standard in 2015?

13 MR. KLOCEK: No, it became  
14 effective. I don't know when they changed it.

15 MR. ETTINGER: Do you know if it was  
16 approved by US EPA?

17 MR. KLOCEK: I believe so because  
18 it's the EPA website that documents that Indiana  
19 standard.

20 MR. ETTINGER: Thank you.

21 MR. RAO: And you would be  
22 submitting information for the other states also?

23 MR. KLOCEK: Yes. Should I go on  
24 with the summaries for the other states or --

1 MS. LIU: Sure.

2 MR. RAO: Sure.

3 MR. KLOCEK: Okay. Pennsylvania  
4 adopted 230 milligram chloride water standard for  
5 potable water supplies only and are silent  
6 regarding chloride and aquatic species. The  
7 previous 2010 proposed adopting the Iowa standard  
8 which accounts for hardness and sulfates that was  
9 withdrawn. A Stroud report issued in 2012 listed  
10 weaknesses in the Pennsylvania proposal that  
11 included using only sodium chloride toxicity  
12 studies and not including calcium, magnesium or  
13 potassium chloride toxicity results.

14 Also, the Stroud report said  
15 that mussel toxicity data was lacking along with  
16 planned toxicity data, although the report  
17 admitted that plant data endpoints are lacking in  
18 the literature. Other procedural weaknesses in  
19 calculations were pointed out in the Pennsylvania  
20 proposal. That was from summary and comments by  
21 Clean Water Action to the Environmental Quality  
22 Board online access 1/19/2019 at a State of  
23 Pennsylvania online address.

24 Missouri -- the online address

1 will be supplied electronically. Missouri  
2 proposed chloride criteria was to copy the Iowa  
3 2009 standard without comment. Missouri did not  
4 detail how this standard would be applied  
5 statewide or how they would develop sulfate or  
6 hardness databases for different regions of the  
7 state. Missouri also did not provide any  
8 discussion of including more recent toxicity  
9 testing data into their proposal. This was online  
10 accessed 1/19/2019.

11 Water quality standards for  
12 chloride in Wisconsin are set based on aquatic  
13 life toxicity. The water criteria for chloride in  
14 Wisconsin is presently 395 mg/L chronic and 757  
15 mg/L acute. Again, a Wisconsin DNR website. And  
16 that concludes that.

17 MR. ETTINGER: You said Missouri did  
18 not say how it was going to -- it did not say that  
19 it was -- how it was going to consider more recent  
20 toxicity data --

21 MR. HUFF: Yeah.

22 MR. ETTINGER: -- is that a  
23 statement by you or are you quoting something?  
24 I'm sorry.

1 MR. KLOCEK: They were denied  
2 because they basically copied the Iowa standard  
3 without saying how they were going to develop  
4 their own databases for hardness which they didn't  
5 elaborate on it or how they were going to include  
6 more recent toxicity data.

7 MR. ETTINGER: And I missed  
8 something. Denied by who?

9 MR. KLOCEK: US EPA.

10 MR. ETTINGER: So US EPA turned down  
11 the Missouri standard based on the Iowa standard  
12 because it does not take into account more recent  
13 toxicity data?

14 MR. KLOCEK: Right.

15 MR. RAO: Moving onto 19B. Can you  
16 please comment on whether any of these standards  
17 will be mirrored or tailored for protecting  
18 Illinois waterways?

19 MR. HUFF: I think I would recommend  
20 that temperature be incorporated into any chloride  
21 water quality standard for Illinois, which has not  
22 been done in those other states to this point. As  
23 I indicated previously, the impact of sulfate and  
24 hardness at colder temperatures has not yet been

1 fully established.

2 MS. LIU: Question 20. The table in  
3 Stephan 2009C, Summary of Data Concerning the  
4 Acute Toxicity of Sodium Chloride to Aquatic  
5 Animals, includes the hardness and sulfate  
6 concentration of the test waters in each of the  
7 studies.

8 Would you please -- 20A. Please  
9 comment on adding to the creation of the table  
10 described above based on the table in Stephan  
11 2009c, the hardness and sulfate concentration from  
12 the study performed by Illinois Natural History  
13 Survey and New England Bioassay.

14 MR. HUFF: We'll put those in table  
15 format. I think we indicated earlier the INHS  
16 hardness was 97 mg/L and the New England Bioassay  
17 hardness was 84 mg/L. Sulfate concentration in  
18 the INHS study was 58.5 mg/L. And I misspoke  
19 earlier on NEB. It was actually 65 mg/L in their  
20 study, also calculated similar to how INHS did  
21 theirs.

22 MS. LIU: 20B. Would you please  
23 comment on adding to this table the acute value of  
24 LC50 results from the studies performed by the

1 Illinois Natural History Survey and New England  
2 Bioassay for each test temperature.

3 Please comment on including both  
4 the acute value and the normalized acute values  
5 using the equation developed by Stephan 2009c at  
6 1.

7 MR. HUFF: We will provide that  
8 information to the Board. Once those values are  
9 normalized -- those normalized values will be  
10 approximately 100 percent higher. And that, with  
11 the hardness of 300 mg/L, is the normalized value.

12 MR. RAO: Moving onto Question 21.  
13 21A.

14 Does Illinois have sufficient  
15 ambient water monitoring data to determine  
16 statewide background values for hardness and  
17 sulfate?

18 MR. HUFF: That question is,  
19 perhaps, better asked for the Agency, but I  
20 believe the answer is, yes, hardness is utilized  
21 currently for establishing water quality standards  
22 for metals and for sulfates. I have requested and  
23 received yesterday from the Illinois EPA their  
24 hardness data for the statewide network.

1 MR. RAO: So will you be providing  
2 information of hardness and sulfate concentration  
3 of waters throughout the state along with comments  
4 on how they vary? That's in 21B.

5 MR. HUFF: The IEPA has access to  
6 that data in a computerized format. I'm not sure  
7 how they sort by regions of the state, but I  
8 assume that can be done. So, yeah, I'll follow  
9 back up with the Agency and see if they can point  
10 me to how I sort that by the watershed. That will  
11 probably be the best way to do that.

12 MR. RAO: 21C. Please elaborate on  
13 the hardness scale and where the test waters used  
14 in the studies by INHS and NEB fall in relation to  
15 hardness in waters throughout Illinois.

16 MR. HUFF: Using hardness and  
17 sulfate data that I received from the Agency  
18 yesterday prepared from 2000 to 2016, the mean  
19 hardness across the state is 286.8 mg/L and the  
20 mean sulfate is 86.8 mg/L. So those are both  
21 higher than the research that we conducted at 10  
22 and 25°C.

23 MR. RAO: 21D. Are hardness and  
24 sulfate concentrations typically monitored in



1 streams where water quality compliance is assessed  
2 such that site-specific values can be determined?

3 MR. HUFF: Yes, that's my  
4 understanding. If that's not monitored there, the  
5 Agency uses a closest stream gauge in the same  
6 watershed is my understanding.

7 MR. RAO: 21E. Please describe how  
8 Illinois waterways are tested for hardness and  
9 sulfate, if it is typically done with other  
10 ongoing water quality monitoring, and how much it  
11 costs.

12 MR. HUFF: So, again, I think this  
13 question is better asked of the Agency, but my  
14 understanding is that the routine network  
15 monitoring is done six times a year at each  
16 location. I suspect there is a bias towards nicer  
17 weather. Days like today I expect the sampler  
18 would not be out there sampling. I believe most  
19 of these are routinely tested for as part of that  
20 network. Commercial laboratory costs are  
21 approximately \$20 for a hardness sample and \$25  
22 for sulfate.

23 MS. DIERS: This is in Springfield.  
24 This is Stefanie Diers, S-T-E-F-A-N-I-E,

1 D-I-E-R-S. I know you've asked some questions  
2 here in 21 of Mr. Huff.

3 The Agency will respond in  
4 pre-filed testimony at the next hearing to clear  
5 some of the things he said up so you get accurate  
6 information on what the Agency does.

7 MR. RAO: We'd appreciate that.  
8 Thank you.

9 MS. DIERS: Thank you.

10 MR. RAO: Moving onto 21F. For  
11 permitted dischargers with water quality based  
12 effluent limits, how much would it cost to include  
13 effluent and in-stream sampling for hardness and  
14 sulfate?

15 MR. HUFF: Again, this is, perhaps,  
16 a better question for the Agency. My  
17 understanding is that for point source dischargers  
18 such as Publicly Owned Treatment Works and  
19 industrial, they would likely have composite  
20 samplers already on their effluent discharge. So  
21 the incremental cost would strictly be the  
22 laboratory costs that I just quoted in their  
23 cases.

24 For the communities, the

1 municipal storm sewer communities or MS 4  
2 communities, there will be many outfalls with snow  
3 melt runoff and no automatic samplers. This would  
4 likely require grab samples during snow melt  
5 periods from representative outfalls. Some may be  
6 doing this already under their MS 4 permit. So  
7 the incremental cost would, again, in those cases  
8 be just the lab cost.

9                   For the stream sampling, it's my  
10 understanding the Agency would like to have  
11 collected on the order of 50 samples over a  
12 two-year period for the stream to establish  
13 hardness and sulfate. So there would be a labor  
14 charge and a lab charge for 50 samples which would  
15 amount to approximately \$5,000 per location.

16                   MR. RAO: Thank you.

17                   MS. LIU: Question 22. Under  
18 derivation of water quality criteria dependent on  
19 water quality characteristics 22A asks, are you  
20 aware of why the current general use chloride  
21 water quality standard is under 35 Ill. Adm. Code  
22 302.208(g) for single-value standards instead of  
23 302.208(e) numeric water quality standards for the  
24 protection of aquatic organisms?

1 MR. HUFF: The single value is  
2 reflective of the time period when this standard  
3 was originally adopted in 1972 in the Board  
4 proceedings in R70-8 where single water quality  
5 values were established for a variety of metal and  
6 cyanide chlorides. The chloride standard of 500  
7 mg/L was based on testimony of Professor Lackey.  
8 Part 302.208(e) was adopted later and focused on  
9 the metals with hardness of the receiving stream  
10 added as a factor.

11 MS. LIU: 22B. Is there any reason  
12 revised chloride water quality standards couldn't  
13 take on an equation form and be located under  
14 302.208(e)?

15 MR. HUFF: At this point in time, I  
16 do not believe sufficient temperature data has  
17 been generated for chloride toxicity. The recent  
18 published article by Jackson and Funk, which was  
19 included in Mr. Klocek's pre-filed testimony, is  
20 an excellent start for mayflies, but it does not  
21 establish the same relationship between toxicity  
22 and temperature for other organisms.

23 Similarly, the effect of  
24 hardness and sulfate have not been evaluated for

1 aquatic species at colder temperatures to my  
2 knowledge.

3 MS. LIU: Question 23. The Board's  
4 rules contain specific procedures under deriving  
5 acute aquatic toxicity criterion dependent on  
6 water chemistry. Section 302.618.

7 23A. Is it possible to develop  
8 a water quality standard equation for chloride  
9 similar to the equation used for the Iowa standard  
10 that incorporates site-specific hardness and  
11 sulfate as well as temperature?

12 MR. HUFF: As noted in the previous  
13 response, I do not believe we have sufficient data  
14 at this time to develop such an equation, but  
15 clearly that should be a direction that Illinois  
16 should proceed with in the future.

17 MS. LIU: 23B. If it is possible to  
18 do a multiple regression analysis on hardness and  
19 sulfate, could one be done for temperature to  
20 develop a slope that can be used to derive an  
21 equation-based standard that is dependent on  
22 hardness, sulfate and temperature?

23 MR. HUFF: Again, additional  
24 temperature data would need to be collected and

1 the relationship with sulfate and hardness would  
2 have to be confirmed with both temperatures.

3 MS. LIU: Question 24. And you  
4 touched on this earlier, but I'd like you to  
5 mention it again.

6 The Jackson and Funk 2019 report  
7 cited by Mr. Klocek uses linear regression to  
8 describe the relationship between temperature and  
9 acute chloride toxicity for four genera of  
10 mayflies across a range of temperatures.

11 Could any of this data be used  
12 to develop a mathematical relationship for an  
13 equation based on an equation-based standard that  
14 is dependent on hardness, sulfate and temperature?

15 MR. HUFF: Jackson and Funk  
16 evaluated the acute toxicity of four species of  
17 mayflies at various temperatures. The  
18 mathematical model for the four species evaluated  
19 could be developed, but would it apply to other  
20 aquatic species? Jackson and Funk did not vary  
21 the hardness or sulfate. So to develop a  
22 relationship, one would have to assume the same  
23 correlation developed at colder temperatures.

24 MS. LIU: Under statewide

1 applicability of general use water quality  
2 standards. Question 25.

3                   The Technical Support Document  
4 states that the derivation of the proposed  
5 chloride water quality standards followed the US  
6 EPA protocol from 1985. For the site-specific  
7 rule for the Chicago Sanitary and Ship Canal that  
8 was adopted in R08-9, CITGO used a different US  
9 EPA method.

10                   Will you please explain why a  
11 method different from the one used for the CSSC,  
12 the Chicago Sanitary and Ship Canal,  
13 site-specific rulemaking is used for this  
14 rulemaking for General Use Waters rulemaking.

15                   MR. HUFF: In the Chicago Sanitary  
16 and Ship Canal site-specific, the species not  
17 present in the winter months in the CSSC were  
18 removed from the list of species. Recognizing the  
19 extent of species likely present somewhere in  
20 Illinois, no species were removed from the list of  
21 this proceeding.

22                   MR. RAO: Question 26. To select a  
23 temperature at which to conduct laboratory tests  
24 on aquatic life that is representative of a winter

1 temperature in Illinois, Huff & Huff used the 75th  
2 percentile of all Illinois stream temperature  
3 data.

4 26(a). Based on information in  
5 the table, can you identify the locations where  
6 the readings were obtained?

7 MR. HUFF: The Agency has a listing  
8 of the location codes that could be used for that  
9 purpose. The data includes the entire database.  
10 So I presume it's representative of the entire  
11 state.

12 MR. RAO: 26B. So do these  
13 locations cover the State of Illinois from north  
14 to south?

15 MR. HUFF: That is my understanding  
16 of the watershed network, yes.

17 THE VIDEOGRAPHER: 26C. Please  
18 explain how the 75th percentile is considered  
19 representative of all of Illinois during the  
20 months of December through April.

21 MR. HUFF: The intent for the period  
22 specified was to incorporate the snowfall period  
23 in Illinois. When snowfall occurs, the runoff  
24 with the de-icing salts in streams will be at



1 temperatures less than 10°C in the vast majority  
2 of events, if not all events. However, changing  
3 the proposed winter standard to when actual stream  
4 temperatures are less than or equal to 10°C would  
5 eliminate many of the concerns raised in a variety  
6 of pre-filed questions.

7 MR. RAO: 26D.

8 MS. LIU: Would you be proposing  
9 language along those lines to revise your current  
10 proposal?

11 MR. HUFF: Yes, I would.

12 MR. RAO: 26D. Please describe how  
13 much the ambient water temperature varies from  
14 northern Illinois to southern Illinois from month  
15 to month during the months of December to March.

16 MR. HUFF: Clearly, on average, it  
17 is colder in the northern part of the state on  
18 average. Again, the intent of the proposal was to  
19 capture the snowfall season. Removing the months  
20 from the proposal and going to a water quality  
21 standard when the stream temperature is less than  
22 or equal to 10°C would eliminate, I believe, the  
23 concern over warmer temperatures in the southern  
24 portion of the state and the warmer water on

1 average in March and April.

2 MR. RAO: 26E. Given this range in  
3 temperature, would a standard based on tests at  
4 10°C still be considered representative of  
5 southern Illinois waterbodies?

6 MR. HUFF: I believe it would be  
7 representative of southern stream temperatures  
8 when snow melt occurs, which was the intent.  
9 Dischargers would still have to meet the  
10 non-winter proposed standard, and but for de-icing  
11 practices, I see no reason these dischargers would  
12 discharge at higher chloride concentrations during  
13 the winter months.

14 MS. ZALEWSKI: 27A. Other than  
15 streams in the Greater Chicago Area, please list  
16 the rivers or streams that could be classified as  
17 "urban streams" in Illinois.

18 MR. HUFF: The Agency publishes  
19 every two years a list of impaired streams and the  
20 causes of impairment. Many cities in Illinois  
21 have smaller streams that receive stormwater  
22 runoff and all of these streams readily exceed 500  
23 mg/L during snow melt periods following salt  
24 application. In addition, I believe the impaired

1 list is biased as the stream sampling tends to  
2 occur during non-storm events. An example of this  
3 bias can be seen by noting the Salt Creek in  
4 DuPage and Cook Counties is absent from the list,  
5 yet continuous monitors by the DuPage River Salt  
6 Creek Workgroup and then that data was included in  
7 the Technical Support Document clearly shows the  
8 chloride exceedances. A list of impaired  
9 waterways will be forwarded electronically to the  
10 Board.

11 MS. ZALEWSKI: B I think you might  
12 have answered, but I'll read it just in case.

13 Are you aware of chloride  
14 monitoring data for other urban streams within  
15 Illinois that are General Use Waters that  
16 demonstrate concentrations above 500 mg/L  
17 during certain times of the year?

18 MR. HUFF: The list -- the 303(d)  
19 list which I'll provide the Board there are  
20 currently 47 stream segments on 31 streams that  
21 are listed as impaired for chlorides.

22 MS. ZALEWSKI: Okay.

23 MR. ETTINGER: Excuse me again. Was  
24 that list submitted as part of the documents that

1 didn't come in within 24 hours?

2 MR. HUFF: Yes, sir.

3 MR. ETTINGER: Thank you.

4 MS. ZALEWSKI: C. Do you know of  
5 chloride monitoring data for urban streams in  
6 other states with winter climate conditions  
7 similar to Illinois?

8 MR. HUFF: Corsi, et al. published  
9 an article entitled "River chloride trends in  
10 snow-affected urban watersheds increasing  
11 concentrations outpace urban growth rate and are  
12 common among all seasons" in late 2014. A copy of  
13 that will be submitted as well to the Board.

14 MS. ZALEWSKI: And that article  
15 discusses other states besides Illinois?

16 MR. HUFF: Yes.

17 MS. ZALEWSKI: Okay. 28. The  
18 Statement of Reasons states, "Both the Illinois  
19 EPA and US EPA were approached about the  
20 possibility of conducting colder temperature  
21 toxicity testing without success."

22 A. Would you please comment on  
23 estimating the costs and time to conduct  
24 additional studies at a range of temperatures.

1 MR. HUFF: Assuming the same four  
2 species are sufficient as what we studied, I would  
3 estimate the cost for a range of temperatures at  
4 \$250,000 and require approximately 18 months to  
5 complete. For reference, the research conducted  
6 for this petition required approximately \$100,000  
7 and nearly two years to complete. With the  
8 knowledge gained at the colder temperatures for  
9 these organisms, the time period could be  
10 shortened. For each additional species studied, I  
11 would estimate an additional \$40,000. Note, this  
12 cost is for temperature studies only, not sulfate  
13 or hardness. Glodcidia testing may be more  
14 complex and, therefore, more expensive.

15 MS. ZALEWSKI: B. I'm not sure if  
16 you answered, but you may have.

17 Would you please comment on  
18 estimating the additional costs and time to derive  
19 acute and chronic chloride water quality standards  
20 if additional information were available for acute  
21 toxicity across a range of temperatures?

22 MR. HUFF: Assuming the same  
23 approach is utilized as utilized in this petition,  
24 I would estimate three months and \$25,000. If

1 outreach to the Illinois EPA is included, I would  
2 add six additional months and an additional  
3 \$50,000. If outreach to the US EPA is to be  
4 included, I would add several more years and add  
5 at least an additional \$100,000 to the above  
6 estimates.

7 MS. ZALEWSKI: C. Would you please  
8 comment on estimating the additional costs and  
9 time to derive an equation-based water quality  
10 standard for chloride standard similar to Iowa's  
11 that includes provisions for site-specific  
12 hardness and sulfate concentration, with the  
13 addition of a temperature component.

14 MR. HUFF: Again, if assuming the  
15 same four species are to be utilized, a series of  
16 tests at varying temperatures, hardness and  
17 sulfate would be necessary. I would think 18  
18 months of research and 3 months for the equation  
19 development at a cost on the order of \$500,000  
20 which includes the temperature studies that was  
21 described under question 28A.

22 MS. ZALEWSKI: Are you -- is there a  
23 way you elaborate how you came up with these  
24 numbers, even later on?

1 MR. HUFF: Yes, most of these were  
2 just projected from the \$100,000 and the number of  
3 variables that you're adding because where we had  
4 only one variable, temperature, you introduce  
5 hardness in there. Now, the complexity goes up by  
6 the square of the number. So you're running four  
7 times as many tests. You now put sulfates in  
8 there. You're at 16 tests for where we were  
9 running one.

10 MS. ZALEWSKI: Okay. Thank you.

11 MR. RAO: Moving onto questions on  
12 TSD Table 1. Chloride Genus and Species Mean  
13 Acute Values.

14 The acronyms are GMAV and SMAV.  
15 Question 29.

16 Please describe how a GMAV is  
17 calculated from multiple SMAV's by use of  
18 geometric means.

19 MR. HUFF: The geometric mean for  
20 the three species of daphnia was computed and then  
21 adjusted by a factor 1.3 for 10°C based on the  
22 ratio of the NOEC for the ceriodaphnia results in  
23 10 and 25°C from New England Bioassay. The use of  
24 the 1.3 factor was based on best professional

1 judgment.

2 MR. RAO: Question 30. The SMAV's  
3 and GMAV's used for three of the four most  
4 sensitive genera sphaerium, ceriodaphnia and  
5 neocloeon, in TSD Table 1 were based on one test  
6 value each from NEB and INHS.

7 30A. Please comment on the  
8 variability in results that may be observed in  
9 toxicity testing of a particular species done in  
10 different laboratories under the same conditions.

11 MR. SOUCEK: I can provide a couple  
12 of examples. I have seen data that I cannot cite  
13 because the data is preliminary and not published  
14 for seven-day sodium chloride toxicity tests for a  
15 single species for five experienced laboratories  
16 use the same protocol and generated 20 percent  
17 effect concentration values that varied by more  
18 than a factor of two. And, furthermore, for  
19 another example for the mayfly and neocloeon, the  
20 96-hour LC50 we generated at 25°C were about 5.5  
21 fold greater than that produced with the same  
22 species by Jackson and Funk 2019. Conditions were  
23 not identical, but the hardness of the dilution  
24 water was similar.



1 MR. RAO: 30B. Please comment on  
2 whether one study per species or genera is  
3 sufficient, especially for the most sensitive  
4 species when used as a basis for deriving a water  
5 quality standard.

6 MR. HUFF: So we looked at four of  
7 the most sensitive species when we conducted our  
8 study and in all cases temperature had an effect  
9 on ameliorating the toxicity at colder  
10 temperatures. So I believe it is sufficient.  
11 Certainly more studies would be preferable, but  
12 the data was consistent across the four species we  
13 evaluated.

14 MR. RAO: 30D. Please cite to some  
15 established protocol, from US EPA or elsewhere,  
16 where substituting the GMAV from several previous  
17 tests with the GMAV from a single new test is  
18 prescribed. If not, could you please elaborate  
19 more on why this approach is appropriate?

20 MR. HUFF: The focus of our effort  
21 was to see if chloride exhibited the same degree  
22 of toxicity at colder temperatures and our  
23 research clearly shows chlorides are less toxic at  
24 colder temperatures. As the data we generated

1 were the only 10°C data available at the time,  
2 substituting these results in Table 1 for the same  
3 species allows us to calculate winter standards.

4           If we have the toxicity values  
5 for most of the other species the same as the 25°C  
6 test, the calculated results were conservative.  
7 The substitution we did was based on the  
8 similarity of the organisms and, again, best  
9 professional judgment and not out of any US EPA  
10 guideline.

11           MS. LIU: Under the species in the  
12 Technical Support Document Table 1, question 31,  
13 in the table, some of the species ranked by GMAV  
14 appear to be out of order.

15           31A. For -- can you help me  
16 with the pronunciation hyalella.

17           MR. ETTINGER: Hyalella.

18           MS. LIU: Hyalella.

19           MR. ETTINGER: We have the same  
20 problem.

21           MS. LIU: Hyalella. The SMAV and  
22 GMAV for the #20 ranked hyalella azteca does not  
23 appear to agree with the SMAV and GMAV for the #6  
24 ranked hyalella azteca.

1                   Should both *hyaella azteca*  
2 along with the Burlington strain be considered  
3 under one rank for the genera *hyaella*?

4                   MR. HUFF: Do you want to answer  
5 that?

6                   MR. KLOCEK: We will update Table 1  
7 with corrections requested normalizing our results  
8 adding in temperatures and incorporating the 10°C  
9 results from Jackson and Funk.

10                  MS. LIU: 31B. In the Stephan 2009a  
11 list, although green sunfish and bluegill have  
12 individual SMAV's, they have one GMAV since they  
13 belong to the same genera. However, in Table 1,  
14 they're ranked separately. Should they be ranked  
15 together?

16                  MR. HUFF: They should be ranked  
17 together and the corrected Table 1 will reflect  
18 that.

19                  MS. LIU: 31C. Fingernail clam is  
20 included in the table. However, it doesn't appear  
21 to be from Stephan 2009a. This is the *musculium*  
22 species.

23                                Would you please elaborate why  
24 it was added and the source of the values for the

1 SMAV and GMAV.

2 MR. KLOCEK: Yes, we're removing  
3 that in the corrected Table 1.

4 MS. LIU: 31C and it should be D.  
5 Sorry. Rank 24 is omitted from the list.  
6 Additionally, some of the species appear out of  
7 order based on GMAV as shown below. Should the  
8 ranks be renumbered?

9 MR. KLOCEK: Yes. We're correcting  
10 that on Table 1.

11 MS. LIU: Question 32. Would you  
12 please describe why the 48-hour and 96-hour LC50  
13 results, while for different durations, both  
14 translate into a species mean acute value.

15 MR. HUFF: This is based on ASTM  
16 E729 manual. Section 11.7 duration of test  
17 Section 11.7.1 "Whenever possible, the exposure  
18 duration should be sufficient to ensure that a  
19 time-independent toxicity level can be determined  
20 or estimated mathematically. In any case,  
21 daphnids and larvae of midges and phantom midges  
22 should be exposed to the test material for 48  
23 hours. All other species should be exposed for at  
24 least 96 hours.

1 MS. LIU: Question 33. The values  
2 from the New England Bioassay reports were  
3 reported in g/L of sodium chloride. The Technical  
4 Support Document converted g/L sodium chloride to  
5 mg/L as chloride to arrive at the LC50 hours --  
6 LC50 values.

7 Would you please confirm the  
8 conversion was based on the ratio of atomic mass  
9 of sodium to chloride.

10 MR. HUFF: Yes, it was although  
11 depending on who was doing the conversion, there  
12 may have been fewer significant digits than the  
13 0.60662 that you utilized.

14 MS. LIU: Question 34. The TSD  
15 Table 1 also adjusted the SMAV's and GMAV's for  
16 musculium, hyalella, daphnia, sphaerium, and  
17 ceriodaphnia, Illinois Natural History Survey and  
18 New England Bioassay.

19 34A. Footnote one for the  
20 fingernail clam notes that it was adjusted to 10°C  
21 by multiplying by a ratio of 1.75 based on the  
22 sphaerium results. The 1.75 ratio appears to be  
23 from the INHS report, is that correct?

24 MR. HUFF: Yes, the source of the

1 musculium data was from the INHS report and were  
2 considered for inclusion. Musculium has been  
3 removed from the revised Table 1 submitted  
4 electronically on January 22nd, 2019. We'll  
5 resubmit that.

6 MS. LIU: 34B. Footnote two for  
7 daphnia states "Adjusted to 10°C based on  
8 ceriodaphnia dubia results by multiplying times  
9 1.3." You mentioned earlier 1.3 was the best  
10 professional judgment value, could you describe  
11 your process of going through that.

12 MR. HUFF: If you look at the  
13 results of the acute toxicity of 25°C versus 10°C,  
14 that ratio difference for ceriodaphnia was on the  
15 order of 1.9 or 2.0 depending on which test. The  
16 1.3 was the difference in the no observable effect  
17 concentration for the ceriodaphnia 1.3. So just  
18 because of the similarity of these other organisms  
19 we said "Let's just apply a conservative 1.3 to  
20 it." I will also offer in revised Table 1 we have  
21 taken that back out and gone back to the 25°C data  
22 for those other species.

23 MS. LIU: Thank you. 34C. For  
24 footnote two, adjustments were made to all three

1 daphnia species based on the results of the  
2 ceriodaphnia dubia.

3           Would you please cite to some  
4 established protocol from US EPA or elsewhere that  
5 prescribes the adjustment of the GMAV of one  
6 genera based on another genera. If not, would you  
7 please further elaborate on the appropriateness of  
8 your approach.

9           MR. HUFF: Again, that was based on  
10 best professional judgment that we saw this  
11 temperature difference in all the species that we  
12 tested and thought from a similarity, but, again,  
13 we have taken that out in the revised statement.

14           HEARING OFFICER KLEIN: So I think  
15 we're at about an hour-and-a-half in. So how  
16 about we take a break, come back in 15 minutes and  
17 then we can start with the Board Question 35.

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

21           HEARING OFFICER KLEIN: Before we  
22 start up again, I just want to note for the record  
23 that we have been joined by Chairman Katie  
24 Papadimitriou and Board member Brenda Carter and

1 Chairman Papadimitriou's attorney advisor Tanya  
2 Rabczak and they are all located in the  
3 Springfield office.

4 So we left off at Question 35.  
5 So, Alisa, you may go whenever you're ready.

6 MS. LIU: Under normal rising acute  
7 values based on hardness and sulfate in Question  
8 35 in the Stephan 2009 --

9 HEARING OFFICER KLEIN: Can you guys  
10 put yourself on mute in Springfield. There we go.  
11 Thank you.

12 MS. LIU: Question 35. In Stephan  
13 2009a and c, the GMAV's and SMAV's were normalized  
14 to hardness and sulfate. The method that he used  
15 is different than the approach that I think you  
16 might be thinking of using as you contemplate  
17 revisions to the tables and the calculations.

18 Would you please comment on  
19 revising TSD Table 1 to use the normalized acute  
20 values of the species tested by the Illinois  
21 Natural History Survey, New England Bioassay,  
22 Jackson and Funk consistent with the way shown in  
23 Stephan 2009c by first dividing the acute values  
24 by the exponential term using the hardness and



1 sulfate levels and the test waters, then normalize  
2 the data to 300 mg's/L hardness and 65 mg/L  
3 sulfate for consistency with the existing Stephan  
4 2009 values used in the table by multiplying by  
5 the exponential term.

6 MR. HUFF: Yes. We'll revise Table  
7 1 and we'll submit a separate Table 3 of just our  
8 data plus Jackson and Funk that will show their  
9 results in a normalized result.

10 MS. LIU: When you do it, will you  
11 please make sure you're doing the normalizing the  
12 way they do it in Stephan 2009 by dividing first  
13 and then multiplying?

14 MR. HUFF: We'll go back and look at  
15 that and try to do that, yes.

16 MS. LIU: I understand that you're  
17 filing something with the Board yesterday that we  
18 weren't able to utilize in the hearing today.

19 Prior to the next hearing, we  
20 can develop questions based on that that will  
21 describe the normalizing question maybe in a  
22 little more detail.

23 MR. HUFF: That -- that will be  
24 fine.

1 MS. LIU: In general, 35B, would you  
2 please comment on how using the normalized acute  
3 values might change the ranks and the calculation  
4 of the final acute value and the final chronic  
5 value, the CMC and the CCC presented in Table 2 of  
6 the Technical Support Document.

7 MR. HUFF: I believe with the  
8 normalized values we will end up with basically  
9 four new species at the bottom of the rank. So  
10 they will all be at the higher temperature where  
11 we're setting at 10°C because at 10°C normalized  
12 data will move up in the acute toxicity value  
13 that's there. The result when you normalize it,  
14 you will see an increase of about 50 percent in  
15 the acute value on a normalized basis.

16 MS. LIU: Question 36A. Please  
17 comment on recalculating the CMC and CCC presented  
18 in the Technical Support Document Table 2 based on  
19 normalized and non-normalized values as done in  
20 Stephan 2009a and c and use of the equation  
21 whereby the CMC and the CCC are then normalized by  
22 dividing by the exponential term at 300 hardness  
23 and 65 sulfate to arrive at the base number that  
24 is used in the equation format for the Iowa

1 standard.

2 MR. HUFF: We will try to do that,  
3 yes, ma'am.

4 MS. LIU: Question 36B. Please  
5 comment on what statewide default values for  
6 hardness and sulphate may be used in Illinois if  
7 you were to turn the equation into a single value  
8 number.

9 MR. HUFF: The mean value from the  
10 data I received from the Agency yesterday in  
11 hardness for Illinois streams was 286.8 mg/L and  
12 the sulfate was 86.8 mg/L. Those mean values  
13 would seem appropriate under that methodology.

14 MS. SANTOS: Can you please repeat  
15 the sulfate?

16 MR. HUFF: 86.8 mg's/L.

17 MS. LIU: I will drop the next  
18 question because you will be doing recalculations.  
19 So it doesn't apply now.

20 MR. RAO: Moving onto Other Acute  
21 Toxicity Testing on mayflies At Various  
22 Temperatures With Linear Regression Analysis.

23 Question 37. The Jackson and  
24 Funk 2019 acute toxicity test examined acute

1 responses to elevated sodium chloride  
2 concentrations at 5, 7.5, 10, 12.5, 15, 20, 25°C.

3 37A. Please comment on  
4 providing a table similar to Table 2 of Jackson  
5 and Funk 2019 showing species, genera,  
6 temperatures, and electrical conductivity with the  
7 96-hour LC50 acute values converted to chloride  
8 concentrations. Please also comment on including  
9 the normalized acute values as done in Stephan  
10 2009 for hardness and sulfate.

11 MR. HUFF: We will provide data  
12 separately for the Jackson and Funk and our work  
13 in one and then we'll incorporate that into Table  
14 1 in a normalized fashion as well.

15 MR. RAO: 37B. Please comment on  
16 why the acute values from these four new genera of  
17 mayflies from Jackson and Funk 2019 were not added  
18 to TSD Table 1 along with the acute values  
19 provided by INHS.

20 MR. HUFF: We didn't get the Jackson  
21 and Funk article until long after the Technical  
22 Support Document was completed. We have  
23 incorporated that now into the Table 1 that we  
24 will submit.

1 MR. RAO: 37C. Please comment on  
2 the effect of adding the 10°C data for the  
3 neocloeon genera from Jackson and Funk 2019 to the  
4 INHS 2017 data would have on the calculation of  
5 the SMAV and the GMAV used in TSD Table 1.

6 MR. HUFF: I don't think it will  
7 have a significant effect because they're not  
8 going to be one of the four most sensitive  
9 organism species.

10 HEARING OFFICER KLEIN: Before you  
11 continue, Mr. Huff, can you please remove that  
12 paper from the microphone to make sure it's not  
13 clogging the sound.

14 MR. HUFF: Sorry.

15 MR. RAO: 37D. Please comment on  
16 any effect of adding the 10°C data for all four  
17 genera would have on the TSD's calculation of the  
18 Final Acute Value and Criterion Maximum  
19 Concentration.

20 MR. HUFF: Same answer. I don't  
21 think it will have a material effect just based on  
22 where it shows up in the ranking normalized.

23 MR. RAO: Moving onto TSD Table 2.  
24 Recalculation values. Question 38.

1 TSD Table 2 is entitled  
2 "Recalculation Values for Chicago Sanitary and  
3 Ship Canal," is this title correct?

4 MR. HUFF: No.

5 MR. RAO: If not, is the table  
6 addressing values for all Illinois waters?

7 MR. HUFF: Yes, that was the intent.

8 MR. RAO: Okay. We're going to skip  
9 39. I think you're going to provide the revised  
10 table later. Moving onto Question 40.

11 Due to the limitations of the  
12 text editor, the format of the mathematical terms  
13 in Table 2 doesn't seem to appear as intended.

14 Based on the US EPA 1985  
15 guidelines, please comment on whether the  
16 equations in our pre-filed questions, I'm not  
17 going to read this equation right now, below  
18 appears as intended.

19 MR. HUFF: The equation that  
20 underlie the output in the data table was correct.  
21 The mathematics that we put down to show how we  
22 were doing that the second and third lines of the  
23 S squared calculations were shown incorrectly and  
24 that's been corrected as well on the table we'll

1 be submitting.

2 MR. RAO: Thank you.

3 MS. LIU: Question 41 under acute  
4 and chronic ratio. The Technical Support Document  
5 Table 2 gives an acute chronic ratio of 3.178.  
6 Did you mean 3.187?

7 MR. HUFF: You can answer that.

8 MR. KLOCEK: Yes, the last two  
9 digits were transposed.

10 MS. LIU: 41B. Will you comment on  
11 how this would alter the final chronic value?

12 MR. HUFF: With the revision noted  
13 in the previous question, the calculation, the CCC  
14 value will increase -- or will decrease by 0.2  
15 percent before rounding.

16 MS. LIU: Under derivation of an  
17 alternative final chronic value, Question 42,  
18 Stephan 2009a described an alternative approach to  
19 deriving the final chronic value "Justified on the  
20 basis of the good science clause in the 1985  
21 guidelines."

22 42A. Would you please comment  
23 on how the four most sensitive species would be  
24 different than TSD Table 1 and 2 based on the

1 GMAV's for the calculation of the final acute  
2 value versus the predicted genus mean chronic  
3 values for the calculation of the final chronic  
4 value using the alternative method.

5 MR. HUFF: Our testing failed to  
6 show chronic toxicity for the duration of the test  
7 for the standard -- the toxicity test while some  
8 chronic effects were observed when exposed to  
9 elevated chlorides for up to seven weeks. We  
10 elected to use the extended testing and the spike  
11 testing as part of our sensitivity analysis and  
12 relied on the calculated acute-chronic ratio. And  
13 without chronic data at 10°C for all the species,  
14 I'm not clear how I would implement that  
15 alternative approach.

16 MS. LIU: I think the alternative  
17 approach was more based on incorporating the  
18 vertebrae and invertebrate acute-chronic ratios  
19 rather than just the invertebrate chronic ratio  
20 that you utilized to calculate the predicted  
21 chronic values. I see where your explanation is  
22 going. It's a slightly different way to do it  
23 mathematically. I was wondering if you would look  
24 at that procedure and try that out as well.



1 MR. HUFF: I'll do my best, yes,  
2 ma'am.

3 HEARING OFFICER KLEIN: Under the  
4 heading technical feasibility and economic  
5 reasonableness, Question 43, as noted in the  
6 Statement of Reasons, the Board is required to  
7 take into account the "technical feasibility and  
8 economic reasonableness of measuring or reducing  
9 the particular type of pollution."

10 Would you please address the  
11 technical feasibility and economic reasonableness  
12 of the proposal.

13 MR. HUFF: Going from a  
14 not-to-exceed winter water quality standard to a  
15 four-day chronic and a higher acute winter water  
16 quality standard will benefit all urban streams in  
17 Illinois without impacting the aquatic communities  
18 in these streams. The non-winter chronic water  
19 quality standard is more restrictive than the  
20 current 500 mg/L not-to-exceed standard and from  
21 the stream work that the DuPage River Salt Creek  
22 Workgroup has conducted as referenced in Steven  
23 McCracken's written comments will benefit these  
24 receiving streams.

1                   Given the current peak chlorides  
2                   and urban streams during snow melt, I do not  
3                   believe the current water quality standards are  
4                   attainable. Adopting a winter standard will allow  
5                   many urban streams to achieve the water quality  
6                   standards through the best management practices  
7                   currently being implemented.

8                   In conclusion, I would say there  
9                   will be a positive economic impact on the Illinois  
10                  economy if a winter chloride standard is adopted.  
11                  I believe the proposed standards are technically  
12                  feasible for many urban streams, but there will  
13                  continue to be urban streams that will have a  
14                  difficult time meeting even the proposed  
15                  standards.

16                  MR. ETTINGER: Excuse me.

17                  HEARING OFFICER KLEIN: Yes.

18                  MR. ETTINGER: Do you want me to go  
19                  with that now or should I wait because I have  
20                  other questions about that later?

21                  HEARING OFFICER KLEIN: You can ask  
22                  the questions now.

23                  MR. ETTINGER: Okay. Your  
24                  understanding is that the 500 mg/L now is a

1 not-to-be-exceeded standard?

2 MR. HUFF: Correct.

3 MR. ETTINGER: Correct. So there is  
4 no chronic standard currently in Illinois?

5 MR. HUFF: Correct.

6 MR. ETTINGER: Okay. What is a  
7 permit writer supposed to do, to your  
8 understanding, if there is no chronic standard or  
9 the standard is missing?

10 MR. HUFF: Well, if -- if you're  
11 talking about when a permit writer goes through a  
12 reasonable potential to exceed a water quality  
13 standard on a point source discharger as opposed  
14 to let's say a municipal system with storm sewers,  
15 he would go through and if there is a reasonable  
16 potential with that discharge exceeding 500 mg/L  
17 with a not-to-exceed standard, I believe he would  
18 put a daily maximum limit on that discharger to  
19 assure that 500 mg/L would not be exceeded under  
20 his analysis.

21 MR. ETTINGER: Okay. Specifically,  
22 in a situation, though, in which there is no  
23 chronic standard, is the permit writer to attempt  
24 to use -- write a permit based on a narrative

1 standard?

2 MR. HUFF: I don't believe so. But  
3 that's a question better asked of the Agency.

4 MR. ETTINGER: I'm just trying to  
5 understand the predicates for your conclusion.

6 The current -- if there is no  
7 numeric standard as to a particular component that  
8 might be relevant to a permit, in general, is one  
9 supposed to write a narrative -- you'd write a  
10 limit based on a narrative standard, to your  
11 knowledge?

12 MR. HUFF: Not -- I don't believe  
13 so. There is a numerical standard in the case of  
14 chlorides. That's what they would address is my  
15 understanding.

16 MR. ETTINGER: Okay.

17 HEARING OFFICER KLEIN: Can we  
18 continue?

19 MR. ETTINGER: He said what he  
20 could.

21 MS. ZALEWSKI: Okay. We're onto  
22 number 44 under Chloride Best Management Practices  
23 and Offsets. In R08-9(d) --

24 MS. BROWN: I --

1 HEARING OFFICER KLEIN: Sorry. Is  
2 there a question in Springfield?

3 MS. BROWN: Yes. Melissa Brown on  
4 behalf of the Illinois Environmental Regulatory  
5 Group.

6 Mr. Huff, can you please just  
7 elaborate on the technical feasibility and  
8 economic reasonableness of the proposed summer  
9 standard?

10 MR. HUFF: I think the summer  
11 standard is going to be difficult in a lot of  
12 streams to achieve those numbers. So, again, I  
13 just simply propose what the US EPA had published  
14 as a summer standard to start a dialogue on the  
15 summer numbers.

16 MS. BROWN: So then you don't think  
17 it's technically feasible now currently, the  
18 summer standard?

19 MR. HUFF: The summer standard? I  
20 think there will be streams in Illinois that will  
21 find that very difficult to achieve and certainly  
22 in the spring months as it's written right now  
23 where you continue to have a contribution from  
24 de-icing whether from retention basins or

1 groundwater, there is typically a tail in the  
2 spring months where the chloride drops over time.

3 MS. BROWN: Okay. Thank you.

4 MS. ZALEWSKI: Okay. 44. In  
5 R08-9(d), Mr. Huff testified regarding a chloride  
6 offset program with the Illinois Toll Highway  
7 Authority.

8 A. Please provide further  
9 elaboration on these efforts.

10 MR. HUFF: So I will submit to the  
11 Board in the next submittal fairly extensive  
12 information on the memorandums of agreement that  
13 the tollway has entered in with two communities  
14 and the full description from the tollway on their  
15 program.

16 MS. ZALEWSKI: B. Were local  
17 communities able to apply to the Illinois Toll  
18 Highway Authority for funding to purchase new  
19 equipment to reduce salt usage in their  
20 communities to offset increased salt usage by the  
21 tollway where the same watersheds were affected?

22 MR. HUFF: Yes, the tollways program  
23 was developed and focused on offsetting new salt  
24 loadings at the watershed level. Thus, all

1 communities adjacent to the Elgin-O'Hare West  
2 Airport Corridor have been made aware of the  
3 program, though primary focus for achieving  
4 offsets has occurred within the project area where  
5 an entirely new facility is being constructed  
6 which is east of I-290 to O'Hare and north to I-90  
7 and south to I-294.

8 MS. ZALEWSKI: C. How much funding  
9 were the communities able to acquire for these  
10 offset agreements, how were the amounts  
11 determined, and how was it allocated among BMP  
12 measures?

13 MR. HUFF: The tollway has not  
14 established a monetary cap for funding communities  
15 as part of the program. The focus of the tollway  
16 program is to achieve an approximate 20 percent  
17 chloride use reduction with its partnering  
18 communities. This reduction amount was  
19 established with a goal of increasing winter snow  
20 and ice removal operational efficiencies within a  
21 community that could be achieved while maintaining  
22 safety for the motoring public.

23 MS. ZALEWSKI: D. Can you name some  
24 of Illinois's communities that have these types of

1 offset agreements?

2 MR. HUFF: There are currently two  
3 communities that have partnered with the tollway  
4 as part of the offset program. They are Wood Dale  
5 and Bensenville and I will submit those  
6 agreements -- additional agreements that are  
7 currently in negotiations between the tollway and  
8 the partnering communities.

9 MS. ZALEWSKI: Thank you. E. Were  
10 the agreements or resulting BMP initiatives made  
11 part of the MS 4 permits?

12 MR. HUFF: The winter operations  
13 BMP's have not been specifically included in the  
14 tollways' MS 4 permit and I'm not sure about the  
15 communities.

16 MS. ZALEWSKI: F. Do you know if  
17 there are similar offset agreements in other  
18 states?

19 MR. HUFF: I am unaware of any  
20 offset programs in the United States.

21 MS. ZALEWSKI: G. What other  
22 sources of funding are communities able to use for  
23 implementing chloride BMP's?

24 MR. HUFF: My understanding is that



1 nearly all of the BMP's implemented by communities  
2 have been funded completely at the local level.  
3 That rate of funding depends on the financial  
4 strength of each community.

5 MS. ZALEWSKI: 45A. Please comment  
6 on whether all municipalities and other entities  
7 discharging to urban waterways have developed and  
8 implemented BMP's to reduce de-icing salt usage.

9 MR. HUFF: BMP's have been  
10 implemented at different rates depending on the  
11 community, the watershed where it resides and how  
12 progressive the public works director in those  
13 communities are. In the DuPage River Salt Creek  
14 Workgroup, aggressive implementation has been  
15 ongoing for more than a decade with a high-degree  
16 of participation by the municipalities.

17 To my knowledge, all of these  
18 communities in the DuPage River Salt Creek  
19 Workgroup Watershed have implemented BMP's  
20 including training, collaboration, pavement  
21 temperature monitoring and advanced water  
22 forecasting servicing. Liquid use has been  
23 increasing each year to where pre-treating and  
24 pre-wetting are currently widely practiced in

1 these basins. Anti-icing is increasing annually.

2 Similar efforts in the Hickory  
3 Creek Basin, the Lower Des Plaines Basin, the  
4 Chicago Area Waterway System, Lake and McHenry  
5 Counties have also been ongoing, but for not as  
6 long as the DuPage River Salt Creek Workgroup  
7 area.

8 MS. ZALEWSKI: B. Can you comment  
9 on whether it would be premature to draw broad  
10 conclusions on the effectiveness of BMP's to  
11 reduce salt usage to meet the chloride standard?

12 MR. HUFF: The focus of the  
13 regulating community has been to reduce salt usage  
14 on an annual basis and progress has been made in  
15 reducing salt on this basis. The problem is that  
16 the standard is not an annual standard. It is a  
17 not-to-exceed number. The question then becomes  
18 under extreme conditions; freezing rain, dropping  
19 temperatures, high wind conditions, et cetera, how  
20 effective liquids training and weather tracking  
21 will be under these extreme conditions.

22 The answer is that the regulated  
23 community for safety purposes will need to apply  
24 copious salt to keep the roads, parking lots and

1 sidewalks safe during these extreme events. I  
2 believe you can look at the trends in the DuPage  
3 River Salt Creek Workgroup Basin and that data was  
4 provided in my Technical Support Document and it  
5 is apparent that the 500 mg/L maximum on Salt  
6 Creek in the east branch of the DuPage River will  
7 not be achieved through BMP's given the high  
8 participation rate currently existing in those  
9 basins.

10 I want to stress that  
11 encouragement of BMP's is absolutely a correct  
12 step to take. My point is we are striving for a  
13 target that will not be achievable in many urban  
14 streams, nor is it necessary to protect our  
15 streams during winter months with that 500 mg/L  
16 standard.

17 MS. ZALEWSKI: Thanks.

18 MR. RAO: Question 46A. Please  
19 comment on whether other sources besides sodium  
20 chloride tend to be more or less toxic to aquatic  
21 life.

22 MR. HUFF: David?

23 MR. SOUCEK: Yes. In general,  
24 sodium chloride tends to be less toxic to aquatic

1 life than magnesium chloride and potassium  
2 chloride, but this can vary by species. For  
3 example, ceriodaphnia dubia and lampsilis  
4 siliquoidea, a fresh water mussel, have been found  
5 to be much more sensitive to potassium chloride  
6 than to sodium chloride by Mount, et al 2016 and  
7 Wong, et al, 2018. However, sodium chloride and  
8 potassium chloride have comparable toxicity on a  
9 Muller basis to the mayfly neocloeon triangulifer,  
10 a study that we established in Soucek, 2018.

11 It's been found that both  
12 ceriodaphnia dubia and the mayfly neocloeon  
13 triangulifer are more sensitive to magnesium salts  
14 than sodium salts and Mount, et al, from 2016  
15 found that calcium has a toxicity that lies for C.  
16 Dubia -- excuse me -- calcium chloride has a  
17 toxicity that lies between that of sodium and  
18 magnesium salts.

19 MR. RAO: 46B. Do you know if any  
20 of the chloride BMP's currently being prescribed  
21 consider the toxicity of other salts? If not,  
22 should they?

23 MR. HUFF: Calcium chloride and  
24 magnesium chloride are both used typically either

1 for pre-wetting or during colder pavement  
2 temperatures when sodium chloride is either less  
3 effective or not effective at all depending on the  
4 temperature. There are corrosion issues with  
5 magnesium chloride so it is typically not used on  
6 bridges. Both magnesium and calcium chlorides are  
7 considerably more expensive than sodium chloride,  
8 but necessary at colder pavement temperatures and  
9 can significantly reduce total chlorides applied  
10 as opposed to sodium salts during cold  
11 temperatures.

12 MR. RAO: Question 47. In your  
13 testimony, you referred to a Connecticut  
14 Department of Transportation study.

15 47A. That study I think was  
16 based on the use of sand-salt mixture compared to  
17 salt?

18 MR. HUFF: Yes.

19 MR. RAO: Are Illinois roadway  
20 authorities considering alternatives other than  
21 sand-salt mixture to reduce salt usage in urban  
22 areas?

23 MR. HUFF: Most of the best  
24 management practices being implemented in Illinois

1 are directed to more efficient application of salt  
2 such as pre-wetting to reduce bounce off the  
3 roadway, anti-icing prior to the storm to prevent  
4 ice formation on the surface, annual calibration,  
5 computer application based on vehicle speed,  
6 plowing first before applying salt and tailoring a  
7 salt application rate to the pavement temperature  
8 and predicted pavement temperature.

9           Essentially, nearly all these  
10 efforts are tailored towards optimizing the salt  
11 application rate and reducing losses due to bounce  
12 so there is no change in the effectiveness. The  
13 addition of carbohydrates such as beet juice  
14 reduces salt applied, but contributes to the  
15 organic loading and you see pretty common in both  
16 the anti-icing and in the pre-wetting where  
17 they're using a 10 to 20 percent mixture of some  
18 carbohydrate with the salt for the liquid portion.

19           MR. RAO: You already talked about  
20 salt alternative options being considered here.

21           Are there any studies conducted  
22 to evaluate the effectiveness of these  
23 alternatives compared to sand-salt mixtures?

24           MR. HUFF: Are there any studies?

1 There has certainly been a lot of work done. So I  
2 would say, yes, there is a fair amount of data  
3 that's out there. When you apply straight  
4 carbohydrates, they tend to be very slippery and  
5 increases accidents. So the City of Chicago tried  
6 that at one point in time on a narrow area. So  
7 they kind have gone to mixtures. You have a lot  
8 of proprietary mixtures of the salt in various  
9 carbohydrates from the vendors of the de-icing  
10 chemicals today.

11 MR. RAO: 47C.

12 HEARING OFFICER KLEIN: Sorry.

13 Before you go on, Mr. Huff, you noted that the  
14 City of Chicago focused in on an area.

15 Was that part of a program or a  
16 study that they did that has a report?

17 MR. HUFF: It was around City Hall  
18 actually and they never did it again after that  
19 day because they had a series of accidents from  
20 the slipperiness of all of the beet juice that  
21 they put down. I mean, the City is doing other  
22 work, but there was no report on that one. They  
23 just stopped that one.

24 MS. ZALEWSKI: Is there anything in

1 the record that applied the beet juice -- I  
2 mean --

3 HEARING OFFICER KLEIN: Is there  
4 anything you can, like, submit?

5 MR. HUFF: Let me see what I can  
6 find.

7 MR. RAO: Thank you. 47C. Please  
8 clarify whether it is your opinion that "Highway  
9 de-icing practices cannot be simply changed" or is  
10 it the consensus of roadway authorities in the  
11 state?

12 MR. HUFF: This is my opinion having  
13 worked for the Tollway, the Skyway, the Illinois  
14 Department of Transportation, county and municipal  
15 highway projects for many years. Every roadway  
16 expansion has to address the impact of the  
17 associated de-icing practices and alternatives are  
18 evaluated including organics such as acetates.  
19 And in every case, more efficient application of  
20 salt has been shown to be the only viable  
21 alternative.

22 MS. LIU: Question 48. As Laura  
23 argues in pre-filed testimony, based on that,  
24 would you please clarify whether the SMAV used in



1 your proposal needs to be revised considering more  
2 recent studies that she cited.

3 MR. HUFF: We use the 2009 species  
4 list as a starting point and added 10°C  
5 temperature information that we had. So with  
6 respect to the glochidia, the research out there  
7 at 10°C is not available.

8 MS. LIU: Question 49. Would you  
9 please comment on Ms. Barghusen's concern  
10 regarding the lack of studies to demonstrate that  
11 the proposed standard affords adequate protection  
12 to the glochidia.

13 MR. HUFF: Mussel glochidia have  
14 been shown to be among the most sensitive  
15 organisms to chloride. All studies so far have  
16 been conducted at or near 21°C. However, Gillis  
17 reported LC50 values in the natural waters over 3  
18 times higher than what they got in the laboratory  
19 reconstituted water which could not be explained  
20 simply with respect to hardness. So, clearly,  
21 additional research is warranted with respect to  
22 glochidia sensitivity to chlorides and natural  
23 waters in addition to tests at 10°C.

24 MR. RAO: I think that completes our

1 questions. Thank you very much.

2 HEARING OFFICER KLEIN: Thank you.  
3 We will now go to the IEPA questions. You guys  
4 are on mute, Springfield.

5 MS. DIERS: Thank you. Can we have  
6 about five minutes just so I can talk to my  
7 technical folks before I start asking our  
8 questions?

9 HEARING OFFICER KLEIN: Yeah.  
10 Mr. Huff, do you have a problem with that?

11 MR. HUFF: No.

12 HEARING OFFICER KLEIN: Okay. We  
13 can come back in five minutes.

14 MS. DIERS: All right. Thank you.

15 HEARING OFFICER KLEIN: Off the  
16 record.

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

20 HEARING OFFICER KLEIN: All right.  
21 We can go back on the record. All right. IEPA,  
22 you may begin your questions.

23 MS. DIERS: Stefanie Diers from  
24 Illinois EPA. I'm going to strike our question

1 one. I believe it was already asked and answered.  
2 So I'm going to go to question two.

3 On page three of your pre-filed  
4 testimony, you state that work plans were  
5 submitted to US EPA but that you heard nothing  
6 back from them.

7 Did you follow-up with US EPA  
8 concerning the work plans that you sent?

9 MR. HUFF: I did not.

10 MS. DIERS: You also state that you  
11 sent your work plans to Illinois EPA and did not  
12 receive any comments, did you follow-up with them?

13 MR. HUFF: No, I did not say that.  
14 I said I received a phone call from Scott Twait  
15 and then Scott indicated there would be a  
16 follow-up letter from the Agency commenting on the  
17 work plan and nothing ever arrived.

18 MS. DIERS: Okay. So going on that,  
19 that addresses question three where we state on  
20 page 4 of your pre-filed testimony, you state that  
21 you spoke to Scott Twait at Illinois EPA and were  
22 told the Agency would like to see more testing at  
23 more temperatures.

24 A. Why were additional

1 temperatures not tested to appropriately derive a  
2 slope, an associated final acute equation, and  
3 final chronic equation for the proposed chloride  
4 standards, as described in US EPA guidance?

5 MR. HUFF: Twofold. One, I was  
6 strictly looking at the de-icing winter practices  
7 and, second, was strictly budgetary considerations  
8 and I offered if Scott could come up with the  
9 money that we would be more than happy to run the  
10 additional tests.

11 MS. DIERS: B. Would the 10°C  
12 chloride water quality standards be protective of  
13 aquatic life at temperatures slightly above 10°C?

14 MR. HUFF: So the proposal I have  
15 placed forward before the Board has resulted in  
16 some confusion. There is a summer proposal  
17 considerably more restrictive than the current 500  
18 mg/L standard. The only significant variable is  
19 the highway de-icing practices which occurs as  
20 defined episodic events. The winter standard was  
21 intended to address these episodic events. Snow  
22 is in a solid form of water, which means that it  
23 exists at a temperature at or below 0°C. Snow  
24 melt caused by salt application will result in the

1 formation of a liquid at temperatures at or below  
2 0°C.

3                   Runoff from highways and parking  
4 lots when salt was applied will be at temperatures  
5 below 10°C and this winter standard was intended  
6 to address these scenarios. Now, if the stream  
7 temperatures are above 10°C, the pavement  
8 temperature will certainly be above 10°C and the  
9 salt application would be minimal during these  
10 scenarios. Salt is primarily applied to break the  
11 bond between the pavement and ice formation.

12                   From the number of questions I  
13 received regarding the winter temperatures, it is  
14 clear that the consensus of participants would  
15 prefer a water quality standard based on  
16 temperature, not seasons. I would have no  
17 objections to changing the approach to a  
18 temperature-based standard in the case of the data  
19 we have that when the stream is at or below 10°C.

20                   MR. ETTINGER: May I follow-up on  
21 that, please?

22                   HEARING OFFICER KLEIN: Yes.

23                   MR. ETTINGER: As a general  
24 question, did you consider the effect of chloride

1 entering streams through groundwater?

2 MR. HUFF: Antidotically? I believe  
3 that would be an issue in March, April and into  
4 May and sometimes into June where the other  
5 proposed standard, the summer standard, would  
6 apply in the latter two months of that.

7 MR. ETTINGER: Antidotically, so you  
8 considered it antidotically, is that what your  
9 answer is? I'm sorry.

10 MR. HUFF: Not specifically. But  
11 you would have to meet from that groundwater  
12 migrating into the streams in May and June the  
13 proposed 230 mg/L chronic standard.

14 MR. ETTINGER: Well, could -- we've  
15 had some warm winters in the past, too. Could you  
16 have groundwater enter in February during a  
17 relatively warm winter also?

18 MR. HUFF: During a warm winter?

19 MR. ETTINGER: Yes.

20 MR. HUFF: I think it depends on how  
21 much salt has been applied. Right. If you're not  
22 applying salt because you have warm weather,  
23 you're not going to get that groundwater with the  
24 elevated chloride.

1 MR. ETTINGER: I guess my question  
2 is, though, we have situations -- have had  
3 situations, my recent memory, in fact, in which we  
4 had snowstorms in December and then an absurdly  
5 warm January by historical standards.

6 Could you not see salt entering  
7 the stream in January, in using my example, at  
8 relatively warm temperatures?

9 MR. HUFF: The temperatures would be  
10 below 50°F. So below 10°C. Groundwater is not  
11 going to be above that temperature at that time of  
12 year period.

13 HEARING OFFICER KLEIN: Ms. Yang?

14 MS. YANG: To follow-up on  
15 Mr. Ettinger's comments on groundwater migration,  
16 have you or would you consider that factor in  
17 relationship to different permeabilities of soils  
18 that are found in Illinois?

19 MR. HUFF: Frankly, I don't think  
20 it's relevant. If you have a water quality  
21 standard, you're striving to meet that standard  
22 independent of what the geology in the State of  
23 Illinois is.

24 MS. YANG: But do you recognize how

1 on certain soils at high porosity and groundwater  
2 be impacted as opposed to soils with lower  
3 permeability?

4 MR. HUFF: It would contribute at a  
5 faster rate in the more permeable soils.

6 MS. YANG: Okay. Would that --  
7 would you consider looking into that impact as an  
8 additional study to this proposal?

9 MR. HUFF: The short answer is no.  
10 I don't think it's relevant. What we were trying  
11 to do is establish whether chlorides are less  
12 toxic at colder temperatures. That's what our  
13 study was about.

14 MR. ETTINGER: Just to be clear as  
15 to what we said before. Your testimony is, is  
16 that groundwater has never been above 50°F in  
17 January or February or March in the history of  
18 Illinois?

19 MR. HUFF: Well, you're -- I don't  
20 think it would occur. I have never seen such data  
21 that would suggest otherwise.

22 MR. ETTINGER: Thank you.

23 HEARING OFFICER KLEIN: Okay.

24 Ms. Diers, you can continue.



1 MS. DIERS: Okay. Question C.  
2 Would chloride toxicity be further mitigated at  
3 test temperatures below 10°C?

4 MR. HUFF: Based on the work of  
5 Jackson and Funk with mayflies where they tested  
6 the toxicity of temperatures at 5°C all the way up  
7 to 25°C, I would say toxicity is further mitigated  
8 at colder temperatures below 10°C, yes.

9 MS. DIERS: Question 4. Did you  
10 share the regulatory proposal with US EPA before  
11 filing the petition with the Illinois Pollution  
12 Control Board?

13 MR. HUFF: No.

14 MS. DIERS: Why not?

15 MR. HUFF: Well, I tried to follow  
16 the Illinois Pollution Control Board's procedures  
17 for filing and budgetary contributions as well.

18 MS. DIERS: Have you talked to US  
19 EPA to see what you have proposed is approvable by  
20 US EPA?

21 MR. HUFF: I have not, no.

22 MS. DIERS: That takes care of  
23 Question 5.

24 Did you share the regulatory

1 proposal with Illinois EPA before filing your  
2 petition with the Board?

3 MR. HUFF: No, I, again, tried to  
4 follow the Pollution Control Board's procedure for  
5 filing a regulatory rule change.

6 MS. DIERS: Question 7. Did you  
7 conduct any outreach with stakeholders concerning  
8 your proposal before you filed it with the  
9 Illinois Pollution Control Board?

10 MR. HUFF: I presented to the DuPage  
11 River Salt Creek Workgroup twice during the  
12 project at its public meetings as well as to the  
13 Hickory Creek Watershed. Both groups have  
14 environmental stakeholders as members. In  
15 addition, I sent out to the clients that funded  
16 the research for progress reports along the way.

17 MS. DIERS: So did you talk to  
18 anybody in central or southern Illinois,  
19 communities or anything, about your proposal?

20 MR. HUFF: No, I did not.

21 MS. DIERS: And why did you not talk  
22 to other communities throughout the State of  
23 Illinois before filing your proposal?

24 MR. HUFF: I basically went off my

1 outreach when I put together my consortium with  
2 the organizations that I had some familiarity  
3 with.

4 MS. DIERS: Would you agree if  
5 you're doing a statewide water quality standard  
6 that you should talk to other people throughout  
7 the state to see what the impact of the proposal  
8 might be?

9 MR. HUFF: Well, again, my primary  
10 focus was on the colder temperature in urban areas  
11 which is primarily northeast Illinois.

12 MS. DIERS: Question 9. As drafted,  
13 this proposal contains a statewide water quality  
14 standard. Did you look at chloride impacts and  
15 road salt usage in central and southern Illinois?

16 MR. HUFF: No, I did not. I mean,  
17 salt usage is salt usage. You have a storm and  
18 you have the appropriate temperatures they're  
19 going to be putting salt down at the same rates as  
20 what would be applied here on an individual storm  
21 event. They would just have fewer of them.

22 MS. DIERS: Ten. Please describe  
23 how temperature and weather from northern, central  
24 and southern Illinois vary.

1 MR. HUFF: It's colder and likely  
2 more snow the further north one is in Illinois.  
3 With respect to stream temperature, again, my  
4 focus was on the episodic salt application events  
5 which can occur over the months proposed.  
6 However, I have no objections to a cold  
7 temperature standard based on the stream  
8 temperatures. So we'd have a winter temperature  
9 that would apply when the stream was at or below  
10 10°C.

11 MS. DIERS: Eleven. Does your  
12 research consider the difference in temperature  
13 and snowfall events for the southern half of the  
14 state as compared to the northern half of the  
15 state?

16 MR. HUFF: Yeah. Our research again  
17 looked at the temperature effects on chloride  
18 toxicity. The proposed winter water quality  
19 standard was developed to address the episodic  
20 snow events with the proposed summer standard  
21 serving as the controlling standard in areas not  
22 dominated by urban snow removal practices.

23 MS. DIERS: Twelve. It appears that  
24 the cold water temperature standards were

1 developed to coincide with periods when road salt  
2 usage is expected in northern Illinois.

3 Did you consider invariant  
4 sources of chloride from coal mines and water  
5 treatment plants in the downstate area?

6 MR. HUFF: One would expect the coal  
7 mines and water treatment plants to discharge  
8 chloride mass independent of snowfall events. One  
9 would not expect these industries to increase  
10 chlorides in the winter just because there was a  
11 higher water quality standard in the winter. The  
12 proposed summer standard, which is less than 50  
13 percent of the current standard, would seem to be  
14 controlling for these industries. Again, I would  
15 have no objection to a winter standard based on  
16 stream temperature independent of the month.

17 MS. MEYERS: Can I ask a follow-up  
18 question?

19 HEARING OFFICER KLEIN: Yes, go  
20 ahead.

21 MS. MEYERS: Stacy Meyers,  
22 Openlands. But you do recognize that it's not an  
23 either/or situation in that if there are other  
24 chloride discharges into the streams, that would

1 be in addition to instead of -- in lieu of salt on  
2 roads, right?

3 MR. HUFF: I'll see if I can  
4 paraphrase. Do I recognize that there are other  
5 sources of salt that would be --

6 MS. MEYERS: That those sources of  
7 salt don't act independently of road salt, but  
8 would be combined with road salt as far as impacts  
9 in the waterways, correct?

10 MR. HUFF: Strictly during the  
11 winter episodic events?

12 MS. MEYERS: Any time that you have  
13 multiple sources of chlorides they would combine  
14 an effect, correct?

15 MR. HUFF: Correct, but they would  
16 also have to meet the summer proposed standard and  
17 what would cause those same dischargers to  
18 suddenly triple or whatever their salt loading in  
19 the winter?

20 My point is that their salt  
21 contribution would be independent of the stream  
22 temperature, independent of the month of the year.

23 MS. MEYERS: But this standard is  
24 for salt, correct?

1 MR. HUFF: It's for chloride.

2 MS. MEYERS: Thank you.

3 MS. DIERS: Question 13. On page  
4 six of your pre-filed testimony, you indicate that  
5 Illinois EPA provided you with Illinois stream  
6 temperature data from 2002 to 2016 and you state  
7 in "Using just the data from December 1st to April  
8 30th yielded a 75th percentile temperature of  
9 9.3°C.

10 Based on these results, a  
11 temperature of 10°C was selected for conducting  
12 winter temperature toxicity testing."

13 Question A. Is it appropriate  
14 to combine winter data, December, January and  
15 February, with spring data, March and April, and  
16 use the 75th percentile temperature to justify  
17 inclusion of March and April as months suitable  
18 for the 10°C standard?

19 MR. HUFF: Again, my intent with  
20 winter standard was to address snowfall de-icing  
21 practices, which are episodic events, and I  
22 believe would predominantly occur when the stream  
23 temperatures are less than 10°C independent of the  
24 month. The months were combined to address the

1 snowfall months. Again, if a snowfall occurs when  
2 pavement temperatures are above 0°C, salt  
3 application declines very significantly to hills  
4 and where snow may blow back onto the roadway.  
5 Such events would not be expected to cause a spike  
6 in chlorides in the receiving streams.

7 MS. DIERS: B. By including  
8 temperature data from winter months, would there  
9 be a bias towards a colder 75th percentile result?

10 MR. HUFF: Certainly. But, again,  
11 the intent was to focus on stream conditions that  
12 occur after snow melt when salt application is  
13 necessary. Inclusion of March and April was  
14 intended to cover the period when salt would be  
15 applied in snow events when temperatures are at or  
16 near 0°C, which I believe was important to the  
17 Agency when writing future NPDES permits where  
18 chloride limits are being considered.

19 MS. DIERS: C. Using the same  
20 dataset referenced in this petition, what are the  
21 75th percentile temperatures of each individual  
22 month?

23 MR. HUFF: So November 10.8°C;  
24 December 5.7°C; January 3.1°C; February 4.3°C;



1 March 8.8°C; and April 15.7°C.

2 MS. DIERS: D. Are there any  
3 differences in stream temperatures between  
4 northern Illinois and southern Illinois?

5 MR. HUFF: The logical answer is,  
6 yes, but, again, the proposed winter standard was  
7 intended to cover episodic salt application events  
8 for highway and parking lot de-icing.

9 MS. DIERS: E. Are there any  
10 locations in Illinois where water temperatures in  
11 December through March are routinely above 10°C?

12 MR. HUFF: I have not evaluated this  
13 and I don't believe it's relevant. Salt  
14 application associated with snow events would be  
15 minor when temperatures are above 10°C. Again, I  
16 have no issues with a chloride standard based on  
17 actual stream temperatures.

18 MS. DIERS: Question 14. On page 6  
19 of your pre-filed testimony, it states that "The  
20 Agency has a protocol for computing the 75th  
21 percentile temperature and a similar approach for  
22 pH for computing seasonal water quality standards  
23 for each specific waterbody for ammonia and a  
24 similar approach was used for developing winter

1 chloride standards."

2 Have you looked at ammonia water  
3 quality standards in Section 302.212(b)?

4 MR. HUFF: Yes.

5 MS. DIERS: A. In those equations,  
6 what is T and what is pH?

7 MR. HUFF: Temperature is T and pH  
8 is the pH of the stream both at the time of  
9 sampling.

10 MS. DIERS: B. When using those  
11 equations to determine compliance in the receiving  
12 stream, the Agency uses the pH and temperature at  
13 the time of ammonia sample. Were you instead  
14 referring to how the Agency calculates permit  
15 limits based on ambient data (75th percentile  
16 temperature and 75th percentile and 50th  
17 percentile pH) located at 35 Ill. Adm. Code Part  
18 355?

19 MR. HUFF: Yes, I was.

20 MS. DIERS: Fifteen. The proposed  
21 regulatory language in Section 302.214(a) requires  
22 a zone of initial dilution (ZID) for the acute  
23 chronic water quality standard and requires a ZID  
24 for the chronic chloride water quality standard.

1                   Did you intend to require a  
2 ZID for the acute chloride water quality standard  
3 and a mixing zone or allowed mixing for the  
4 chronic chloride water quality standard?

5                   MR. HUFF: Yes, I did.

6                   MS. DIERS: Sixteen. The proposed  
7 regulatory language in Section 302.214(b) requires  
8 a ZID for the acute chloride water quality  
9 standard and allows no mixing for the chloride --  
10 for the chronic chloride water quality standard.

11                   Did you intend to require a ZID  
12 for the acute chloride water quality standard and  
13 a mixing zone or allow mixing for the chronic  
14 chloride water quality standard?

15                   MR. HUFF: Yes, I did.

16                   MS. DIERS: Seventeen. In the  
17 proposed regulatory language in Section  
18 302.214(b) (2), there is a statement that the  
19 samples for determining compliance must be  
20 collected in a manner that assures a  
21 representative sample.

22                   Did you intend for this  
23 requirement to be in Section 302.214(a) (2) also?

24                   MR. HUFF: Yes, I did.

1 MS. DIERS: Is it your intention --  
2 this is 18. I'm sorry.

3 Is it your intention that these  
4 proposed chloride water quality standards are the  
5 general use standards or is it your intention that  
6 the proposed standards replace chloride standards  
7 in Section 302.407(g) (2) and Section 303.449 for  
8 the site specific standard for the Chicago  
9 Sanitary and Ship Canal?

10 MR. HUFF: Yeah, my intent was to  
11 replace both the general use, the Chicago Area  
12 Waterways and Lower Des Plaines and the site  
13 specific on the Chicago Sanitary and Ship Canal.

14 MS. BROWN: Can I follow up?

15 MS. DIERS: Mm-hmm.

16 MS. BROWN: Hi. Melissa Brown with  
17 the Illinois Environmental Regulatory Group again.

18 Are you aware of the pending  
19 chloride time-limited water quality standard  
20 proceedings in front of the Board?

21 MR. HUFF: Yes, I am.

22 MS. BROWN: And what's your  
23 understanding of how your proposal, if adopted,  
24 would affect -- excuse me -- the pending petitions

1 for the timing of the water quality standards?

2 MR. HUFF: I think they're somewhat  
3 independent of each other and I think based on the  
4 data I've seen there may be some watersheds  
5 depending on what the ultimate winter number is.  
6 They could drop the request for a variance, but  
7 there is also a large number of those watersheds  
8 that will still have to proceed with the  
9 time-limited water quality variance.

10 MS. BROWN: Thank you.

11 HEARING OFFICER KLEIN: Ms. Rabczak?

12 MS. RABCZAK: I have a follow-up.  
13 The reverse question. Tanya Rabczak with the  
14 Board. Chairman, I have a question.

15 If the Board adopts the  
16 time-limited water quality standards, how would  
17 that affect pending rulemaking?

18 MR. HUFF: How will that affect?

19 HEARING OFFICER KLEIN: Pending  
20 rulemaking.

21 MR. HUFF: My -- my proposal?

22 HEARING OFFICER KLEIN: Yes.

23 MR. HUFF: I really believe they're  
24 independent of each other. If the Board adopts

1 time-limited water quality variances, if a  
2 watershed now meets the new winter standard, they  
3 would drop the need for having the variance. But  
4 those watersheds that are still over whatever is  
5 adopted here in the way of a winter chloride will  
6 still have to proceed with a time-limited water  
7 quality variance and aggressively implement and  
8 report the best management practices.

9 MS. RABCZAK: Another question I  
10 have is can you please clarify the scope of  
11 regulated entity under your proposal versus the  
12 regulated entity under the time-limited water  
13 quality petition that we have for chloride.

14 MR. HUFF: I'm sorry. Can you  
15 repeat that?

16 MS. RABCZAK: Could you please  
17 clarify the scope of the regulated entity under  
18 your proposal versus the proposal in the  
19 time-limited water quality petition for chloride?

20 MR. HUFF: I believe that the scope  
21 of my proposal would basically apply to every  
22 operation that practices de-icing practices in the  
23 State of Illinois because that's going to affect  
24 their water quality standards whereas the

1 time-limited water quality variances are based on  
2 specific watersheds where data exists that they  
3 are above currently the 500 mg/L standard.

4                   And if the Board were to adopt a  
5 new winter standard, each of those watersheds  
6 would have to go back and determine whether they  
7 needed to continue with that variance because they  
8 don't need the new winter standard or whether if  
9 they feel comfortable they meet the winter  
10 standard, they would drop the variance.

11                   MS. RABCZAK: So your proposal has a  
12 broad -- a much broader scope of regulated  
13 entities than the current time of the water  
14 quality standards?

15                   MR. HUFF: Yes, I would agree with  
16 that. Yes.

17                   HEARING OFFICER KLEIN: Ms. Diers,  
18 you can continue.

19                   MS. DIERS: Question 19. On page  
20 eight of your pre-filed testimony, you state in  
21 that "From the Technical Support Document, each  
22 exceedance was generally less than a week duration  
23 which formed the basis for asking Dr. Soucek to  
24 run the third series of toxicity testing with the

1 exposure to elevated chloride for seven days  
2 followed by returning the chlorides to a lower  
3 concentration over a period of days."

4 Is this representative of  
5 discharge from an industry that has a consistent  
6 discharge of chloride?

7 MR. HUFF: Again, the intent was to  
8 look at de-icing runoff durations. I would not  
9 expect an industry to increase its chloride  
10 discharge during the winter season because the  
11 water quality standard increased. If industry  
12 achieved a proposed summer water quality standard  
13 or even the existing water quality standard, there  
14 is no reason to expect they would suddenly begin  
15 in the winter months to discharge more chlorides  
16 but for their own pavement de-icing practices.

17 MS. DIERS: Question 20. On page 94  
18 of the regulatory petition, it states that "Using  
19 the toxicity data published in the 1988 Ambient  
20 Water Quality for Chlorides and then modifying the  
21 results for certain species based on the current  
22 10°C research, winter water quality criteria for  
23 chlorides can be derived. Table 1 presents a  
24 listing of the chloride genus and species mean



1 acute values ranked from the most tolerant -- most  
2 tolerant chlorides to the least tolerant species."

3 A. However, Table 1, page 95 of  
4 404, is not from the 1988 National Criteria,  
5 rather it appears this is a dataset used in the  
6 2009 Iowa chloride standard with the exception  
7 being the inclusion modification of GMAVs for the  
8 organisms recently tested in support of this  
9 petition, is that correct?

10 MR. HUFF: Yes, it is.

11 MS. DIERS: B. Was the dataset from  
12 Iowa ultimately used as the baseline for deriving  
13 the cold temperature standards?

14 MR. HUFF: The 2009 dataset was  
15 ultimately used as the dataset as this dataset was  
16 agreed upon by Iowa and Stephan's of US EPA as  
17 desirable to incorporate in more recent toxicity  
18 data than was available in 1988.

19 MS. DIERS: Then why were the 1988  
20 National Criteria proposed for the General Use  
21 standards, whereas a modified dataset of the 2009  
22 Iowa standard was used in derivation of the cold  
23 temperature standards? That's still in B.

24 MR. HUFF: Because for the summer I

1 really -- my focus was on the winter, but I  
2 thought if the Board was going to open up  
3 proceedings on chlorides, it was appropriate to  
4 have a discussion on summer as well and the 1988  
5 National Criteria was the most recent actually  
6 published document from EPA where they have  
7 specific water quality criteria. So that's what I  
8 used for the summer.

9 MS. DIERS: So in C, why was the  
10 cold water temperature database not appropriately  
11 identified as the 2009 Iowa dataset in the  
12 petition?

13 MR. HUFF: I'm sorry. Could you  
14 repeat that question?

15 MS. DIERS: It's question C. Why  
16 was the cold temperature database not  
17 appropriately identified as the 2009 Iowa dataset  
18 in the petition?

19 MR. HUFF: That was just a mistake  
20 on our part.

21 MS. DIERS: D. The 2009 Iowa  
22 chloride standards are hardness and  
23 sulfate-dependent. Why were hardness and sulfate  
24 not incorporated into the new standards proposed

1 by this petition?

2 MR. HUFF: Well, I think because  
3 Illinois currently has a chloride standard of 500  
4 mg/L without regard to the sulfate or hardness.  
5 When the Agency proposed a chloride standard for  
6 the Chicago Area Waterway, they again went with  
7 500 mg/L without consideration of hardness or  
8 sulfates and I was just trying to keep this  
9 simple.

10 So I have absolutely no  
11 reservations about incorporating sulfate and  
12 hardness into a water quality standard and I have  
13 reservations that the data doesn't exist at colder  
14 temperatures and we're making the assumption that  
15 the current relationship between sulfate and  
16 hardness that was established at higher  
17 temperatures would hold at colder temperatures.

18 MS. DIERS: Twenty-one. The GMAVs  
19 in Table 1 were ascertained from the 2009 Iowa  
20 dataset and are normalized to a hardness of 300  
21 mg/L and a sulfate of 65 mg/L which appears to  
22 inflate the reported GMAV values compared to the  
23 non-normalized GMAVs that are representative of  
24 the actual reported literature values.

1                   A. Was it your intent to  
2 incorporate the hardness and sulfate dependent  
3 toxicity of chloride into the GMAVs?

4                   MR. HUFF: We use that Table 1 in a  
5 normalized fashion and then plug in our 10°C. I  
6 think the intent was that those normalized  
7 hardness and sulfate are closer to what there is  
8 in Illinois as compared to what the researchers  
9 were doing -- using for their hardness and  
10 sulfate.

11                   MS. DIERS: B. The use of the  
12 hardness and sulfate normalized GMAVs in Table 1  
13 may lead to the derivation of less stringent acute  
14 and, via the ACR approach, chronic standards.

15                   Was an attempt made to report  
16 the GMAVs in a non-normalized format?

17                   MR. HUFF: We -- we did not  
18 normalize our results that were put into Table 1.  
19 Had we normalized those, they would have resulted  
20 in higher proposed numbers. I think our intent  
21 when we resubmit Table 1 we will normalize the  
22 data and then we will also compute the CMC and the  
23 CCC based on the mean concentrations of hardness  
24 and sulfate in Illinois.

1 MS. DIERS: Twenty-two. On page 94  
2 of the petition, you state that the 1988 Ambient  
3 Water Quality for Chlorides was used as the  
4 initial source of toxicity data, however, the  
5 species list on page 95 of your petition does not  
6 match the species list in the 1988 National  
7 Criteria document.

8 Why is the species list  
9 different from the 1988 National Criteria  
10 document?

11 MR. KLOCEK: The 1988 dataset  
12 contained 12 taxa used for the GMAV. The 2009  
13 dataset initially contained 29 taxa reflecting  
14 newer data than available in 1988. More recent  
15 databases are available since 2009.

16 However, the 2009 dataset and  
17 procedure utilized by Iowa had been approved by  
18 the US EPA. I do not believe the expanded dataset  
19 would materially change our calculations for a  
20 winter standard.

21 MS. DIERS: Twenty-three. I'm not  
22 going to ask you. We already talked about that  
23 earlier.

24 MR. KOCH: Ask it.

1 MS. DIERS: Nevermind. My technical  
2 person would like me to ask you 23.

3 During the Chicago waterway  
4 hearings, US EPA took the position that the Iowa  
5 standard was no longer approvable. Have you  
6 communicated with US EPA about their position  
7 concerning Iowa's chloride standard?

8 MR. HUFF: No. Again, my focus was  
9 strictly on the temperature effects of chloride  
10 toxicity.

11 MS. DIERS: If you are aware that US  
12 EPA would no longer approve the Iowa standard, why  
13 was it used to support your petition?

14 MR. HUFF: Well, again, we focus on  
15 the research that shows that chlorides are less  
16 toxic in the winter. The Iowa methodology in the  
17 Stephan 2009 were just offered and I guess in a  
18 convenient way to calculate out what a winter  
19 standard would be.

20 MS. DIERS: Twenty-five. I'm going  
21 to skip 24. We talked about that.

22 Twenty-five. Have there been  
23 any other studies since the 2009 Iowa derivation?

24 MR. HUFF: Yes, and some of those

1 studies were included in the literature review,  
2 Laura Barghusen's testimony and Roger Klocek's  
3 testimony.

4 MS. DIERS: Twenty-six. On page 5  
5 of your pre-filed testimony, you state that in "As  
6 the four most sensitive species drive the  
7 derivation of the FAV, and subsequently the CMC  
8 and CCC, the work plans selected the four species  
9 most sensitive to chlorides for toxicity testing.

10 The approach was to substitute  
11 the results for these four species and similar  
12 organisms in the list of the genus mean acute  
13 values (GMAV) leaving the remaining species  
14 results as published without temperature  
15 adjustment and then recompute the new FAV with  
16 this mixed temperature list."

17 A. Have the four species most  
18 acutely sensitive to chloride been tested under  
19 cold temperatures?

20 MR. KLOCEK: Our tests on sphaerium  
21 and ceriodaphnia represented two of the four most  
22 sensitive species on the list of the Iowa taxa.  
23 Neocloeon was added as a taxon acutely sensitive  
24 to chloride at standard test temperatures 25°C.

1 The fourth taxon is villosa, a mussel, and was not  
2 tested by us. We chose to avoid testing mussel  
3 glochidia as being difficult to obtain regularly  
4 and also due to the elevated cost for glochidia  
5 testing. Few labs regularly test glochidia which  
6 added to our decision to test only non-glochidia  
7 bearing taxa. We believe that obtaining data to  
8 show that lower temperature ameliorated the  
9 effects of chloride toxicity would be sufficient  
10 to apply the effect across broad taxa  
11 designations.

12 MS. DIERS: B. It seems when using  
13 the non-normalized Iowa dataset and supplementing  
14 it with cold temperature test results lampsilis  
15 and physa are among the most acutely sensitive  
16 taxa.

17 Why were these genera not  
18 selected for cold temperature testing?

19 MR. KLOCEK: We used the 29 taxa  
20 normalized data list as it represents the same  
21 list we used during the Chicago Ship Canal  
22 proceedings in 2011. Originally, we used a  
23 non-normalized list in 2011 but received a comment  
24 that we should use normalized data. Hence, we



1 used the normalized value list for the current  
2 petition, for the standard temperature data, and  
3 non-normalized for the species we tested at 10°C.

4 By not normalizing the 10°C  
5 data, the results are more conservative. We did  
6 this because the relationship for hardness and  
7 sulfate have not been established at 10°C, thus  
8 requiring an assumption that the same relationship  
9 at 25°C holds at 10°C. We would not have chosen  
10 to test lampsilis mussels or any other mussels due  
11 to limited funding and the high cost of glochidial  
12 testing.

13 MS. BARGHUSEN: I'm Laura Barghusen,  
14 B-A-R-G-H-U-S-E-N, from Openlands.

15 Are you aware of whether the  
16 GMAVs or FMAVs for mussels in the database  
17 presented in Table 1 included early life stages of  
18 mussels in computing the values?

19 MR. KLOCEK: I don't believe they  
20 did.

21 MR. HUFF: Talk --

22 THE COURT REPORTER: I didn't hear  
23 that.

24 MR. KLOCEK: I don't think they

1 included glochidia in the 2009 lampsilis mussel  
2 test. I think it was just juvenile mussels.

3 MS. BARGHUSEN: Thank you.

4 HEARING OFFICER KLEIN: Let me take  
5 a check here. It's 1:10 and I don't know if it's  
6 past people's lunchtime, but we can take a break  
7 here and then reconvene at 2:00 or we can power  
8 through. We're approaching the end of IEPA's  
9 questions. So I don't know if --

10 MR. HUFF: Power through.

11 HEARING OFFICER KLEIN: Power  
12 through them then we'll take a break for lunch,  
13 does that work?

14 MS. SANTOS: That's fine.

15 MS. DIERS: Question 27. Would you  
16 agree the new acute toxicity data for chloride is  
17 available and is unaccounted for in the dataset  
18 used in this petition?

19 MR. KLOCEK: We agree that new data  
20 exists that was not accounted for in our petition  
21 but virtually all of the new data was conducted at  
22 warmer temperatures. It is our contention that  
23 data from chloride toxicity tests conducted at  
24 cooler temperatures will show that chloride

1 toxicity is ameliorated by cooler temperatures  
2 across broad taxa lines as demonstrated by our own  
3 data and other data presented in our petition. We  
4 will amend Tables 1 and 2, with the recently  
5 published paper on mayflies with the 10°C results  
6 and normalize our data.

7 MS. DIERS: Twenty-eight. Would the  
8 incorporation of new acute toxicity data modify  
9 the standards proposed in this petition?

10 MR. HUFF: There are a number of  
11 approaches to developing water quality standards  
12 and the available literature continues to evolve.  
13 Certainly, whatever approach in dataset that is  
14 selected will yield somewhat unique water quality  
15 standards. With the incorporation of the mayfly  
16 data in there, which is normalized, it won't have  
17 a material effect on the final calculated values.

18 MS. DIERS: Twenty-nine. Would you  
19 agree the new chronic toxicity data for chloride  
20 is available and is unaccounted for for the  
21 derivation of chronic standards proposed by this  
22 petition?

23 MR. HUFF: Well, again, our focus  
24 was on the colder temperature 10°C. In the first

1 round of testing, we did a 10°C. We failed to  
2 show any chronic effects. We extended that  
3 testing for longer term exposure and the spike  
4 concentrations of chloride where some chronic  
5 effects were observed. We ended up using the ACR  
6 to derive the chronic standard and use our test  
7 results to compare with the computed chronic  
8 standard as part of the sensitivity analysis and  
9 the Technical Support Document. I am unaware of  
10 any additional chronic toxicity data generated at  
11 colder temperatures, but look forward to seeing  
12 such information.

13 MS. DIERS: I'm going to go to B.  
14 Would the incorporation of new chronic toxicity  
15 data allow for the derivation of chronic standards  
16 that may be derived using GMCVs in lieu of the ACR  
17 approach? It's 29B.

18 MR. KLOCEK: Well, yes, it's  
19 possible that that could be done.

20 David, do you have a take on  
21 that also that with the incorporation of new  
22 chronic toxicity data allow for the derivation of  
23 chronic standards that may be derived using GMCVs  
24 in lieu of the ACR approach?

1 MR. SOUCEK: I mean, I think  
2 we've -- we've decided that there aren't  
3 sufficient cold temperature chronic data out  
4 there, but if there were that we had from the  
5 eight -- eight families, then, potentially, yes,  
6 that would be the case.

7 MS. DIERS: Okay. I'm going to  
8 strike C. We have already talked about 30. The  
9 Board asked that earlier. So I'll go to 31.

10 Both the 1988 National Criteria  
11 document and the 2009 Iowa standard included a  
12 GMCV for pimephales (fathead minnow) of 433 mg/L,  
13 which was the second most sensitive GMCV in the  
14 dataset. The ceriodaphnia GMCV equals less than  
15 419 mg/L). Yet, the cold temperature chronic  
16 standard was developed using an invertebrate ACR  
17 that is twofold less protective than the  
18 vertebrate ACR.

19 A. Why was  
20 temperature-dependent chloride testing not  
21 conducted on --

22 MR. KOCH: Pimephales.

23 MS. DIERS: -- pimephales?

24 MR. KLOCEK: We selected the most

1 sensitive species based on the acute toxicity test  
2 as likely that almost all cold-blooded vertebrates  
3 and invertebrates on any chloride toxicity list  
4 would show amelioration of chloride toxicity when  
5 tested at cooler temperatures.

6 MS. DIERS: B. Does the  
7 invertebrate ACR result in a chronic cold  
8 temperature standard that's protective of  
9 pimephales and other vertebras?

10 MR. KLOCEK: A vertebrate ACR should  
11 be used for vertebrates. The pimephales chronic  
12 value of 413 mg/L is based upon one study from  
13 1985. More recent data from Elphick 2011 shows a  
14 chronic value of 704 mg/L with an ACR of 5.8  
15 conducted at 25°C.

16 MS. DIERS: Thirty-two. Was any  
17 consideration given to testing vertebrates, for  
18 example, fish, under cold temperatures?

19 MR. HUFF: Not -- not as part of our  
20 study. We just didn't have the budget for it.

21 MS. DIERS: Thirty-three are you  
22 aware of any -- I'm sorry.

23 MR. KOCH: 32A.

24 MS. DIERS: 32A. I'm sorry. I

1 jumped ahead.

2 Is there any evidence that  
3 suggests vertebrate sensitivity to chloride is  
4 temperature variant.

5 MR. HUFF: Cool temperatures, slow  
6 metabolism of any cold-blooded organism and slow  
7 metabolism can ameliorate effects of toxicity  
8 compared to toxicity at higher temperatures.

9 MS. DIERS: B. Is there any  
10 evidence to suggest that invertebrates would be  
11 the most sensitive organism under cold  
12 temperatures?

13 MR. HUFF: Invertebrate taxa are  
14 considered the most sensitive organisms to  
15 chloride at lab temperatures and show a higher  
16 tolerance of chloride at 10°C. It is expected  
17 that fish will show a similar amelioration to  
18 chloride toxicity at cooler temperatures.

19 If this were not correct, one  
20 would expect to see fish kills associated with  
21 de-icing runoff, which I am unaware occurs. I  
22 would also note Mr. McCracken's written comments  
23 in these proceedings regarding elevated winter  
24 chlorides and aquatic community health.

1 MS. DIERS: C. Could other  
2 temperature invariant taxa such as vertebrates be  
3 more sensitive under cold temperatures?

4 MR. KLOCEK: I would refer back to  
5 the response for question 32B.

6 MS. DIERS: Thirty-three. Are you  
7 aware of any Illinois invertebrates with  
8 lifecycles that require or prefer temperatures of  
9 10°C or lower for completing mating, egg --

10 MR. KOCH: Deposition.

11 MS. DIERS: -- deposition -- I'm  
12 sorry -- and development of offspring?

13 MR. KLOCEK: Yes.

14 MS. DIERS: Is there any chloride  
15 toxicity data for these taxa? That would be 33A.

16 MR. KLOCEK: The fingernail clam,  
17 sphaerium simile has toxicity data at temperatures  
18 of 25°C and 10°C. This clam can incubate live  
19 young in gill marsupium and release them during  
20 winter much like some of the winter brooding  
21 freshwater mussels incubate glochidia larvae in  
22 gill marsupium and release them during winter.  
23 There is a large amount of recent toxicity data  
24 for mussels tested at 25°C but no data for mussels



1 tested at 10°C.

2 MS. DIERS: B. Would the proposed  
3 cold temperature chloride standards be protective  
4 of invertebrates that utilize cooler temperatures  
5 to complete their life cycles?

6 MR. KLOCEK: Based on sphaerium and  
7 other invertebrate data, we believe that the  
8 proposed chloride standard would protect sensitive  
9 invertebrates that use cooler temperatures to  
10 complete their reproductive cycle.

11 Again, I would refer you to  
12 Mr. McCracken's written comments on the actual  
13 stream biology data.

14 MS. DIERS: Question 34. You  
15 mention that the ACR of 3.187 was ascertained from  
16 the 2009 Iowa chloride standard and that this ACR  
17 was solely developed from invertebrate data.

18 A. What was the justification  
19 for developing the chronic standard using the  
20 invertebrate ACR, while dismissing the vertebrate  
21 ACR of 7.308?

22 MR. HUFF: We tested four sensitive  
23 species based on an acute toxicity and all were  
24 invertebrate taxa. Thus, we used the 2009

1 invertebrate ARC for these test results.

2 MS. DIERS: B. Is it appropriate to  
3 use the acute to chronic ratio (ACR) when enough  
4 data is available to compute the -- compute the  
5 chronic standard without the ACR?

6 MR. KLOCEK: We do not believe there  
7 is sufficient chronic data at 10°C and the  
8 standard testing has to be extended at 10 C --  
9 10°C to find any chronic effects. Based on this,  
10 using the ARC is appropriate and the sensitivity  
11 analysis that we referenced in the Technical  
12 Support Documents confirm that the ACR approach  
13 yielded conservative results.

14 MS. DIERS: C. Would it be more  
15 appropriate to rank GMCVs, calculate an FCV, then  
16 adjust the FCV with a multiplier ascertained from  
17 the paired cold temperature and warm temperature  
18 tests conducted in support of this petition?

19 MR. KLOCEK: Possibly. But pairing  
20 the warm and cool temperature data together would  
21 diffuse the effect that cool temperature has on  
22 mitigating chloride toxicity. Because of the  
23 large difference in cool and warm temperature  
24 testing values, it is more appropriate to keep the

1 cool temperature values separate in this petition.

2 MS. DIERS: That's all we have.

3 HEARING OFFICER KLEIN: Okay. So it  
4 is 1:20. We can take a break for lunch. Be back  
5 here by 2:20. Does that work? Can we do 45  
6 minutes? Would it be all right with a 45-minute  
7 lunch and maybe see if we can try to finish this  
8 up today?

9 MR. HUFF: 2:05?

10 HEARING OFFICER KLEIN: 2:05.

11 MR. ETTINGER: Depends what you mean  
12 by this up.

13 HEARING OFFICER KLEIN: Sorry?

14 MR. ETTINGER: Depends what you mean  
15 by this up.

16 HEARING OFFICER KLEIN: That's fair.  
17 All right. So be back at 2:05.

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

21 HEARING OFFICER KLEIN: If we can go  
22 on the record. Before we start with questions, a  
23 couple of things that I need to address.

24 First, Ms. Diers, can you guys

1 unmute Springfield?

2 MS. DIERS: Sorry.

3 HEARING OFFICER KLEIN: Can you  
4 please introduce who the technical advisors are  
5 with you because I think they made comments or  
6 were saying stuff so just for the court reporter.

7 MS. DIERS: They are -- I'll let  
8 them introduce themselves and tell you their  
9 positions here at the Agency.

10 MR. KOCH: Brian Koch. Last name is  
11 spelled K-O-C-H. I work in the water quality  
12 standards section and I'm the technical advisor.

13 MR. TWAIT: Scott Twait, T-W-A-I-T.  
14 I'm the manager of the water quality standards  
15 section.

16 HEARING OFFICER KLEIN: Great.  
17 Thank you. And then before we also begin, we need  
18 to do a step that we should have done at the  
19 beginning, but could the court reporter please  
20 swear in the three witnesses.

21 WHEREUPON:

22 JAMES HUFF, ROGER KLOCEK and DAVID SOUCEK  
23 called as a witness herein, having been first duly  
24 sworn, deposeth and saith as follows:

1 HEARING OFFICER KLEIN: All right.  
2 Great. Thank you.

3 So now, Ms. Yang, you can  
4 proceed with IDNR's questions.

5 MS. YANG: Thank you. My name is  
6 Virginia Yang, spelled Y-A-N-G. I'm legal counsel  
7 for the Illinois Department of Natural Resources  
8 and I'm providing comments on behalf of the  
9 Illinois Department of Natural Resources as well  
10 as Illinois Nature Preserve Commission.

11 HEARING OFFICER KLEIN: Can you  
12 folks mute in Springfield?

13 MS. DIERS: Yes.

14 MS. ZALEWSKI: Waive if you can't  
15 hear us. Okay?

16 HEARING OFFICER KLEIN: Sorry,  
17 Ms. Yang. You can proceed.

18 MS. YANG: Before I start with the  
19 questions and comments from the Illinois  
20 Department of Natural Resources, I have a few  
21 questions just to clarify some of the concepts and  
22 terminology that has been used and in your  
23 comments earlier this morning you use the terms  
24 episodic snowfall events and winter weather

1 conditions.

2 Can you explain the intent of  
3 that or what the criteria of that is, those  
4 concepts?

5 MR. HUFF: So the concept is that  
6 during the winter when we have storms and salt is  
7 applied there is a period of time where the snow  
8 melt will carry high levels of sodium chloride  
9 into the receiving streams and it's an episodic  
10 event. It goes up fairly rapidly and then it will  
11 have a tail coming down and that episodic event  
12 may last one day, seven days and really in extreme  
13 cases on bigger streams it can last longer than  
14 seven days.

15 MS. YANG: Are you only considering  
16 snowfall or other conditions of winter?

17 MR. HUFF: Well, freezing rain.  
18 Whenever -- whenever de-icing salt would be  
19 applied.

20 MS. YANG: Okay. And did you look  
21 into the differences of these events in the  
22 northeastern part of the state as opposed to  
23 central Illinois and southern Illinois?

24 MR. HUFF: No, I looked at -- the

1 episodic events will occur wherever they are  
2 applying de-icing salt and they apply those  
3 throughout the region. It's more the frequency of  
4 which they're applied in the south as opposed to  
5 the north.

6 MS. YANG: Okay.

7 MR. ETTINGER: Sorry. Could I  
8 follow up on that?

9 Is it your understanding that  
10 the only thing that would cause an episodic event  
11 is road salt?

12 MR. HUFF: Well, it's not strictly  
13 roads. Right. I have parking lots, any kind of  
14 de-icing practice that would occur.

15 MR. ETTINGER: For example, have you  
16 studied how hog lagoons might be emptied or  
17 controlled -- other controlled lagoon discharges?

18 MR. HUFF: I have not.

19 MR. ETTINGER: Thank you.

20 MS. YANG: Okay. I'm going to go  
21 through the comment -- the questions and comments  
22 that were developed by IDNR as well as Illinois  
23 Nature Preserve Commission and the format that we  
24 used was a question and then in order to give a

1 basis for that question, we developed a comment  
2 just to show what our thinking was for that  
3 question.

4 So I'm just going to go  
5 through -- there are like five or six of these and  
6 ask you to comment on DNR's recommendation. Okay.  
7 So the first --

8 HEARING OFFICER KLEIN: Ms. Yang,  
9 you don't have to read them all.

10 MS. YANG: Okay.

11 HEARING OFFICER KLEIN: They are in  
12 the record as if read. So --

13 MS. YANG: I will just read the  
14 question then and cite to the comment.

15 HEARING OFFICER KLEIN: Yup. That  
16 works.

17 MS. YANG: All right. The first  
18 concept talked about range of chloride sensitivity  
19 for Illinois aquatic species and life stages. The  
20 question is, how does a petitioner address the  
21 range of chloride sensitivity exhibited by  
22 Illinois aquatic species and life stages? And  
23 then the comment is that Illinois aquatic life is  
24 represented by approximately 217 extant species of



1 fish, 65 mussels, 32 benthic crustaceans, and  
2 hundreds of aquatic insects and other  
3 invertebrates, plants and algae. All of these  
4 species and their life stages vary in sensitivity  
5 to chlorides.

6           The comment of the approach to  
7 deriving water quality standards based on  
8 laboratory toxicity tests using a limited number  
9 of representative species, like that used by the  
10 petitioner, is being re-evaluated by many  
11 professional scientists and science-based  
12 organizations which we cite in our comment and we  
13 also cite that these organizations and  
14 professionals nationally and worldwide are making  
15 advances in modernizing water quality criteria  
16 methods, including expanding the definition of  
17 acceptable data beyond the limited toxicity test  
18 protocols.

19           So I'd like you to comment on  
20 DNR's recommendation that petitioner incorporate  
21 the full range of chloride sensitivity exhibited  
22 by Illinois aquatic life by means of utilizing  
23 more contemporary and community-based methods such  
24 as SS -- SSD's which are species sensitivity

1 distributions in developing the chloride standard.

2 MR. HUFF: Again, I think our  
3 purpose was to determine whether chloride exhibits  
4 less toxicity in colder temperatures and that's  
5 where our focus was. We selected from the acute  
6 toxicity list, from the Iowa list, the four most  
7 sensitive species and ran the colder temperature  
8 studies with those four species. These results  
9 were then incorporated into the 2009 Iowa chloride  
10 dataset and only adjusted the toxicities for the  
11 species that we tested as a conservative approach.

12 The Iowa listing is believed to  
13 be similar to the Illinois species where chloride  
14 toxicity data are available as the majority of  
15 data was generated in higher temperatures, the  
16 computed water quality standard is conservative  
17 and these alternative methods, I believe, will  
18 require more data at the colder temperature in  
19 order to carry those out.

20 MS. YANG: The next question deals  
21 with protection of Illinois aquatic life for  
22 mortality and other sublethal responses. The  
23 question is how does the petitioner ensure the  
24 proposed chloride standards are protective of

1 Illinois's aquatic life given that mortality and  
2 other sublethal responses that occur at chloride  
3 concentrations less than those required to produce  
4 the LD50?

5 LD50 is the median lethal dose  
6 of the amount of the substance required to kill 50  
7 percent of exposed individuals. We note in our  
8 question that both lethal and sublethal responses  
9 can reduce the likelihood of population  
10 persistence and in the context of protected  
11 species would be prohibited as "take" as defined  
12 by the Illinois Endangered Species Protection Act.

13 We would like petitioner to  
14 comment on IDNR's recommendation that there is an  
15 evaluation of chloride sensitivity at lethal  
16 endpoints below the LD50 sublethal endpoints for  
17 aquatic life including protected species.

18 MR. HUFF: So in addition to running  
19 the acute toxicity tests, which you're referring  
20 to with the LD50, we ran chronic tests to evaluate  
21 the sublethal effects to ensure the proposed  
22 chloride standards are protective of Illinois  
23 aquatic life. We ran those tests.

24 MS. YANG: Was that -- was there

1 consideration of Illinois protected species during  
2 those tests?

3 MR. HUFF: Again, we used the four  
4 most sensitive species from the acute toxicity  
5 list which were generated where they were made  
6 available from Iowa.

7 MS. YANG: The third topic concerns  
8 impacts of increased chloride concentrations in  
9 Illinois surface water and groundwater. The  
10 question is to what extent will the proposed  
11 chloride standards contribute to increased  
12 chlorides in Illinois surface water and  
13 groundwater? We note that chloride concentrations  
14 are increasing in Illinois surface waters and  
15 groundwater and we specifically cite to the Class  
16 3 groundwater requirements under 30 Ill. Adm. Code  
17 62.230 Class 3 special resources groundwater that  
18 impacts IDNR's protected and dedicated lands under  
19 the Illinois Natural Areas Preservation Act and we  
20 would like petitioner's comment on DNR's  
21 recommendation as to further evaluation of the  
22 contributions of proposed chloride standards to  
23 the observed trends of increasing chlorides in  
24 Illinois surface water and groundwaters.

1 MR. HUFF: So I think your question  
2 assumes that if the Board were to adopt the winter  
3 and summer numbers that there would be an increase  
4 in chlorides and I would argue that just the  
5 opposite is going to happen. We're going to  
6 continue to reduce chlorides to meet the more  
7 restrictive summer numbers and we don't currently  
8 meet the 500 mg/L in urban areas now in the winter  
9 and this will allow those watersheds an  
10 opportunity, through best management practices, to  
11 either get closer to or to achieve those.

12 The proposed non-winter acute  
13 standards is less than half the current chloride  
14 water quality standard in Illinois. So you  
15 wouldn't expect an increase in chloride from that.  
16 Non-urban areas, if the stream achieves this  
17 non-winter standard, there is no technical reason  
18 one would experience an increase in chlorides  
19 during the winter months.

20 In urban areas, the existing 500  
21 mg/L standard is not being currently achieved and  
22 even the proposed winter standards are not being  
23 achieved strictly due to the de-icing practices  
24 with sodium chloride. A change in the winter

1 standard will provide a target for watersheds that  
2 can be achieved through the implementation of  
3 BMP's in many of our streams.

4 In summary, the proposed water  
5 quality standard will result in an overall  
6 reduction in chloride concentrations in Illinois  
7 surface and groundwater.

8 MS. YANG: The fourth topic concerns  
9 the once per three-year exceedance which is  
10 insufficient to protect Illinois aquatic life.  
11 The question is, what is the justification for the  
12 once per three-year exceedances under the proposed  
13 water standards and its impact on aquatic life?  
14 We would like you to comment on DNR's  
15 recommendation that petitioner estimate frequency  
16 and intensity of exceedances in Illinois waters  
17 and evaluate the responses of the Illinois aquatic  
18 life to these exceedances.

19 MR. HUFF: So I would refer to the  
20 comments of Steve McCracken as submitted in this  
21 regulatory proceeding from the DuPage River Salt  
22 Creek Workgroup where he has gone out and  
23 collected biological stream data throughout the  
24 watershed and he is seeing in the west branch of

1 the DuPage River where they have chloride levels  
2 above 500 mg/L in the winter, but lower than the  
3 233 mg/L in the summer where they have put a  
4 biological community there as part of the support  
5 for what we're doing.

6           The intent of the once per three  
7 years was they announced we're having more and  
8 more intense storm events. It's much like the  
9 hundred year rain events that we seem to have  
10 every year now and there will be snow events with  
11 dropping temperatures and freezing rains that will  
12 require salt applications for longer duration than  
13 the typical storm events and I was just trying to  
14 allow for an accommodation of these extreme  
15 events. These events already occur and the  
16 chloride data was presented in the Technical  
17 Support Document as several of the watersheds  
18 clearly show these periodic spikes.

19           MS. YANG: Do you have a comparable  
20 study or are you aware of any ongoing studies for  
21 central Illinois and southern Illinois?

22           MR. HUFF: With respect to chlorides  
23 in their streams, I am not aware of any studies.

24           MS. YANG: Okay. Fifth topic would

1 be adverse effect of Illinois aquatic life to  
2 chlorides under increased water temperature. The  
3 question is, how would water temperatures above  
4 those in the experiments used to derive the  
5 proposed chloride standards impact Illinois's  
6 aquatic life?

7           The comment says that the  
8 petitioner used laboratory toxicity experiments at  
9 10°C to derive winter period chloride standards  
10 with the following assumptions. One, that the  
11 test conditions are representative of water  
12 temperatures through Illinois winters and, two,  
13 that sensitivity of aquatic life to chloride  
14 decreases with temperature.

15           The comment we have is that  
16 Illinois stream and river temperatures exceed 10°C  
17 and 28 percent of EPA's winter period records.  
18 During the most recent 11 years, it exceeded 15°C  
19 in nearly 10 percent of those records.

20           So the question is, we would  
21 like a comment regarding the petitioner's  
22 evaluation of chloride sensitivities in Illinois  
23 aquatic life and all seasonal ranges of  
24 temperatures incurring in all Illinois waters.



1 MR. HUFF: So the winter standard  
2 proposed was, again, intended to address these  
3 episodic snow melt, runoff events. The runoff  
4 temperature streams will be below 10°C during such  
5 events. If a stream achieves the proposed  
6 non-winter standard, then when stream temperatures  
7 are above 10°C, the chlorides would be less than  
8 the lower non-winter standard during those periods  
9 of time. The proposed winter standard could also  
10 be limited to when the stream temperatures are  
11 less than 10°C as opposed to the seasonal  
12 approach. This change would seem to alleviate a  
13 number of concerns for the current proposal.

14 MS. YANG: Sixth question is --  
15 concerns the impact on early aquatic life stages  
16 during winter season. The petitioner account --  
17 does the petitioner account for the sensitive life  
18 stages of Illinois's aquatic life when delineating  
19 the temporal extent of the winter standards  
20 period?

21 The comment talks about the life  
22 stages of Illinois aquatic life most sensitive to  
23 chloride will be present during the winter period.  
24 The eggs -- fish eggs and larvae are present in

1 Illinois waters in early spring, which is within  
2 the petitioner's proposed water period at water  
3 temperatures below 15°C and these aquatic -- early  
4 aquatic life stages are more sensitive to chloride  
5 than that of the adult.

6 DNR would like a comment  
7 regarding petitioner to evaluate the timing of  
8 sensitive life history stages and incorporating  
9 the relative stages into the development of those  
10 proposed chloride standards.

11 MR. HUFF: I think if we go instead  
12 of a seasonal water quality standard we go to the  
13 10°C specific stream temperature, unless when the  
14 winter chloride standard would apply, that would  
15 alleviate some of the concern in that question.

16 Again, we selected four  
17 sensitive species that -- and show that in all  
18 four cases that chloride toxicity is reduced as  
19 the temperature -- 10°C temperature as opposed to  
20 25°C and we would expect that same relationship to  
21 hold for all aquatic species.

22 MS. YANG: Next question concerns  
23 the impact arising from varied sources of  
24 chlorides. The question is, how do the proposed

1 standards address the varying sources of chloride  
2 in Illinois?

3                   And the comment is because of  
4 these multiple forms of chlorides, the differing  
5 toxicities, the multiple sources of chlorides  
6 statewide and regionally, differs in abundance  
7 with those compounds, we believe it is critical to  
8 understand the chlorides from these other elements  
9 and the relative toxicity testing of such  
10 compounds.

11                   We would like a comment  
12 regarding the estimate of the spatial temporal  
13 prevalence and toxicity of chlorides other than  
14 sodium and use of these estimates to evaluate  
15 impact on Illinois aquatic life.

16                   MR. HUFF: Dr. Soucek provided an  
17 answer to one of the other questions, the relative  
18 toxicity of the other forms of chlorides or  
19 potassium chloride, magnesium chloride. Our  
20 current standard is 500 mg/L. The proposed summer  
21 acute standard is less than 50 percent of the  
22 current general use water quality standard. The  
23 proposed winter standard is --

24                   MR. ETTINGER: Wait. Did you mean

1 to say that your proposed standard is less than 50  
2 percent of the current --

3 MR. HUFF: No, the chronic standard  
4 is. Sorry. Yes. I caught that.

5 MR. ETTINGER: Sorry. Perhaps --  
6 sorry for interrupting, but do you want to start  
7 over and say what you meant to say?

8 MR. HUFF: Sure. The proposed  
9 summer chronic standard is less than 50 percent of  
10 the current general use water quality standard.  
11 The proposed winter standard is focused upon  
12 winter de-icing practices which is predominantly  
13 sodium chloride. The seasonal spikes in chlorides  
14 are from sodium chloride. There is no reason to  
15 expect a change in any -- any forms of chlorides  
16 discharged by other sources as a result of this  
17 proposal.

18 MS. YANG: Last question concerns  
19 water quality impacts upon semi-aquatic  
20 communities and types of habitats. The question  
21 is, does the petitioner account for water --

22 MS. LIU: Ms. Yang?

23 HEARING OFFICER KLEIN: Sorry. We  
24 have a question.

1 MS. YANG: Okay.

2 MS. LIU: May I follow up on your  
3 earlier question? You mentioned agricultural  
4 sources of chloride. Are there episodic events  
5 associated with applications of potassium chloride  
6 fertilizer that would impact streams similarly to  
7 the way urban streams are impacted by de-icing  
8 practices?

9 MR. HUFF: I don't believe that  
10 during the winter months that there would be  
11 application of the potassium to the agricultural  
12 fields. So there is certainly potentially  
13 episodic events from such applications when that's  
14 applied either in the fall or in the spring  
15 months, but those would then be compared to the  
16 summer standard.

17 MS. LIU: Thank you.

18 MR. ETTINGER: I'm sorry. Do you  
19 mean to say you don't believe agriculture in  
20 Illinois receives application of fertilizer or  
21 other things in the month of April?

22 MR. HUFF: No. During the winter  
23 months, potassium chloride -- the source of  
24 potassium -- I don't believe is applied during the

1 winter months.

2 MR. ETTINGER: But winter months, in  
3 your answer now, does not include April or March  
4 or it does?

5 MR. HUFF: It would be when the  
6 temperature is less than 10°C in the stream.

7 MR. ETTINGER: Okay. So your  
8 testimony is that you don't believe that  
9 fertilizer or pesticides are ever applied at less  
10 than 10°C?

11 MR. HUFF: My answer was potassium  
12 chloride.

13 MR. ETTINGER: Potassium chloride.  
14 Thank you.

15 MS. YANG: My question -- so the  
16 question is, does the petitioner account for water  
17 quality changes that may occur in semi-aquatic  
18 community-types/habitats, such as wetlands, and  
19 the biota that inhabit them if the proposed  
20 chloride standards are approved?

21 MR. HUFF: Point source discharges  
22 in Illinois are generally to streams in Illinois,  
23 not wetlands or fens. Design practices for new  
24 and expanded roadways specifically address the

1 impact on fens and wetlands during the  
2 alternatives evaluation, with avoidance of roadway  
3 drainage the preferred approach. Where fens and  
4 wetlands are already impacted by de-icing runoff,  
5 the proposed standard would have no impact over  
6 the no action alternative.

7 MS. MEYERS: I have a follow-up  
8 question to that.

9 HEARING OFFICER KLEIN: Go ahead.

10 MS. MEYERS: Do we anticipate there  
11 will be new or widened roads throughout  
12 northeastern Illinois and other urban places in  
13 our state over time?

14 MR. HUFF: I have no idea.

15 MS. MEYERS: Do we think that the  
16 only roads that are probably going to exist are  
17 the roads that we have today?

18 MR. HUFF: I would say we're  
19 substantially built out.

20 MS. MEYERS: Are you familiar, for  
21 instance, with Quintin Road?

22 MR. HUFF: Yes.

23 MS. MEYERS: And that is a road  
24 that's going to be widened?

1 MR. HUFF: Yes.

2 MS. MEYERS: And there is right next  
3 to it wetlands that are a part of the federal  
4 wetland mitigation bank or project?

5 MR. HUFF: Yes.

6 MS. MEYERS: And that there is  
7 something called salt splash or spray?

8 MR. HUFF: Yes.

9 MS. MEYERS: And when roads are  
10 widened, that salt splash and spray can impact  
11 adjacent wetlands and other natural areas?

12 MR. HUFF: Unless they reduce the  
13 speed limit to reduce the spray, that's correct,  
14 which is what has been proposed on Quintin Road.

15 MS. MEYERS: We can go into that  
16 further. However, suffice to say that, isn't it  
17 probable that with roads that are widened  
18 throughout northeastern Illinois or added  
19 throughout northeastern Illinois or where there  
20 are wetlands present, that this could, in fact,  
21 impact more wetlands than it presently does?

22 MR. HUFF: Theoretically possible,  
23 yes.

24 MS. YANG: I have no further



1 questions.

2 HEARING OFFICER KLEIN: Okay. Then  
3 moving on I was thinking we would go with  
4 Openlands's pre-filed questions, does that work?

5 MS. BARGHUSEN: Okay. I'm Laura  
6 Barghusen, B-A-R-G-H-U-S-E-N, from Openlands and I  
7 will be asking some pre-filed questions of  
8 Mr. Huff and Dr. Klocek.

9 My first question is for  
10 Mr. Huff. In your testimony, you state that there  
11 is no basis for believing that BMP's by themselves  
12 will result in achieving a 500 mg/L not-to-exceed  
13 winter standard. Smaller streams still have peak  
14 chloride concentrations in excess of 1,500 mg/L  
15 and it is not realistic to expect a 67 percent  
16 reduction in salt usage that would be required  
17 during the worst runoff events in order to achieve  
18 compliance. That's from page two, paragraph two  
19 of Huff testimony. I believe the efforts will  
20 fall far short of achieving a 500 mg/L  
21 not-to-exceed chloride level from page three,  
22 paragraph two.

23 So the question is, what is your  
24 basis for stating that the BMP's can't result in

1 meeting these standards everywhere in the state?

2 MR. HUFF: As noted in my testimony,  
3 urban streams are currently experiencing peak  
4 chlorides in excess of 1,500 mg/L. If you assume  
5 the background chlorides in the same streams are  
6 only 200 mg/L, then the de-icing practices are  
7 contributing 1,300 mg/L during these events.

8 To be successful then, the  
9 regulated community would have to cut salt  
10 application by 84 percent not on an annual basis,  
11 but on these bad storm events through best  
12 management practices. For that to be possible  
13 suggests the regulated community is currently  
14 wasting 84 percent of the salt it applies. The  
15 DuPage River Salt Creek Workgroup has been a  
16 leader in implementing BMP's for more than a  
17 decade and the stream data continues to show  
18 violations of the current water quality standard  
19 and, at best, a modest reduction in peak chloride  
20 concentrations. That's the basis.

21 MS. BARGHUSEN: Okay. And so that  
22 defines BMP as just reduce salt application?

23 MR. HUFF: Well, there is a lot of  
24 tools in a best management practice toolkit,

1 whether that's applying salt based on the pavement  
2 temperature and the predicted temperature  
3 overnight if it's going on there to more accurate  
4 weather forecasting and use of liquids, those  
5 types of things.

6 MS. BARGHUSEN: Okay. Question 2.

7 In your testimony, you state that "I reached out  
8 to US EPA at the end of the UAA proceedings about  
9 the possibility of funding coal temperature  
10 toxicity testing as they had recently funded  
11 chloride toxicity testing on several aquatic  
12 species."

13 My question is, what were the  
14 studies regarding recently funded chloride  
15 toxicity testing by the US EPA?

16 MR. HUFF: I'd like Dr. Soucek to  
17 answer that.

18 MR. SOUCEK: My laboratory was  
19 supported to research the toxicity of chlorides to  
20 various species. The original project I did for  
21 the Iowa chloride standard was funded with Region  
22 5 funds that were sent directly to Great Lakes  
23 Environmental Center but I was a subcontract on  
24 that. The grant was received in 2008 and we

1 published a paper on that in 2011.

2                   Then I received another grant  
3 from Region 5 funds Great Lakes Restoration  
4 Initiative funds in 2012. Those fund were, again,  
5 passed from Region 5 through USGS, a different  
6 entity, to be -- and those funds we developed  
7 methods for full life chronic toxicity testing  
8 with this mayfly neocloeon triangulifer and for  
9 that project we published a paper with chronic  
10 chloride toxicity data at 25°C and that paper was  
11 published in 2015 and then finally I received  
12 another grant in 2013, again, Great Lakes  
13 Restoration Initiative Funds, from Region 5 passed  
14 through USGS to study the influence of dilution  
15 water chemistry on acute major ion toxicity  
16 including sodium chloride and other chloride salts  
17 and we published those results in 2018.

18                   MS. BARGHUSEN: Thank you. To your  
19 knowledge, did any of the studies include the  
20 following on glochidia of fat muckets, that would  
21 be Wang, et al, 2018, acute toxicity of sodium  
22 chloride and potassium chloride to a unit of  
23 mussel, lampsilis siliquoidea in water exposures,  
24 was that, to your knowledge, part of the recently

1 funded chloride toxicity testing?

2 MR. HUFF: I have no knowledge on  
3 where that funding came from.

4 MS. BARGHUSEN: Okay. Thank you.  
5 Were you aware of the study as you were working on  
6 your petition?

7 MR. HUFF: No.

8 MS. BARGHUSEN: Okay.

9 MR. HUFF: No, I wasn't.

10 MS. BARGHUSEN: And did you -- were  
11 you aware of -- well, I think did you utilize the  
12 study by Gillis, which presents data showing that  
13 the glochidia of two species present in Illinois  
14 waters (the wavy-rayed lamp mussel and northern  
15 riffleshell) have significantly lower acute  
16 tolerances to chloride than the ones presented in  
17 your petition?

18 MR. HUFF: Our research was on the  
19 temperature effect on the toxicity of chlorides to  
20 the four sensitive aquatic species. What our  
21 research showed is that temperature is an  
22 important variable in the toxicity of chloride.  
23 Gillis noted that the glochidia were significantly  
24 less than sensitive to salt than natural waters

1 that could not be attributed to the hardness  
2 difference alone. To EC50 and natural water from  
3 the Grand River for P --

4 MR. KLOCEK: Fasciolaris --

5 MR. HUFF: -- Fasciolaris 3,416 mg/L  
6 of chloride was three times higher than the  
7 reconstituted water. These studies were all  
8 conducted at 21°C and, again, our focus was on the  
9 10°C results that we could find.

10 MS. BARGHUSEN: Thank you. Were the  
11 studies that you referenced, Dr. Soucek, were they  
12 in process or were they complete when you  
13 originated the cold water studies presented in  
14 your petition?

15 MR. SOUCEK: The studies that I  
16 mentioned, two of them were completed. The one on  
17 the -- for the development of the data for the  
18 Iowa chloride standard and the -- the one on the  
19 development of the chronic toxicity testing method  
20 for the mayfly those were complete. The third one  
21 was maybe in process and almost finishing up when  
22 we started doing the initial work for this cold  
23 temperature study.

24 MS. BARGHUSEN: And how did you

1 consider the results of those completed studies in  
2 your proposal?

3 MR. SOUCEK: Well, we used the  
4 previous study that I did to form reference points  
5 for the temperatures -- for the treatment levels,  
6 the chloride concentrations that we used to test  
7 the mayfly and the fingernail clam and the  
8 amphipod.

9 MS. BARGHUSEN: Okay. Thank you.  
10 Okay. Question -- the next question is in the  
11 petition for the proposed chloride standard.

12 In reviewing Table 1, chloride  
13 genus and species mean acute values the four most  
14 sensitive species are listed as the mayfly, the  
15 water flea species, the lamprolaima mussel and the  
16 fingernail clam.

17 So the questions are, some of  
18 these may already be answered, but I'm going to  
19 read them through.

20 Are you aware that the 2011  
21 Gillis report that the toxicities for these  
22 species are significantly lower than the numbers  
23 in Table 1 of the four sensitive species in the  
24 Huff proposal?

1 MR. HUFF: Again, the purpose of our  
2 research was to look at temperature effects on the  
3 toxicity of chloride studies. Gillis's studies  
4 were conducted at 21°C and at a hardness between  
5 95 and 115. So Table 1 the value you're looking  
6 at has already been normalized.

7 MS. BARGHUSEN: And assessing the  
8 toxicity of sodium chloride to the glochidia of  
9 fresh water mussel -- I'm sorry. That's just the  
10 study name. Going onto the next one.

11 Are you aware that the northern  
12 riffleshell, the wavy-rayed lamp mussel and the  
13 fat mucket live in Illinois waters?

14 MR. HUFF: Yes, I am.

15 MS. BARGHUSEN: And have you read as  
16 part of your literature review of the Gillis 2011  
17 report, which is referenced in your literature  
18 review, that the acute threshold for these species  
19 is much lower than the species mean acute value in  
20 Table 1 of the Huff proposal?

21 MR. HUFF: Well, again, we took that  
22 Table 1 from Iowa and then what we tried to do was  
23 plug in our results that were at 10°C into that.  
24 So we didn't try to modify the other data that was



1 in there. On the Gillis study, she tested the  
2 same species in the natural water and obtained an  
3 EC50 that was fourfold higher. The natural water  
4 had higher hardness, the increases in EC50 was  
5 much greater than accounted for for hardness alone  
6 in the natural waters.

7 MS. BARGHUSEN: And did the values  
8 you state in this table reflect the acute mean  
9 values for glochidia and juvenile mussels?

10 MR. HUFF: Again, at 10°C, that work  
11 hasn't been done. So the answer is it hasn't been  
12 established.

13 MS. BARGHUSEN: In your opinion, the  
14 studies such as the two published by Wang, et al,  
15 demonstrate that more stringent chloride  
16 thresholds are necessary to protect all life  
17 stages of these and other mussels.

18 MR. HUFF: Our research again was  
19 focused on the effective temperature. Wang did  
20 not address temperature effects using 23°C for his  
21 test. Wang demonstrated that hardness is a  
22 critical variable on chloride toxicity for fat  
23 mucket, glochidia and juveniles.

24 MS. BARGHUSEN: In the petition for

1 the proposed chloride standard, the US EPA used a  
2 protocol to compute the seasonal water quality  
3 standards for each specific waterbody for ammonia.  
4 It states that the Huff proposal is premised upon  
5 a similar approach to develop winter chloride  
6 standards.

7 My question is, are you aware  
8 how variable the temperatures are across the state  
9 as compared to addressing the seasonal figures for  
10 a specific waterbody? Don't the temperatures in  
11 southern Illinois vary widely from the ones in  
12 northern Illinois?

13 MR. HUFF: So, again, the purpose of  
14 the proposed winter time period was to reflect  
15 when snowfall potential is present. Runoff from  
16 snow melt events where sodium chloride is applied  
17 would have temperatures well below 10°C and the  
18 receiving streams during such events would also be  
19 expected to be less than 10°C. However, I have no  
20 objection to a winter water quality standard that  
21 applies only when the waterbody temperature is at  
22 or below 10°C which would eliminate the concern  
23 over temperature differences across the state.

24 MS. BARGHUSEN: Okay. According to

1 a map presented on the USGS website, there is  
2 softer waters present in southern Illinois when  
3 compared to northern Illinois. The questions are,  
4 are you aware that studies like the two referenced  
5 by Wang have found that softer waters result in  
6 lower chloride toxicities as have been  
7 demonstrated in the fat mucket mussel?

8 MR. HUFF: Yes.

9 MS. BARGHUSEN: And would you agree  
10 that aquatic life will be less protected from  
11 chlorides overall in southern Illinois than  
12 northern Illinois in softer waters?

13 MR. HUFF: If what?

14 MS. BARGHUSEN: Just in general if  
15 there is chlorides in the water.

16 MR. HUFF: If there are chlorides in  
17 the water? So they'd be more sensitive chlorides  
18 in the water because of softer water.

19 MS. BARGHUSEN: In southern  
20 Illinois?

21 MR. HUFF: In southern Illinois.

22 MS. BARGHUSEN: So you agree with  
23 that?

24 MR. HUFF: I agree with what I just

1 said, that they are more susceptible to chloride  
2 in softer water that's present in those streams.

3 MS. BARGHUSEN: Okay. Are you aware  
4 of places mapped as having harder water such as  
5 McHenry County that are using water softeners that  
6 contain chlorides?

7 MR. HUFF: So water softeners are  
8 regenerated with a sodium chloride brine and the  
9 backwash from this regeneration contains high  
10 concentrations of chlorides which would be  
11 predominantly sodium chloride. However, this  
12 source of chlorides, our streams, would not have a  
13 seasonal component. So if the summer water  
14 quality standards are achieved, this source would  
15 not be a factor in determining whether the winter  
16 standards would be achieved. It's not a variable.  
17 It's a relatively constant load to the streams.

18 MS. BARGHUSEN: How did you account  
19 for these variables in your analysis and proposal?

20 MR. HUFF: Our work was directed at  
21 the toxicity of chlorides at colder temperatures  
22 and then we used the results to derive an  
23 alternative winter water quality standard based on  
24 these results. These variables such as water

1 softeners, softer water, are not relevant to  
2 attempting to adjust the current chloride  
3 standards for the lower toxicity at colder  
4 temperatures. We recognize that hardness  
5 particularly plays an important role in chloride  
6 toxicity, but the relationship at colder  
7 temperatures have not yet been established.

8           Until that work is completed, I  
9 believe our cold temperature work offers the best  
10 current signs for adjusting develop -- for  
11 adjusting a winter standard. Once the hardness  
12 work is completed at colder temperatures, the  
13 chloride standard should be revisited. With  
14 respect to the summer standard, the standards  
15 offered with the most recent recommendation from  
16 the US EPA in final form, we recognize there has  
17 been a significant amount of work on chloride  
18 toxicity in warmer temperatures and the proposed  
19 summer limits were offered to begin a discussion  
20 on the appropriate summer limits.

21           MS. BARGHUSEN: All right. It  
22 appears that in the Huff petition and accompanying  
23 materials that fat mucket glochidia were not  
24 tested at 10°C. Why?

1 MR. HUFF: The testing on glochidia  
2 is a relatively new research area. We selected  
3 four species from the 2009 Iowa listing that were  
4 the most sensitive from an acute toxicity point of  
5 view and conducted our research on those.

6 MR. ETTINGER: Then we have if  
7 you're assuming that this adds protection to more  
8 sensitive species, then why are the figures still  
9 so much higher than the ones found for acute  
10 toxicity for glochidia in Gillis and Wang?

11 MR. HUFF: Well, again, I'm not sure  
12 that data has been normalized. It hasn't been run  
13 at 10°C on there. So I think it's like comparing  
14 apples to oranges.

15 MS. BARGHUSEN: Okay. Now, I have  
16 some questions for Dr. Soucek. The first one is  
17 in -- in your testimony you talked about the  
18 chloride toxicity to fingernail clams as well as  
19 two other non-mussel species that were studied.  
20 Your pre-filed testimony indicated a finding that  
21 the fingernail clam did not get relief in terms of  
22 chronic chloride toxicities at the lower  
23 temperature which was 10°C.

24 So the questions are, do you

1 think this means that the lower temperature would  
2 not protect fingernail clams from the chronic  
3 effects of chloride that might be seen at higher  
4 temperatures?

5 MR. SOUCEK: Pardon me. While the  
6 process of developing water quality standards or  
7 criteria uses toxicity test results with a  
8 relatively limited number of species --

9 HEARING OFFICER KLEIN: Sorry.  
10 Mr. Soucek, can you slow down a little bit?

11 MR. SOUCEK: I apologize. I'll  
12 start over. While the process of developing water  
13 quality standards or criteria uses toxicity test  
14 results with the relatively limited number of  
15 species to estimate safe levels for others, I do  
16 not believe it is prudent to use the specific  
17 result of a single test with a single species to  
18 predict specific responses or potential trends in  
19 responses of other distantly related species.

20 Since fingernail clams are not  
21 mussels, which mussels are an order of unionidae,  
22 fingernail clams belong to a different order of  
23 Bivalvia Veneroida. In other words, as different  
24 anatomically as mayflies are from dragon flies or

1 amphipods from decapods or mice are from cats, I  
2 will not be comfortable applying trends in the  
3 result of fingernail clam studies to mussels.

4           Just to further illustrate this  
5 in a 2015 publication we compared the influence of  
6 chloride on nitrate toxicity to genetic strains of  
7 the same species of *hyalella azteca* and amphipod  
8 and found that while varying background chloride  
9 concentration in the dilution water had a very  
10 strong effect on nitrate LC50 for one strain,  
11 about a tenfold change in the LC50, it had no  
12 influence whatsoever on the nitrate LC50 for the  
13 other strain.

14           So these are the same species  
15 and very different -- very different trends in  
16 responses based on water quality. So I think it's  
17 difficult to predict from one species to the other  
18 and particularly from one family -- one order to  
19 another family.

20           MR. ETTINGER: Excuse me. Could I  
21 follow-up on that? Were you finished with your  
22 answer to that part of the question?

23           MR. SOUCEK: Yes.

24           MR. ETTINGER: I'm interested in



1 this study on nitrate and chloride. Could you  
2 describe that a little bit more?

3 MR. SOUCEK: Yeah, we looked at the  
4 influence of background chloride concentration or  
5 relatively low concentrations from 5 mg/L up to  
6 about 100 mg/L and using these genetically  
7 distinct strains of amphipods, so this is the US  
8 lab strain and the Burlington strain, these are  
9 two different -- the two different strains that  
10 are used in most toxicity tests and we looked --  
11 we use these different chloride concentrations in  
12 background dilution water to assess acute and  
13 chronic nitrate toxicity.

14 What we found was that if you  
15 change chloride in the background water from 5  
16 mg/L to about 100 for the one strain of hyalella  
17 you get a change in LC -- in LC50 of about a  
18 tenfold difference, whereas with the other strain  
19 it was basically a flat line. No matter what the  
20 background chloride concentration, the LC50 was  
21 the same for nitrate.

22 MR. ETTINGER: So I'm trying to  
23 understand. So as to some strains, the  
24 combination of nitrate and chloride is more toxic

1 than just chloride alone?

2 MR. SOUCEK: No, it was more a  
3 matter of if the chloride was too low -- so it's  
4 the opposite trend. For the one strain when  
5 chloride was too low, nitrate toxicity was much  
6 higher whereas if chloride got up above 20 up to  
7 100 nitrate toxicity it decreased.

8 MR. ETTINGER: Okay. So chloride  
9 will actually reduce nitrate toxicity in some  
10 cases and the absence of chloride would increase  
11 nitrate toxicity in some cases?

12 MR. SOUCEK: Over the range of  
13 chloride concentrations that we tested.

14 HEARING OFFICER KLEIN: Which are  
15 actually lower than we're looking at here?

16 MR. SOUCEK: Correct.

17 MR. ETTINGER: Thank you.

18 MS. BARGHUSEN: Okay. Moving onto  
19 the next question.

20 How was it decided to limit the  
21 representation of mussels in the 10°C testing  
22 solely to the fingernail clam?

23 MR. SOUCEK: Fingernail clams were  
24 not chosen to represent mussels. They were chosen

1 because that particular species, sphaerium simile,  
2 was previously shown to be sensitive to sodium  
3 chloride in tests conducted in my laboratory,  
4 Soucek, et al, 2011, and it's a species -- it's a  
5 species that I've used on multiple occasions for  
6 toxicity testing.

7 I chose the three species we  
8 used because they were relatively sensitive and I  
9 have worked with them a lot. Introducing a new  
10 variable like cold temperature can make  
11 experiments difficult. So for this study, I  
12 thought it best to work with species with which  
13 I'm familiar.

14 MS. BARGHUSEN: How did you account  
15 for softer waters in different parts of the state  
16 in your findings on mussel species sensitivity?

17 MR. SOUCEK: Again, I did not  
18 conduct any tests with mussel for this study. I  
19 was given sufficient funds to do a relatively  
20 limited number of tests with three chosen species.  
21 We chose a moderately hard water to conduct the  
22 testing with all three species. Having published  
23 a number of papers on the influence of hardness on  
24 major ion toxicity, I'm well-aware of that effect.

1 We simply didn't have the funds to do the testing  
2 on multiple hardness levels.

3 MS. BARGHUSEN: This last one is in  
4 your experience as a toxicologist, is it your  
5 opinion that at 10°C, you would likely see a  
6 similar influence of hardness on chloride  
7 toxicities to mussels as seen at warmer  
8 temperatures?

9 MR. SOUCEK: I would be interested  
10 in conducting studies to determine whether this is  
11 the case. I have not seen data of this sort.  
12 Having worked on major ion toxicities since 2003,  
13 I have observed that while, in general, increasing  
14 hardness ameliorates sodium and salt toxicity to  
15 most species, this is not always the case and the  
16 degree to which it occur varies.

17 Furthermore, different species  
18 respond differently to different salts. We're  
19 talking potassium versus sodium versus magnesium  
20 and making sweeping generalizations is not  
21 prudent. In the absence of any data on the effect  
22 of low testimony on hardness amelioration of salt  
23 toxicity, I would not be comfortable guessing what  
24 might happen.

1 MS. BARGHUSEN: Thank you. And  
2 you're familiar that Wang found the correlation of  
3 mussels and chloride toxicities at warmer  
4 temperatures?

5 MR. SOUCEK: The correlation between  
6 what?

7 MS. BARGHUSEN: I'm sorry. Hardness  
8 and chloride toxicity, that chloride toxicity  
9 varied with hardness at warmer temperatures?  
10 You're familiar with that research?

11 MR. SOUCEK: Yes, I'm familiar with  
12 that. That's been shown with lots of species.

13 MS. BARGHUSEN: Okay. Thank you. I  
14 think that's it. Thank you.

15 MR. SOUCEK: Thank you.

16 HEARING OFFICER KLEIN: Okay. I'll  
17 check on the time here. Do you want to take a  
18 ten-minute break and start up with Sierra Club's  
19 questions?

20 MR. ETTINGER: If you would like to  
21 take a ten-minute break, we can do that.

22 HEARING OFFICER KLEIN: I'm fine  
23 going forward. Everyone can talk? Yeah? Okay.  
24 We can keep going. Mr. Ettinger, you can go

1 ahead.

2 MR. ETTINGER: I guess these quite  
3 aren't on my script, but I kind of want to see  
4 what we're doing here.

5 Do I understand before I ask you  
6 a bunch of questions about months of the year,  
7 that the months of the year proposition is off the  
8 table now and you're going to go back and get us a  
9 new proposal that deals with 10°C?

10 MR. HUFF: Yes.

11 MR. ETTINGER: Okay. So that's off  
12 the table. Then I also heard you say that you  
13 just wanted to begin the discussion as to  
14 offseason temperature standards. We've had some  
15 discussion -- I guess we'll have some discussion  
16 in the future, but is that part of your proposal  
17 anymore?

18 MR. HUFF: Well, I just felt if the  
19 Board was going to open up a proceeding on the  
20 winter chloride, they ought to look at the summer  
21 chloride as well.

22 MR. ETTINGER: I agree they should,  
23 but I'm asking what your proposal is now as  
24 opposed to --

1 MR. HUFF: I have a proposal that in  
2 the petition as is from US EPA their 1988 document  
3 is kind of a starting point.

4 MR. ETTINGER: I guess I'm just --  
5 we're -- it's nice to have discussions. I'm just  
6 trying to figure out what's formally before the  
7 Board and as of right now what's formally before  
8 the Board is a winter proposal that's going to be  
9 modified and a summer proposal based on a 1988 US  
10 EPA document, is that correct?

11 MR. HUFF: Yes, sir.

12 MR. ETTINGER: Okay. Have you -- do  
13 you have any reason to believe that US EPA would  
14 approve a standard based on its 1988 document?

15 MR. HUFF: I have no opinion one way  
16 or the other. I don't have that experience.

17 MR. ETTINGER: Okay. Now, I'll go  
18 to my pre-filed questions.

19 On page three, what is the basis  
20 for your statement that as to impaired waters any  
21 future growth involving additional roadways,  
22 parking lots or driveways will be virtually  
23 impossible?

24 MR. HUFF: As I understand the

1 regulations, a new discharger cannot further  
2 degrade an impaired waterway. So where a stream  
3 has been identified as impaired for chlorides, the  
4 applicant for a new facility would have to offset  
5 the de-icing salt it will need to manage snow and  
6 ice on its property. With the existing  
7 dischargers already committed to implementing best  
8 management practices, additional offsets will need  
9 to be found beyond BMP's already committed to by  
10 the existing dischargers. I think new growth will  
11 find it near impossible and certainty  
12 cost-prohibitive to find chloride offsets to  
13 purchase.

14 MR. ETTINGER: And this is your --  
15 based on your understanding of the current  
16 Pollution Control Board regulations involving  
17 new -- new or increased discharges?

18 MR. HUFF: Yes.

19 MR. ETTINGER: Page four. Please  
20 detail the documents and studies that are the  
21 basis for the conclusion that summer values of  
22 less than 200 mg/L appear to be more important in  
23 supporting benthic communities.

24 MR. HUFF: This is based on personal



1 communication with Steven McCracken of the DuPage  
2 River Salt Creek Workgroup, which is correlated  
3 water quality with the aquatic community quality.  
4 This organization has found that summer chlorides  
5 less than approximately 200 mg/L is important in  
6 maintaining a healthy aquatic community.

7 MR. ETTINGER: And I presume that  
8 some -- that those studies should be considered by  
9 the Board in setting summer standards?

10 MR. HUFF: Was that a question? I'm  
11 sorry.

12 MR. ETTINGER: Well, do you believe  
13 that those studies that you referred to by  
14 Mr. McCracken should be considered when the Board  
15 undertakes to set the summer standard?

16 MR. HUFF: It seems reasonable to  
17 me, yes, sir.

18 MR. ETTINGER: Maybe it appeared  
19 somewhere, but I didn't really see the  
20 mathematical calculation that you used for the  
21 four species. Is that produced somewhere in the  
22 documents?

23 MR. HUFF: At Table 1 and Table 2.

24 MR. ETTINGER: I didn't really see

1 how the formula was run. It's there, though?

2 MR. KLOCEK: But it's going to be  
3 replaced because there are errors with it.

4 MR. ETTINGER: Okay. So we're going  
5 to see a new calculation?

6 MR. KLOCEK: Yes.

7 MR. HUFF: Off the record.

8 HEARING OFFICER KLEIN: We can go  
9 off the record.

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

12 HEARING OFFICER KLEIN: We can go  
13 back on the record.

14 MR. ETTINGER: On page -- on page  
15 13, we ask how is it anticipated that the standard  
16 can be exceeded once every three years on average  
17 will affect NPDES permit writing?

18 MR. HUFF: The intent of this  
19 provision was simply to acknowledge that more  
20 intense storms are occurring and for safety  
21 reasons salt will be necessary to reopen roads and  
22 businesses in larger quantities. I believe the  
23 sole impact would be to not list these receiving  
24 streams as impaired from such events.

1 HEARING OFFICER KLEIN: So you'd  
2 anticipate that dischargers who were not having  
3 these episodic discharges, but were having  
4 continual discharges, would not have different  
5 permit limits than they have now?

6 MR. HUFF: Correct.

7 MR. ETTINGER: Okay. Statement of  
8 reasons. I put down statement of reasons. That's  
9 probably why.

10 On page two, can you elaborate  
11 on why you consider the fact that elevated winter  
12 chloride levels are present in waterways with  
13 moderately impacted aquatic communities "support  
14 the position that elevated winter concentrations  
15 are less destructive to aquatic communities?"

16 MR. HUFF: Our research clearly  
17 demonstrated that temperature is a critical factor  
18 with respect to chloride toxicity. To see if this  
19 finding is supported by actual stream work, I turn  
20 to Steven McCracken of the DuPage River Salt Creek  
21 Workgroup.

22 What their extensive work has  
23 shown is that summer chloride concentrations have  
24 a significant effect on the aquatic community

1 quality while winter chloride concentrations do  
2 not as long as the summer chlorides are down below  
3 that approximately 200 mg/L.

4 MR. ETTINGER: Have you considered  
5 how groundwater discharge into these waterbodies  
6 might be affected by elevated use of chloride in  
7 the winter?

8 MR. HUFF: I'm not quite sure of the  
9 relevance of considering groundwater. We have  
10 monitoring data in the streams. So to the extent  
11 that groundwater is contributing chlorides, it's  
12 picked up in the stream data that was presented in  
13 the Technical Support Document.

14 MR. ETTINGER: Well, let's --

15 MS. BROWN: We have a follow-up.

16 HEARING OFFICER KLEIN: There is a  
17 follow-up.

18 MS. BROWN: Yes. Melissa Brown with  
19 Illinois Environmental Regulatory Group.

20 The McCracken studies that you  
21 have been referencing, are they in the record?

22 MR. HUFF: They are not.

23 MS. BROWN: Will you be able to  
24 provide copies of those studies and put them in

1 the record?

2 MR. HUFF: I believe so. The ones  
3 that have been finalized they're on their website.

4 MS. BROWN: And have those studies  
5 been included in peer reviewed publications?

6 MR. HUFF: Some of that work has  
7 been that I'm aware of, yes.

8 MS. BROWN: Okay.

9 HEARING OFFICER KLEIN: Can you  
10 identify what some of it is has been published?

11 MR. HUFF: I will follow up on that  
12 when I pull that material together.

13 MR. ETTINGER: Thank you. I'll ask  
14 it.

15 What do you consider sufficient  
16 monitoring to determine that streams that are  
17 currently not listed as impaired due to chlorides  
18 are actually unimpaired, as you contend?

19 MR. HUFF: The Agency has encouraged  
20 continuous conductivity monitors to collect better  
21 data with respect to snow melt runoff. This is a  
22 very good approach. As the routine stream  
23 monitoring is bias towards nicer weather, episodic  
24 spikes are easily missed in the winter months.

1 Grab samples are to be collected. Depending upon  
2 the size of the stream, they need to be collected  
3 during or immediately after temperatures warm to  
4 generate sufficient runoff.

5 MR. ETTINGER: With regard to the  
6 Section B of the statement of reasons on page  
7 five, what chronic chloride water quality criteria  
8 are you referring to in the last sentence of  
9 Section B?

10 MR. HUFF: The ones we develop my  
11 point was simply to note our chronic standard is  
12 conservative.

13 MR. ETTINGER: Conservative compared  
14 to what?

15 MR. HUFF: In that we only adjusted  
16 the temperature for the species we tested plus in  
17 the original submittal of three daphnia as well.  
18 So all the rest are still the test results on  
19 toxicity from the 23 to 25°C.

20 MR. ETTINGER: Section D. You raise  
21 the issue of the need for a spring standard for  
22 water temperatures near 15°C.

23 Do you have plans to test  
24 organisms at this temperature and make a proposal

1 for a standard?

2 MR. HUFF: Financial support from  
3 the regulated community will be dependent upon the  
4 outcome of these proceedings. If a winter  
5 standard is not achieved, then there will be  
6 insufficient financial support from the regulated  
7 community to fund additional research.

8 However, if a winter chloride  
9 standard is the outcome of these proceedings, then  
10 I believe there would be sufficient support to  
11 continue to evaluate 15°C and on a personal note,  
12 I will not be involved upon completion of this  
13 proceeding because I'm going to retire.

14 MR. ETTINGER: Can I object to that?  
15 On page six, have you compiled the data to show  
16 that de-icing chloride spikes are less than  
17 96-hour episodic events as stated?

18 MR. HUFF: Section 4 the Technical  
19 Support Document presented data on this question.  
20 In general, the larger the drainage area, the  
21 longer the duration of the spikes, but at lower  
22 concentrations. Smaller streams tend to be  
23 flashier, higher peak, but shorter duration.

24 MR. ETTINGER: Please explain the

1 statement that "If exposure is extended, chronic  
2 effects can be observed, but at higher chloride  
3 concentrations of exposure."

4 MR. HUFF: The higher concentrations  
5 of chloride refers to the 10°C versus the chronic  
6 effects found at 25°C.

7 MR. ETTINGER: Regarding the C.  
8 Dubia 96-hour chronic toxicity testing at 10°C,  
9 did all chronic indicators show no change,  
10 independent of chloride levels?

11 MR. HUFF: Correct.

12 MR. ETTINGER: I'm going to skip  
13 this. I'm going to drop the next given the fact  
14 that the monthly is dead. We did not take into  
15 account -- this is on the Technical Support  
16 Document.

17 Were tests done in anything  
18 other than moderately hard water?

19 MR. HUFF: No.

20 MR. ETTINGER: What is the  
21 definition of moderately hard water that was used,  
22 that we're using here?

23 MR. HUFF: David, can you answer  
24 that?



1 MR. SOUCEK: Yes, the US EPA method  
2 documents for acute toxicity testing I think the  
3 wet testing documents moderately hard water is  
4 between the range of, I believe, 80 to 120.

5 MR. ETTINGER: Section 5.1. Are  
6 there conditions in which chlorides could be  
7 elevated in Illinois streams longer than 35 days?

8 MR. HUFF: If you're talking about  
9 from de-icing practices or just in general?

10 MR. ETTINGER: I'm talking about in  
11 general.

12 MR. HUFF: Oh, absolutely.

13 MR. ETTINGER: What strain of  
14 hyalella is likely to be present in southern  
15 Illinois?

16 MR. HUFF: I'll let David answer  
17 that one.

18 MR. SOUCEK: I have a masters  
19 student Kali Major working in my lab at Natural  
20 History Survey collected hyalella specimens from  
21 Jackson County, Coles, Edgar, Perry, Saline and  
22 Gallatin Counties in Illinois and sequenced their  
23 cytochrome c oxidase 1 genes and published those  
24 results in Major, et al, 2013. All the specimens

1 she collected from those counties in southern  
2 Illinois belong to what she called the flat branch  
3 strain which is genetically distinct from both the  
4 Burlington stain that was used in this study and  
5 the US lab strain, which is the most commonly  
6 tested strain. I then later published a paper in  
7 2015. I described this flat branch strain of  
8 *hyalella azteca* as a new species called *hyalella*  
9 *wellborni*. Just antidotically this species is  
10 widespread throughout central and southern  
11 Illinois.

12 MR. ETTINGER: Are you using this  
13 strain for testing now?

14 MR. SOUCEK: We tried to culture  
15 that one. It was a lot harder to culture in the  
16 laboratory than the other strains are. We tried  
17 to, but we're not currently at this time.

18 MR. ETTINGER: It's just a wild,  
19 southern boy or what's the --

20 MR. SOUCEK: It doesn't reproduce as  
21 much and it can go a couple generations it seems  
22 like and then it just loses vitality.

23 So it's something that I would  
24 like to continue working on because it's a pretty

1 widespread strain, but the other two are much  
2 easier to work with.

3 MR. ETTINGER: I think we're done.

4 HEARING OFFICER KLEIN: Done. All  
5 right. Let's see. 3:20. Let's take a ten-minute  
6 break and then we'll reconvene and figure out how  
7 we want -- where we want to go from there, does  
8 that sound good?

9 MS. MEYERS: Sounds great. Thank  
10 you.

11 HEARING OFFICER KLEIN: Off the  
12 record.

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

16 HEARING OFFICER KLEIN: We can go  
17 back on the record.

18 MR. ETTINGER: I believe  
19 Dr. Skrukruud would go first. So maybe we need to  
20 move you to where the court reporter can hear you  
21 better.

22 MS. BARGHUSEN: Do you want to go --

23 THE COURT REPORTER: How about right  
24 there.

1 HEARING OFFICER KLEIN: Can the  
2 reporter please swear the witness in.

3 WHEREUPON:

4 CINDY SKRUKRUD  
5 called as a witness herein, having been first duly  
6 sworn, deposeth and saith as follows:

7 HEARING OFFICER KLEIN: All right.

8 MR. ETTINGER: Let me say one other  
9 thing. We tendered corrected testimony. There  
10 was one paragraph which I handed to Mr. Klein.  
11 There is one paragraph where we made a correction  
12 and you're free to ask about that, but it has to  
13 do with paragraph five, I believe.

14 HEARING OFFICER KLEIN: Have you  
15 provided a copy to Mr. Huff?

16 MR. ETTINGER: I have not.

17 MS. SKRUKRUD: I can share mine with  
18 him. I gave you a second copy. I can give that  
19 to Jim.

20 HEARING OFFICER KLEIN: All right.  
21 Mr. Huff, that's an amended copy. So if there's  
22 no objection, I will enter the amended testimony  
23 into the record. It's entered. Mr. Huff, you can  
24 proceed.

1 MR. HUFF: Dr. Skrukrud, question  
2 one. Bullet one of your pre-filed testimony  
3 indicates that the petition makes little sense as  
4 applied as it focuses on highway de-icing  
5 practices.

6 Is not highway/pavement de-icing  
7 the primary winter source of chlorides in Illinois  
8 streams.

9 MS. SKRUKRUD: Chlorides from winter  
10 de-icings are a major source of chlorides in  
11 Illinois waters. Bullet one raises the issue that  
12 there are other sources of chloride pollution to  
13 Illinois waters that need to be considered in this  
14 rulemaking including water softener discharges and  
15 discharges from industrial sources like oil fields  
16 and coal mines.

17 As an example, the Pond Creek  
18 Coal Mine in Williamson County is proposing to  
19 discharge 2.7 million gallons per day of  
20 groundwater infiltration into their underground  
21 mine. They're proposing to discharge it into the  
22 Big Muddy River. Discharges would contain an  
23 average of 2,237 mg/L of chloride and 1,940 mg/L  
24 of sulfate.

1 MR. HUFF: So would there be a  
2 seasonal component that a coal mine -- the oil and  
3 gas or water softeners that you've lifted up?

4 MS. SKRUKRUD: No, I don't think  
5 there would be a seasonal component for those.

6 MR. HUFF: So would not they be  
7 controlled by the proposed summer standard then?  
8 If they met the summer standards, would you expect  
9 them to discharge more in the winter?

10 MS. SKRUKRUD: Your question is,  
11 yes, I think they would need to comply with the  
12 summer standards and in terms of changing their  
13 operations, I'm not an expert on coal mines. So I  
14 would just be speculating.

15 MR. HUFF: Okay. That was really  
16 question two. Question six. While acknowledging  
17 the proposed summer quality standards are from the  
18 US EPA, you express concern they are not  
19 restrictive enough.

20 What would you propose for  
21 summer chloride standards and what would be the  
22 impact on the Illinois economy.

23 MS. SKRUKRUD: I don't have a  
24 proposal for the summer standards. As we consider

1 this rulemaking, we need to develop standards  
2 protective of Illinois aquatic species in all life  
3 stages and I have not analyzed the impact on the  
4 Illinois economy.

5 MR. HUFF: That's all the questions  
6 I have for Dr. Skrukrud.

7 HEARING OFFICER KLEIN: Does anyone  
8 else have questions? All right. Ms. Laura  
9 Barghusen -- oh, there is a question.

10 MS. PAPADIMITRIU: Martine, this is  
11 Chairman Papadimitriu. May I ask a few questions?

12 HEARING OFFICER KLEIN: Yes.

13 MS. PAPADIMITRIU: Thank you.  
14 Mr. Huff, good afternoon.

15 MR. HUFF: Good afternoon.

16 MS. PAPADIMITRIU: I have two  
17 questions that you may have covered this morning.  
18 I was at another hearing. So I apologize if this  
19 is duplicative.

20 What is the basis for your  
21 belief that the current chloride standard will not  
22 be achievable in the future?

23 MR. HUFF: So this question is for  
24 me.

1 HEARING OFFICER KLEIN: It's for  
2 Mr. Huff.

3 MR. HUFF: The DuPage River Salt  
4 Creek Workgroup has been implementing best  
5 management practices for over a decade. They are  
6 about 12 years in. They have a very high  
7 participation rate. I believe every municipality  
8 within those drainage basins has implemented best  
9 management practices. If you look at the data  
10 submitted with the Technical Support Document, you  
11 can see maybe a declining trend in chlorides on an  
12 annual basis, but it's -- it's slow-going and you  
13 have these larger storms like what we're  
14 experiencing today that the BMP's aren't going to  
15 be sufficient to cut the salt usage down on those  
16 most intense storms.

17 The BMP's are doing a fine job  
18 on more efficient salt application on an annual  
19 basis, but the streams are just too far away to  
20 achieve a 500 mg/L not-to-exceed basis where they  
21 already have a background chloride, say, on the  
22 order of 200 mg/L and they're spiking up in these  
23 bad storms to like up to 1,500 mg/L.

24 MS. PAPADIMITRIU: Okay. And second



1 question, is it my -- is my understanding correct  
2 that you're seeking a permanent standard?

3 MR. HUFF: Yes.

4 MS. PAPADIMITRIU: In perpetuity?

5 MR. HUFF: Well, I believe chlorides  
6 are like every other pollutant. As we develop  
7 more science, we need to go back and revisit these  
8 and there is a mechanism. There is a triennial  
9 review of the water quality standards. Here, we  
10 really need to do additional temperatures. We  
11 need to do sulfate and -- and hardness testing at  
12 colder temperature and that -- that data has not  
13 been assembled yet. So I would liken these as  
14 almost an interim standard. When that work is  
15 done, then we'll be in a basis to make a more  
16 refined chloride standard.

17 MS. PAPADIMITRIU: So from your  
18 answer, and I don't want to put words in your  
19 mouth, it sounds like a temporary standard, one  
20 longer than three years, but shorter than forever,  
21 might be acceptable to you?

22 MR. HUFF: Absolutely.

23 MS. PAPADIMITRIU: Okay. Thank you.  
24 That's all I have. Thank you.

1 HEARING OFFICER KLEIN: Okay. So we  
2 can move on now to Ms. Barghusen. If the court  
3 reporter can swear her in.

4 WHEREUPON:

5 LAURA BARGHUSEN  
6 called as a witness herein, having been first duly  
7 sworn, deposeth and saith as follows:

8 HEARING OFFICER KLEIN: Ms.  
9 Barghusen, actually, I'm going to backtrack  
10 because I didn't provide Ms. Skrukrud this  
11 opportunity.

12 Was there an opening statement  
13 that you wanted to make.

14 MS. SKRUKRUD: No, that's fine.

15 HEARING OFFICER KLEIN: Sure?

16 MS. SKRUKRUD: Yes.

17 HEARING OFFICER KLEIN: Sorry.

18 Ms. Barghusen, if you have an opening statement,  
19 you can make it now.

20 MS. BARGHUSEN: I do not have an  
21 opening statement.

22 HEARING OFFICER KLEIN: Mr. Huff,  
23 you can proceed to questions.

24 MR. HUFF: Thank you. On page one,

1 you state that a more lenient study for chlorides  
2 would ultimately result in greater pollution in  
3 these waters. The proposed summer chronic  
4 standard is more restrictive than the current  
5 standard. So presumably the statement refers to  
6 the proposed winter standard.

7 As no urban stream in Illinois  
8 currently meets the 500 mg/L chloride standard  
9 during snow melt periods, a condition that has  
10 existed for more than 40 years, can you explain  
11 how the proposal will result in greater pollution  
12 in urban streams.

13 MR. ETTINGER: I'm going to object  
14 to the question as based on a legal conclusion  
15 that's not correct, but, with that, she should do  
16 the best she can.

17 MS. MEYERS: Thank you, Albert.

18 MS. BARGHUSEN: My thought was that  
19 the chlorides would enter the waterways at the  
20 amount permitted, or at least that they could, and  
21 in some cases would and I was also assuming that  
22 people, government and industry would work to meet  
23 a permitted standard and that the standard would  
24 be met.

1 MR. HUFF: Question two. Is the  
2 substance of your testimony that the Illinois  
3 Pollution Control Board should reject the proposed  
4 summer/winter chloride standards and simply  
5 maintain the 500 mg/L chloride standard?

6 MS. MEYERS: I would object to that  
7 as to provide a legal conclusion, but, Laura, if  
8 you want to answer, you can.

9 MS. BARGHUSEN: Yeah, I really am  
10 not suggesting what standard we should use. I'm  
11 merely providing testimony on the current petition  
12 and whether I think it would be protective of  
13 certain creatures that I have studied.

14 MR. HUFF: Question six. On page  
15 four, you also cited a study by Wallace and  
16 Biastoch that found a threshold for diversity in  
17 abundance at chloride concentrations between 50  
18 and 90 mg/L.

19 Did this study look at seasonal  
20 chlorides, maximum chlorides or summer chlorides?

21 MS. BARGHUSEN: This study found  
22 that there was a threshold for diversity in  
23 abundance of macroinvertebrates at chloride levels  
24 between 50 and 90 mg/L. The study consisted of

1 monthly grab sampling. So it was a sample taken  
2 at one specific time at 20 sites across the  
3 Toronto region. The total number of samples taken  
4 was 321. The samples were taken in 2002 and then  
5 again in 2012.

6 So all months were represented  
7 by those samples in those two years. Summary  
8 statistics were then calculated for the study.  
9 The authors report that the median chloride levels  
10 were significantly higher in 2012 at 159 mg/L than  
11 they were in 2002 at which time they were 92 mg/L.  
12 They attributed this to the increasing  
13 salinization of the rivers and stream between  
14 those years. They sampled macroinvertebrates in  
15 2002 and then in 2012 at 51 sites across the same  
16 ten watersheds in the Toronto area during the  
17 months of June to September.

18 At the same time that they  
19 sampled the macroinvertebrates, they took specific  
20 conductance at the sites and then related that to  
21 chloride levels in regressions that they had run  
22 previously so that they could convert the specific  
23 conductance into an estimated chloride level. And  
24 so that data was collected in the June to

1 September months and the chloride levels used were  
2 the ones measured as specific conductance and  
3 converted the chlorides during the  
4 macroinvertebrate sampling at each site.

5           And the reason I included this  
6 study in my testimony is because it raises issues  
7 of community shifts in aquatic life at lower -- at  
8 levels lower than the ones we're considering here  
9 and because it also raises the issue which is  
10 discussed in the same study in the discussion of  
11 seepage of chlorides into soil and groundwater  
12 that then can be released into streams and rivers  
13 all year as groundwater is released raising the  
14 chloride levels all year round and it -- it cites  
15 a study that Williams, et al, did that showed  
16 chloride contamination and groundwater in springs  
17 in the greater Toronto area.

18           And then to quote the threshold  
19 study in a discussion retention of chloride and  
20 groundwater in soils prolongs exposure beyond  
21 winter and early spring and leads to elevated  
22 concentrations during summer when reproduction may  
23 be occurring. And they cite that to another  
24 study, Findlay and Kelly 2011.

1 MR. HUFF: Thank you. Question 8.  
2 In a Gillis article, he noted that the poor  
3 quality of the glochidia survival, 77.4 percent  
4 control, may have impacted the low EC50 that he  
5 reported of a 168 mg Cl-/L and Wang found the EC50  
6 and low hardness water was 441 mg/L.  
7 Significantly higher than Gillis. And those  
8 results were 20 degrees.

9 So is that correct, that  
10 statement, that the Gillis one basically had a  
11 problem with his control that he had in his paper?

12 MS. BARGHUSEN: Yes, I think that  
13 those things that you said are true. However, if  
14 you look at the data that's presented in both the  
15 Gillis paper and in the two papers by Wang, et al,  
16 I think you see really many results that indicate  
17 a low chloride toxicity, acute chloride toxicity,  
18 in mussel glochidia. And from my way of thinking,  
19 the fact that it's repeated over studies gives it  
20 more credibility.

21 So, for example, I can read them  
22 to you. So the acute EC50's, meaning the  
23 concentration with 50 percent of the glochidia are  
24 effectively dead, of mussel glochidia in Gillis,

1 et al, 20 -- or just Gillis, I'm sorry, 2011 and  
2 Wang, et al, 2018, are reported in their  
3 publications as follows.

4 For the fat mucket in 2008,  
5 tested in reconstituted moderately hard water of  
6 95 to 115 mg CaCO<sub>3</sub>/L there was an acute EC<sub>50</sub> of  
7 168 mg Cl<sup>-</sup>/L in glochidia from Cox Creek -- and I  
8 think that's the one you were referencing.

9 MR. HUFF: Right, that's the one  
10 that controls.

11 MS. BARGHUSEN: And then they did  
12 another one where the fat mucket in 2009 tested in  
13 reconstituted moderately hard water of 95 to 115  
14 hardness, the acute EC<sub>50</sub> was 1,430 mg Cl<sup>-</sup>/L from  
15 glochidia from the Maitland River. The Plain  
16 Pocketbook tested in reconstituted moderately hard  
17 water at 817 mg Cl<sup>-</sup>/L. These are acute  
18 toxicities. The wavy-rayed lamp mussel in 2008  
19 tested in reconstituted moderately hard water at  
20 113 mg Cl<sup>-</sup>/L. The wavy-rayed lamp mussel in 2009  
21 tested in reconstituted moderately hard water with  
22 an acute EC<sub>50</sub> of 285 mg Cl<sup>-</sup>/L. The northern  
23 riffleshell tested in reconstituted moderately  
24 hard water with an acute EC<sub>50</sub> of 244 mg Cl<sup>-</sup>/L.



1                   So those were among tests that  
2 Gillis reported and then looking at Wang, et al,  
3 with tests on fat mucket. Glochidia they did it  
4 in moderately hard reconstituted water and got an  
5 EC50 for the glochidia of 728 mg Cl-/L. They also  
6 tested the glochidia at different hardnesses in  
7 the Columbia Environmental Research Center well  
8 water and at 50 degrees hard, as you noted, they  
9 got an EC50 of 441 mg Cl-/L. At 100 hard, they  
10 got an EC50 of 544 mg Cl-/L.

11                   Once they were up to 200 hard,  
12 they got an EC50 of 1,288 mg Cl-/L and once they  
13 were up to 300 hard, they got an EC50 of 1,597 mg  
14 Cl-/L. I think it's important to remember when  
15 considering these that the concentrations at which  
16 half of the test animals effectively die that a  
17 protected standard would presumably have to be  
18 lower than that and that even if you take the very  
19 highest one at 300 hardness, you get a value --  
20 and cut it in half, say, you'd still get a value  
21 of 798.5 mg Cl-/L, which would be still lower than  
22 either the summer or winter acute in the proposal  
23 and you note that -- I think you asked me really  
24 about the poor quality of the glochidia and so I

1 think that the fact that there have been several  
2 tests of acute chronic chloride -- I mean, acute  
3 chloride toxicity in which glochidia from several  
4 different mussel species have repeatedly tested  
5 below the proposed acute winter and summer  
6 standards is relevant and I think -- let's see.  
7 And Gillis -- can you tell me this question number  
8 again? It's eight, right.

9 MR. HUFF: Eight.

10 MS. BARGHUSEN: Eight. Okay. Good.  
11 And Gillis did comment that the natural river  
12 water that she tested did offer more protection  
13 than the reconstituted water. She wasn't sure  
14 exactly why that was. She noted that the natural  
15 river water was harder than the reconstituted  
16 water that's usually used in chloride and other  
17 contaminant testing and that this could be part of  
18 the reason since harder water offers protection,  
19 but she thought that that couldn't really account  
20 for the great difference that she was seeing and  
21 she thought other water chemistry factors might  
22 also have contributed to the reduced toxicity of  
23 chloride in the natural water that she tested.

24 But basically it was unclear why

1 the natural water was affording protection in that  
2 test and she did talk about the advantages of  
3 using reconstituted water in the tests that they  
4 provide consistency. A lot of the tests that are  
5 done are done in reconstituted waters so you can  
6 compare them between tests -- or between studies  
7 and so they permit comparison between studies and  
8 between species and then notes that there is a  
9 disadvantage that they may not necessarily predict  
10 how an organism is going to respond to that  
11 contaminate in its natural environment. She said  
12 on the other hand one disadvantage of natural  
13 water exposure is other contaminants may be  
14 present which can contribute to toxicity. So to  
15 sum up --

16 MR. HUFF: Just -- I'm sorry. I  
17 thought you were done.

18 MS. BARGHUSEN: To sum up, I think  
19 the repeated tests at sort of accepted ways of  
20 testing glochidia in -- through methods that are  
21 often used and repeated tests that are giving  
22 comparatively low chloride toxicities should be  
23 taken into account.

24 MR. HUFF: So you noted that those

1 were lower than the proposed winter toxicity.

2 Were any of those tests done at  
3 colder temperatures or were they all above 20  
4 degrees?

5 MS. BARGHUSEN: Yeah, these tests  
6 were all above 20 degrees.

7 MR. HUFF: So it's really not  
8 appropriate to compare to the winter proposed  
9 standard?

10 MS. BARGHUSEN: Well, I don't know  
11 because they haven't been tested at 10°C.

12 MR. HUFF: Question 14. On page 7,  
13 you describe the translocation of the northern  
14 riffleshell mussels into the Vermillion River.

15 Can you describe the peak  
16 chlorides recorded in this watershed where the  
17 mussels were translocated?

18 MS. BARGHUSEN: No, I have not  
19 studied the chlorides in the Vermilion basin.

20 MR. HUFF: So do you think they  
21 considered that before they translocated those  
22 mussels?

23 MS. MEYERS: Objection. She just  
24 said she wasn't aware.

1 HEARING OFFICER KLEIN: Sustained.

2 MR. HUFF: I have no further  
3 questions. Thank you.

4 HEARING OFFICER KLEIN: Okay. Can  
5 we go off the record real quick.

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

9 HEARING OFFICER KLEIN: Okay. So  
10 during that break, we discussed the next steps for  
11 the hearing. What we have decided is that the  
12 March 6th hearing is going to be canceled. I will  
13 issue a hearing officer order to that effect.  
14 Then I will schedule a prehearing conference in  
15 approximately 30 days at which time we will expect  
16 or see if Mr. Huff has filed a modified proposal  
17 and, if not, then check on the status of that.

18 And if we are far enough long,  
19 schedule -- potentially schedule subsequent  
20 hearings at that prehearing conference.  
21 Tomorrow's continuation is canceled because it is  
22 unnecessary. Today's transcript should be  
23 available sometime next week and it will be  
24 available on COOL, the clerk's online filing

1 system, and it can be viewed and printed by  
2 anybody.

3 Is there anything else that  
4 needs to be addressed at this time? Hearing none,  
5 I would like to thank everyone for braving the  
6 weather and making the trip downtown and  
7 participating in this first hearing and it is now  
8 adjourned. Thank you.

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1 STATE OF ILLINOIS )  
2 ) SS.  
3 COUNTY OF COOK )  
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5 I, Steven Brickey, Certified Shorthand  
6 Reporter, do hereby certify that I reported in  
7 shorthand the proceedings had at the hearing  
8 aforesaid, and that the foregoing is a true,  
9 complete and correct transcript of the proceedings  
10 of said hearing 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 \_\_\_\_\_ day of  
15 \_\_\_\_\_, A.D., 2019.

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<p><b>A</b></p> <p><b>A.D</b> 207:15</p> <p><b>a.m</b> 1:9 4:13</p> <p><b>abbreviated</b> 15:18</p> <p><b>able</b> 31:14 65:18 78:17 79:9 80:22 180:23</p> <p><b>absence</b> 170:10 172:21</p> <p><b>absent</b> 51:4</p> <p><b>absolutely</b> 83:11 115:10 185:12 193:22</p> <p><b>absurdly</b> 95:4</p> <p><b>abundance</b> 147:6 196:17,23</p> <p><b>acceptable</b> 34:6 137:17 193:21</p> <p><b>accepted</b> 3:22 203:19</p> <p><b>accepts</b> 6:8</p> <p><b>access</b> 35:22 40:5</p> <p><b>accessed</b> 34:3 36:10</p> <p><b>accidents</b> 87:5,19</p> <p><b>acclimation</b> 21:10</p> <p><b>accommodation</b> 13:22 143:14</p> <p><b>accompanying</b> 165:22</p> <p><b>account</b> 33:4 37:12 73:7 145:16,17 148:21 150:16 164:18 171:14 184:15 202:19 203:23</p> <p><b>accounted</b> 122:20 161:5</p> <p><b>accounts</b> 35:8</p> <p><b>accurate</b> 24:10 42:5 155:3</p> <p><b>acetates</b> 88:18</p> <p><b>achievable</b> 83:13 191:22</p> <p><b>achieve</b> 12:7 74:5 77:12,21 79:16</p>	<p>141:11 153:17 192:20</p> <p><b>achieved</b> 79:21 83:7 112:12 141:21,23 142:2 164:14,16 183:5</p> <p><b>achieves</b> 141:16 145:5</p> <p><b>achieving</b> 12:10 79:3 153:12,20</p> <p><b>acknowledge</b> 13:17 178:19</p> <p><b>acknowledging</b> 190:16</p> <p><b>acquire</b> 79:9</p> <p><b>ACR</b> 116:14 124:5 124:16,24 125:16 125:18 126:7,10 126:14 129:15,16 129:20,21 130:3,5 130:12</p> <p><b>acronyms</b> 55:14</p> <p><b>act</b> 102:7 139:12 140:19</p> <p><b>action</b> 35:21 151:6</p> <p><b>actual</b> 49:3 105:17 115:24 129:12 179:19</p> <p><b>acute</b> 13:1,12 15:15 16:14,19,24 19:1 19:14,18 23:5 32:11 36:15 38:4 38:23 39:4,4 45:5 46:9,16 53:19,20 55:13 60:14 62:13 64:6,19,23 66:2,4 66:12,15 67:20,24 67:24 68:7,9,16 68:18 69:18 71:3 71:5 72:1 73:15 92:2 106:22 107:2 107:8,12 113:1 116:13 119:12 122:16 123:8 126:1 129:23</p>	<p>130:3 138:5 139:19 140:4 141:12 147:21 156:15,21 157:15 159:13 160:18,19 161:8 166:4,9 169:12 185:2 199:17,22 200:6 200:14,17,22,24 201:22 202:2,2,5</p> <p><b>acute-chronic</b> 72:12,18</p> <p><b>acutely</b> 119:18,23 120:15</p> <p><b>add</b> 3:18 10:19 29:5 54:2,4,4</p> <p><b>added</b> 21:23 44:10 59:24 68:17 89:4 119:23 120:6 152:18</p> <p><b>adding</b> 24:15 38:9 38:23 55:3 59:8 69:2,16</p> <p><b>addition</b> 5:13 11:24 13:10 30:24 50:24 54:13 86:13 89:23 98:15 102:1 139:18</p> <p><b>additional</b> 7:4 25:7 27:16 45:23 52:24 53:10,11,18,20 54:2,2,5,8 80:6 89:21 91:24 92:10 96:8 124:10 175:21 176:8 183:7 193:10</p> <p><b>Additionally</b> 60:6</p> <p><b>address</b> 4:9 10:8 35:23,24 73:10 76:14 88:16 92:21 93:6 100:19 103:20,24 131:23 136:20 145:2 147:1 150:24 161:20</p>	<p><b>addressed</b> 29:17 30:21 206:4</p> <p><b>addresses</b> 91:19</p> <p><b>addressing</b> 70:6 162:9</p> <p><b>adds</b> 166:7</p> <p><b>adequate</b> 89:11</p> <p><b>adjacent</b> 79:1 152:11</p> <p><b>adjourned</b> 206:8</p> <p><b>adjust</b> 130:16 165:2</p> <p><b>adjusted</b> 55:21 61:15,20 62:7 138:10 182:15</p> <p><b>adjusting</b> 165:10 165:11</p> <p><b>adjustment</b> 63:5 119:15</p> <p><b>adjustments</b> 62:24</p> <p><b>Adm</b> 13:1,13 43:21 106:17 140:16</p> <p><b>Administrative</b> 34:2</p> <p><b>admitted</b> 5:15 6:24 35:17</p> <p><b>adopt</b> 111:4 141:2</p> <p><b>adopted</b> 33:14,17 33:21 35:4 44:3,8 47:8 74:10 108:23 110:5</p> <p><b>adopting</b> 33:16 35:7 74:4</p> <p><b>adopts</b> 109:15,24</p> <p><b>adult</b> 18:4 146:5</p> <p><b>adults</b> 21:22,23 22:2</p> <p><b>advanced</b> 81:21</p> <p><b>advances</b> 137:15</p> <p><b>advantages</b> 203:2</p> <p><b>adverse</b> 144:1</p> <p><b>advisor</b> 2:3,5 3:11 3:13 64:1 132:12</p> <p><b>advisors</b> 132:4</p> <p><b>affect</b> 108:24</p>	<p>109:17,18 110:23 178:17</p> <p><b>affording</b> 203:1</p> <p><b>affords</b> 89:11</p> <p><b>aforsaid</b> 207:8</p> <p><b>afternoon</b> 191:14 191:15</p> <p><b>Agency</b> 5:2 39:19 40:9,17 41:5,13 42:3,6,16 43:10 48:7 50:18 67:10 76:3 91:16,22 104:17 105:20 106:12,14 115:5 132:9 181:19</p> <p><b>aggressive</b> 81:14</p> <p><b>aggressively</b> 110:7</p> <p><b>ago</b> 27:10</p> <p><b>agree</b> 12:6 58:23 99:4 111:15 122:16,19 123:19 163:9,22,24 174:22</p> <p><b>agreed</b> 113:16</p> <p><b>agreement</b> 78:12</p> <p><b>agreements</b> 79:10 80:1,6,6,10,17</p> <p><b>agricultural</b> 149:3 149:11</p> <p><b>agriculture</b> 149:19</p> <p><b>ahead</b> 17:13 29:17 34:10 101:20 127:1 151:9 174:1</p> <p><b>Airport</b> 79:2</p> <p><b>al</b> 16:4 17:5 52:8 84:6,7,14 156:21 161:14 171:4 185:24 198:15 199:15 200:1,2 201:2</p> <p><b>Albert</b> 2:10 195:17</p> <p><b>algae</b> 137:3</p> <p><b>Alisa</b> 2:4 3:9 64:5</p> <p><b>alleviate</b> 145:12 146:15</p>
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