BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

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

NOTICE OF FILING

To: John Therriault, Clerk
Marie Tipsord, Hearing Officer
James R. Thompson Center
Illinois Pollution Control Board
100 West Randolph Street, Suite 11-500
Chicago, Illinois 60601

SEE ATTACHED SERVICE LIST

PLEASE TAKE NOTICE that I have filed today with the Illinois Pollution Control Board Illinois EPA's Motion to Preserve Opportunity to Submit Pre-filed Questions for Julia Wozniak and Illinois EPA's Pre-Filed Questions, a copy of which is herewith served upon you.

ILLINOIS ENVIRONMENTAL
PROTECTION AGENCY

By: Deborah J. Williams
Deborah J. Williams
Assistant Counsel

Dated: August 22, 2008
1021 North Grand Avenue East
P.O. Box 19276
Springfield, Illinois 62794-9276
(217) 782-5544

THIS FILING IS SUMBITTED ON RECYCLED PAPER

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

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

MOTION TO PRESERVE OPPORTUNITY TO SUBMIT PRE-FILED QUESTIONS FOR JULIA WOZNIAK

NOW COMES the Proponent, the ILLINOIS ENVIRONMENTAL PROTECTION AGENCY ("Illinois EPA"), by one of its attorneys, and pursuant to 35 Ill. Adm. Code 101.500, 101.502, 101.522, 102.402 and 102.420 moves that the Hearing Officer allow the Illinois EPA to submit its pre-filed questions for Midwest Generation witness Julia Wozniak at such time as the Hearing Officer Orders the filing of pre-filed questions for Midwest Generation witnesses Greg Seegert and Dr. Alan Burton. In support of its Motion, the Illinois EPA states as follows:

1. On May 19, 2008, the Hearing Officer issued an order scheduling additional hearings in this matter for September 8, 9 and 10 and 23, 24 and 25. In addition, a Pre-filed Testimony deadline of August 4, 2008 and a Pre-Filed Question deadline of August 25, 2008 were established.

2. The Metropolitan Water Reclamation District of Greater Chicago filed a Motion to Stay these proceedings on June 12, 2008. On July 21, 2008, the Board denied that Motion and upheld the Pre-filed Testimony and Question deadlines established in the May 19, 2088 Hearing Officer Order.

3. Midwest Generation filed a Motion for Extension of Time to File Pre-filed Testimony of Greg Seegert and Dr. Alan Burton on July 25, 2008. In its Motion, Midwest Generation requested an extension of time until September 8, 2008 to file testimony for these two witnesses. Midwest Generation stated that "this extension is limited in both time and scope... [Midwest Generation] is not seeking an extension of time to file pre-filed testimony of any other witnesses." Motion at pp. 2-3.

4. Midwest Generation's Motion was granted by the Hearing Officer on August 1, 2008. On August 4, 2008, Midwest Generation timely pre-filed testimony of Julia Wozniak. No other testimony has been filed by Midwest Generation to date.

5. In addition to Ms. Wozniak, forty-six (46) pieces of testimony were filed on August 4, 2008 from approximately thirty-nine (39) different witnesses. Simultaneously with this Motion, the Agency is timely filing its pre-filed questions for these witnesses.

6. Ms. Wozniak's testimony and the thirteen (13) Attachments to it overlaps in many respects subject matters that the Illinois EPA expects will also be covered in the key testimony of Greg Seegert and Dr. Alan Burton. Therefore, it would confuse the Record for cross-examination of Ms. Wozniak to occur before testimony has even been filed by Mr. Seegert and Dr. Burton. In addition, it would prejudice the Illinois EPA's case in support of its rulemaking proposal to prepare pre-filed testimony of this one Midwest Generation witness prior to the deadline for submittal of testimony by the other Midwest Generation witnesses on the same subject. For example, any subjects of cross-examination of Ms. Wozniak would be subject to rehabilitation on the same issues in the later testimony. This makes it necessary for the Agency to seek leave from the Hearing

Officer to preserve its right to submit questions of Ms. Wozniak on the same date and time as the Hearing Officer orders the parties to submit pre-filed questions for Midwest Generation's remaining use designation witnesses.

WHEREFORE, for the reasons set forth above, the Illinois EPA moves that the Hearing Officer GRANT the Agency's Motion to preserve the opportunity to submit pre-filed questions for Midwest Generation witness Julia Wozniak until the date the Hearing Officer Orders submittal of Pre-filed Questions for Greg Seegert and Dr. Alan Burton.

Respectfully submitted,
ILLINOIS ENVIRONMENTAL
PROTECTION AGENCY

By: Deborah J. Williams

Deborah J. Williams
Assistant Counsel

Dated: August 22, 2008

1021 North Grand Avenue East
P.O. Box 19276
Springfield, Illinois 62794-9276
(217) 782-5544

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

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

Illinois EPA's Pre-Filed Questions for Kevin J. Boyle, Ph.D.

The Illinois Environmental Protection Agency ("Illinois EPA" or "Agency"), by and through its attorneys, hereby submits its Pre-Filed Questions for Kevin J. Boyle, Ph.D. based on his pre-filed testimony in the above-captioned matter. The Agency reserves the right to ask additional follow-up questions as necessary.

1. Has your approach for calculating economic benefits been used in other states to set water quality standards? If so, what states? And what action did these states take based on this approach?

2. Does your report address any environmental benefits of this rulemaking from improved aquatic life uses?

3. Explain where fishing fits into your analysis. Fishing is a recreational activity and the economic benefits of the proposed recreational uses would be reflected, but does your analysis reflect any economic benefits from improvements in the fish consumption use or from improvements to game fish species from improved aquatic life uses?

4. What is a benefit-function transfer?

5. Explain the difference between a linear and log linear equation?

6. You testify that MWRDGC monitoring data was used to calculate the Water Quality Index improvements of this rulemaking from 6.1 to 6.8.

a. Was this ambient data or effluent data?

b. Did you make these calculations or did someone else?

c. Can you provide the Water Quality Index and resulting calculations for the Record?

d. Do the improvements in the index reflect improvements to fecal coliform concentrations only or do they also reflect projected improvements to the temperature and dissolved oxygen conditions of the waterway?

7. Can you provide a copy for the Record of the 1986 survey of Chicago and surrounding communities' residents that use the CAWS from your report and reference list?

8. Explain your testimony that OMB 2006 Standards and Guidelines for Statistical Surveys says to use a value of 80 percent for the response rate variable? How would use of a different variable change the conclusions of your testimony?

9. Please explain your calculation of the in-person interview variable. Why do you state that your use of a variable of one (1) is consistent with the National Oceanic and Atmospheric Administration's Blue Ribbon Panel recommendations?

10. Explain how the Water Quality Recreational Use variable is calculated or derived?

11. Have you considered the economic costs of recreation-related illnesses in your analysis? Would incorporating these costs result in additional economic benefits from this rulemaking?

12. On page 55 (Exhibit 2) you list the three journal articles you rely on for the Meta-analysis results, the adjustment for potentially over-stated values, and the percent of Chicago Area Waterway System users. Could you provide copies of these articles for the rulemaking Record?

13. You list three guidance documents your analysis is based on or consistent with:

OMB 2003 Guidance on Development of Regulatory Analysis
U.S. EPA's 2000 Guidelines for Preparing Economic Analyses
U.S. EPA's 1995 Interim Economic Guidance for Water Quality Standards

The 1995 U.S. EPA Guidance document is Attachment C to the Statement of Reasons. Are the other two guidance documents in the Record? Can you submit them?

14. Please provide copies for the Record of any additional publications relied on or underlying data used in developing your recommendations that would have to be made available to the public by the Board or the Agency pursuant to the Illinois Administrative Procedure Act, 5 ILCS 100/5-40(b)(3.5).

Respectfully submitted,

ILLINOIS ENVIRONMENTAL
PROTECTION AGENCY

By: Deborah J. Williams

Deborah J. Williams
Assistant Counsel

Dated: August 22, 2008

1021 North Grand Avenue East
P.O. Box 19276
Springfield, Illinois 62794-9276
(217) 782-5544

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

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

Illinois EPA's Pre-Filed Questions for Southeast Environmental Task Force Witnesses Alan Mammoser and Victor Crivello

The Illinois Environmental Protection Agency ("Illinois EPA" or "Agency"), by and through its attorneys, hereby submits its Pre-Filed Questions for Southeast Environmental Task Force Witnesses Alan Mammoser and Victor Crivello based on their pre-filed testimony in the above-captioned matter. The Agency reserves the right to ask additional follow-up questions as necessary.

Pre-filed questions for Victor Crivello

How does the Lake Calumet Vision Committee promote public access and boating on Lake Calumet?

Pre-filed questions for Alan Mammoser

How does the Calumet Area Land Use Plan "focus on the creation of public access through small open spaces to the rivers." (*See* page 4 of pre-filed testimony).

How is disinfection a "key component to the success of the Calumet Area Vision Plan?" (*See* page 7 of testimony).

Respectfully submitted,

ILLINOIS ENVIRONMENTAL
PROTECTION AGENCY

By: Deborah J. Williams

Deborah J. Williams
Assistant Counsel

Dated: August 22, 2008

1021 North Grand Avenue East
P.O. Box 19276
Springfield, Illinois 62794-9276
(217) 782-5544

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

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

Illinois EPA's Pre-Filed Questions for Natural Resources Defense Council Witnesses Marc H. Gorelick, M.D., Marilyn V. Yates, Ph.D. and Peter Orris, M.D., M.P.H.

The Illinois Environmental Protection Agency ("Illinois EPA" or "Agency"), by and through its attorneys, hereby submits its Pre-Filed Questions for Natural Resources Defense Council witnesses Drs. Marc H. Gorelick, Marilyn V. Yates and Peter Orris based on their pre-filed testimony in the above-captioned matter. The Agency reserves the right to ask additional follow-up questions as necessary.

Illinois EPA's Pre-filed questions for Marc Gorelick, M.D. and Peter Orris, M.D., M.P.H.

1. How would someone know if they had contracted an asymptomatic *Giardia* infection from recreational activity and passed it on to their family?

2. What conclusions have you drawn from the Tables you include as Exhibits 3 and 2 (respectively) to your testimonies?

3. Why is a negative epidemiological result more difficult to interpret and apply than a positive one?

4. On page 11 of Dr. Gorelick's testimony it states "This may be especially true when water conditions are thought to be ore hazardous." Did you mean to say "more" hazardous?

5. Why would the District's CHEERS study not fully reflect the potential danger of unintended ingestions and significant exposure to especially vulnerable individuals?

6. Who are you referring to when you say "vulnerable individuals"?

Questions for Marylynn V. Yates, Ph.D.

1. What major cities use disinfection? What smaller communities use disinfection?

2. In your opinion, what were the analytical errors you found with the microbial risk assessment ("MRA") study conducted by MWRDGC?

3. In your opinion, why is MWRDGC's epidemiological study ("CHEERS") not a sufficient tool to assess the need for disinfection? How could the epidemiological study be useful in this rulemaking process?

4. In your opinion, what would be a sufficient number of individuals for sampling in the CHEERS study? If you were to conduct an epidemiological study of the risk to recreators in these waters how would you go about it?

5. Your testimony on page 2 in the second bullet point states, "Previous studies of waterbodies with much lower concentrations of indicator bacteria in the CAWS have demonstrated risk to recreational users from

waterborne pathogens, even absent primary contact ...use." Can you provide citations to some of these studies for the Record?

6. Why do you believe that U.S. EPA's revised bacteria criteria will be more stringent than the current criteria rather than less stringent or simply more targeted to the better indicator organisms?

7. Explain what you mean on page 6 of your testimony when you state that viruses are species specific?

8. Why is Geosyntec's use of the term "enteric viruses" not an accurate characterization of the analysis performed?

9. On page 13 you state "U.S. EPA has in recent years informally applied a standard of 5 times the primary contact standard (sometimes as high as 10 times), or a 1,000 cfu/100mL – in evaluating proposed state standards for recreational waters in which non-primary contact recreation takes place." Do you have an opinion on whether this informally applied standard is appropriate or based in scientific literature? Would you recommend a different non-primary contact numeric ambient water quality standard?

10. You testify that the Agency's fecal coliform general use water quality standard is 30 years old. Do you have an opinion on a better indicator of the presence of pathogenic organisms than fecal coliform, E *coli* or E*nterococci*?

11. On page 20 you state "The process of disinfection itself is not susceptible to fine tuning. Its impact is binary." Please explain this statement.

12. Is it your testimony that the risk levels of 8 in 1,000 illnesses for freshwater and 19 in 1,000 illnesses for marine waters are arbitrary?

13. On page 24 you state that invalid sampling methods were used in MWRD's Dry Weather Risk Assessment. Please explain which sampling methods you think are flawed?

14. On page 26 you list a number of informational gaps in MWRD's Dry Weather Risk Assessment. Have you received answers to fill in these gaps by reviewing additional pre-filed documentation from the District?

15. You testify on page 28, bullet 1 that "people canoeing on clean water are much more likely to be careful to avoid accidental immersion and otherwise behave in a manner unlikely to result in ingestion of water." Do you mean to say contaminated water instead of clean water? Or that they are less likely instead of more likely?

Respectfully submitted,

ILLINOIS ENVIRONMENTAL
PROTECTION AGENCY

By: Deborah J. Williams
Deborah J. Williams
Assistant Counsel

Dated: August 22, 2008

1021 North Grand Avenue East
P.O. Box 19276
Springfield, Illinois 62794-9276
(217) 782-5544

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

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

ILLINOIS EPA'S PRE-FILED QUESTIONS FOR ENVIRONMENTAL LAW AND POLICY CENTER WITNESSES

The Illinois Environmental Protection Agency ("Illinois EPA" or "Agency") by and through its attorneys, hereby files pre-filed questions to Environmental Law and Policy Center regarding the pre-filed testimony of their various witnesses in the above captioned case. The Agency reserves the right to ask additional follow-up questions if necessary.

Questions for Gerald W. Adelmann (Openlands)

1) Can you please give us some names of the waterfowl migrating through this region?
2) On page 2 of your pre-filed testimony you state, "... and will help shape smart growth throughout the Greater Chicagoland area for years to come." How will this proposal help shape "smart growth"?
3) How does Openlands work with local governments to increase the number of available non-motorized boat launches?
4) How is "safe and adequate paddling access" defined?
5) What is the May 2000 CAWS study you cite in your pre-filed testimony?

Questions for Laura Barghusen (Openlands)

1) What local and state agencies do you partner with?
2) What does this partnership consistent of?
3) What is a "water trail"?
4) How do these "water trail" plans get approved?
5) How are the various launches chosen?
6) When do you think the seven proposed launch sites along the stretches of the CAWS and Lower Des Plaines River will be approved?
7) On page 2 of your pre-filed testimony you state, "The Lower Des Plaines River (LDPR) below the confluence of the Chicago Sanitary and Ship Canal (CSSC) is part of the Northeastern Illinois Regional Water Trail Plan. However, it was characterize in 1999 as 'major improvements needed,' ..." What major improvements are needed? Is safety a concern?
8) On page 5 of your pre-filed testimony you state, "These include and unimproved access point ..." What is an "unimproved access point"? Are they safe?
9) On page 8 of your pre-filed testimony you state, "The interest that college and high school rowing teams are showing in using the Calumet-Sag Channel for regattas indicates that this use is very likely

to continue to increase in the future." What information is given to the participants about water quality and safety precautions?

Questions for Dr. David L. Thomas

1) In your opinion, why do you believe it is sensible to determine the highest attainable aquatic use of a waterway by studying the physical characteristics?
2) In your opinion, why do you believe that the QHEI is a sound methodology for assessing physical habitat?
3) Do you know if this methodology is accepted in other states, specifically Region 5 states?
4) Why do you believe that it is a reasonable conclusion that a QHEI score of 60 generally indicates that a waterway can attain the Clean Water Act goal of a balanced indigenous population of fish?
5) What do you mean by "generally?
6) What do you mean when you say you understand the arguments with respect to a QHEI score of 45-60 in that it may be able to meet the Clean Water Act Goal, depending on the particular characteristics of the area?
7) What would those particular characteristics be?
8) Why do you believe that the Upper Dresden Island Pool can support a more balanced and diverse fish population?
9) What experience are you referring to with respect to contaminated sediments?

10) Explain why you state would be "surprised if spawning does not currently take place" in the Use A waters "for those species that are common to the waterway".

Pre-filed questions for Margaret Frisbee

1) On page 3 of you pre-filed testimony you state, "Over the past 11 years, these guides have taken at least 2,640 people canoeing on the North Shore Channel, North Branch of the Chicago River, Main Stem, South Branch, down Bubble Creek and along the Chicago Sanitary and Ship Canal ..." What information do they receive on the water quality? Do you know if any of the guides gotten sick from contact with the water? Do you know if any of the guides had to visit the doctor? Do you know if any guests have gotten sick?
2) On page 5 of your pre-filed testimony you mention, "The Chicago River Agenda ..." Who wrote the report?
3) In your pre-filed testimony you refer to a "state-sanctioned water trails." Please explain what this is.

Respectfully submitted,

Stefanie N. Diers

Dated: August 22, 2008
Illinois Environmental Protection Agency
1021 North Grand Avenue East
Post Office Box 19276
Springfield, Illinois 62794-9276
217-782-5544

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

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

Illinois EPA's Pre-Filed Questions for Corn Products witness Alan J. Jirik

The Illinois Environmental Protection Agency ("Illinois EPA" or "Agency"), by and through its attorneys, hereby submits its Pre-Filed Questions for Corn Products witness Alan J. Jirik based on his pre-filed testimony in the above-captioned matter. The Agency reserves the right to ask additional follow-up questions as necessary.

1. Your testimony indicates that Corn Products uses the waters of the Chicago Sanitary and Ship Canal at its Argo Plant for non-contact cooling purposes.

a. Does Corn Products take intake temperature measurements of these waters? Does Corn Products take effluent temperature measurements? How frequently?

b. What restrictions are placed in Corn Products NPDES permit regarding the effluent temperatures?

2. What proportion of the Argo Plant's effluent is discharged to the CSSC? What portion is sent to MWRDGC for treatment?

3. On page 3 of your testimony, you state that the CSSC is a "relatively recently created artificial man-made channel." Recently created in relation to what?

4. On page 3 of your testimony you state that the CSSC is more like an aqueduct than a natural stream or river. Explain how this is this different from the Chicago River, North Branch Chicago River below North Avenue Turning Basin, South Branch Chicago River, South Fork of South Branch, Brandon Pool, Lake Calumet connecting channel and the CAWS and Brandon Pool Aquatic Life Use B segment of Calumet River? What are the criteria that differentiate an "aqueduct" from a stream?

5. Your testimony states that the CSSC provides a commercially important navigation function. Is this different from the Upper Dresden Island Pool, Brandon Pool, South Branch Chicago River and Cal-Sag Channel?

6. On page 3 of your testimony you state that small boats cannot safely navigate the CSSC due to the wakes from larger boats and barges and recreational users cannot easily exit the water. Is this different from the Brandon Pool or the North and South Branches of the Chicago River? How is it different?

7. Are you aware of the existence of the Western Avenue and Summit Boat launches which allow hand-powered boat access to the CSSC?

8. On page 4 of your testimony you cite to page 36 of the Illinois EPA's Statement of Reasons to support the fact that MWRCGC prohibits wading in the CSSC. Doesn't the Statement of Reasons actually state that "wading is prohibited by MWRDGC on all of the human-made reaches of CAWS, including: North Shore Channel, the upper North Branch Chicago River, CSSC, Calumet-Sag Channel and Lake Calumet"?

9. On page 5 you testify regarding the vertical walls or steep slopes in the CSSC. Wouldn't this also describe the South Branch Chicago River, South Fork of the

South Branch Chicago River, Chicago River and North Branch Chicago River downstream of the North Avenue turning basin?

10. You state on page 6 that "Taken from a biological perspective, the Sanitary & Ship Canal therefore essentially terminates at the fish barrier." Please explain what is meant by this statement?

11. Explain why you believe that the CSSC is sufficiently distinct to support a unique use classification for aquatic life uses? Explain why you believe that the CSSC is sufficiently distinct to support a unique use classification for recreational uses?

12. How would you define the CAWS Use C waters for regulatory purposes?

13. How will you distinguish the CSSC from the reach of North Branch Chicago River that extends from the south end of the North Avenue Turning Basin to its confluence with South Branch Chicago River and Chicago River?

a. From Chicago River?

b. From South Branch Chicago River to its South Fork?

c. From Calumet River from Lake Michigan to Torrence Avenue?

d. From the Lake Calumet Connecting Channel?

e. From the Lower Des Plaines River from its confluence with the CSSC to the Brandon Road Lock and Dam?

14. Will you be proposing language to the Board for aquatic life or recreational uses of the CSSC?

15. You quote from the Board opinion in AS 96-10 to conclude that the Board has recognized the unique character of the CSSC. Did this opinion distinguish the CSSC from the Lower Des Plaines River or South Branch Chicago River?

16. How would your facility be impacted if the electrical generating facilities located upstream were required to add supplemental cooling capacity?

Respectfully submitted,

ILLINOIS ENVIRONMENTAL
PROTECTION AGENCY

By:_____
Deborah J. Williams
Assistant Counsel

Dated: August 22, 2008

1021 North Grand Avenue East
P.O. Box 19276
Springfield, Illinois 62794-9276
(217) 782-5544

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

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

ILLINOIS EPA'S PRE-FILED QUESTIONS FOR ROBERT S. ELVERT

The Illinois Environmental Protection Agency ("Illinois EPA" or "Agency"), by and through its attorney, hereby files the following pre-filed questions to Exxon Mobil regarding the pre-filed testimony of Robert S. Elvert in the above-captioned case. The Agency reserves the right to ask additional follow-up questions if necessary.

1. Can you describe the recreational uses you have observed near the Joliet refinery upstream of the I-55 Bridge?
2. Can you describe the recreational uses you have observed near the Joliet refinery downstream of the I-55 Bridge?
3. Do you believe the current recreational uses of the Lower Des Plaines River represent a security risk at your facility? If so, please state why?
4. Do you believe the current recreational uses of the Lower Des Plaines River represent a safety risk to the recreational user? If so, please state why?
5. Why do believe a change in use from Secondary Contact to Incidental Contact will encourage increased recreational use of the Upper Dresden Island Pool?

6. On page 5 of your testimony you use the term "federally protected Energy facility." What is the definition of this term?

7. On page 5 of your testimony you call the Joliet refinery a "U.S. Coast Guard governed facility." What is the definition of this term?

8. If you are not supporting an incidental contact recreational use designation as proposed by Illinois EPA, what would you propose for the Upper Dresden Island Pool?

9. Where did you get the figures cited on page 3 of your pre-filed testimony?

10. Can you cite in the record where people testified that there would be increased recreational use in the Upper Dresden Island Pool?

11. Please state what your additional safety concerns are?

12. What local and state agencies are you referring to on page 6 of your pre-filed testimony?

13. How do think the Agency could address these concerns in its proposal now before the Board?

14. On page 2 of your pre-filed testimony you state, "... will encourage increased use of the Dresden Pool, and consequently, increased numbers of recreational users may be placed in danger since the Dresden Pool ... is heavily used to navigate barges in and out of the area." Are there fleeting operations in General Use Waters? Do you know how they deal with the safety/security issues that you have brought up? Do you know if they allow boaters to use the waters?

15. On page 4 of your pre-filed testimony you state, "... witnesses indicated that the CAWS and Lower Des Plaines River will continue to see an increased use by canoes, kayaks, and other small watercraft if the proposed rules are adopted." Can you please explain how you came to this conclusion?

16. Would you agree that your safety concerns cannot be addressed in setting water quality standards?

17. On page 3 of your pre-filed testimony you discuss the periodic existence of double barges being 110 feet wide in the areas where the pool is 500 feet wide. Is a clear path of 4/5ths of the waterway, especially around Treats Island and other side stream areas not enough space for hand powered watercraft to avoid the commercial activity in the Upper Dresden Island Pool?

18. Do you have photographs or any other evidence (other than the drowning mentioned in your pre-filed testimony) of small crafts being overwhelmed by the barges in the pool?

19. Was the cited drowning the result of wakes?

20. Is the pool a straight-walled channel or does it have side zones with more gradual banks that buffer or absorb wakes?

21. Is your "specific designated area" demarcated with signs or other warning systems? If so, are the warnings obvious to recreational users?

Respectfully submitted,

Stefanie N. Diers

Dated: August 22, 2008

Illinois Environmental Protection Agency
1021 North Grand Avenue East
Post Office Box 19276
Springfield, Illinois 62794-9276
217-782-5544

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

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

ILLINOIS EPA'S PRE-FILED QUESTIONS FOR JAMES HUFF, P.E.

The Illinois Environmental Protection Agency ("Illinois EPA" or "Agency") by and through its attorneys, hereby files the following pre-filed questions to CITGO Petroleum and PDV Midwest, LLC, regarding the pre-filed testimony of James E. Huff, P.E. in the above-captioned case. The Agency reserves the right to ask additional follow-up questions if necessary.

1) On page 2 of your pre-filed testimony you state that you have reviewed "many" reports submitted into the record, could you please state what reports you are referring to?
2) Are you proposing that the CSSC should be made into its own separate category, how would you describe this new category?
3) What water quality standards would you propose for CSSC?
4) How would you address the violations of the chloride standard during the winter months?
5) Can you please explain how you go about developing a best management practice for chlorides and sulfates in place of winter water quality standards?

6) On page 2 of your pre-filed testimony you state, "I have also evaluated the impact the proposed use designation will have on Citgo and Corn Products." What are the impacts on Citgo and Corn Products?

7) On page 2 of your pre-filed testimony you state, "With the exception of the Lake Calumet Connecting Channel, all of the waterways in this group are natural waterways." Could you define "natural waterway"? In your opinion, are the waterways deep-draft shipping channels with limited habitat?

8) Page 3, paragraph 3 of your pre-filed testimony you state, "There is no other water body in the Chicago Area Waterway System (CAWS) which has the unique physical features, commercial shipping, discharge loadings, and lack of appropriate habitat for aquatic life, as does the Ship Canal." Other than the fact that the Brandon Pool is not in the CAWS, could you describe how the CSSC is different from Brandon Pool?

9) From an aquatic life habitat stand point, how does the CSSC differ from the upper Calumet River? Lower North Branch Chicago River? Chicago River? Upper South Branch Chicago River?

10) On page 2 of your pre-filed testimony you state, "When barges pass, the physical design of the canal functions as a dangerous wave machine that amplifies the wake and creates very large waves when the barges wakes bounce off the vertical walls." In this regard, how does the CSSC differ from the upper Calumet River? From portions of

the North Branch Chicago River and South Branch Chicago River not governed by the no-wake zones?

11) Are you aware of the existence of the Western Avenue and Summit Boat launches, which allow hand-powered boats access to the CSSC?

12) In various parts of your pre-filed testimony you discuss the fish barrier. Doesn't the upper CSSC, upstream of the electrical fish barrier, constitute a waterway link between the Chicago and Calumet River systems, providing for aquatic life movement between the two systems?

13) On page 3 of your pre-filed testimony you state, "A single canoe, sculling or hand powered boat was observed over the 28 days." At the time of the study, were there any operating boat launches in the CSSC?

14) On page 4 of your pre-filed testimony you state, "The safest thing is to keep people out of the water entirely". Does the U.S. Army Corps of Engineers prohibit recreation in and around the electric barrier?

15) On page 7 of your pre-filed testimony you state, "... make two significant assumptions. First, that fish passage even occurs or second fish passage is even desirable." If as you say there is no fish passage, shouldn't we still protect the existing aquatic

community? What about fish that swim from the Calumet system to the Chicago River system and vice versa?

Temperature

1) On page 13 paragraph 1 of your pre-filed testimony you state "In essence, the Agency discounted Mr. Yoder's analysis, and set the non-summer temperatures so that the MWRDGC would not have to install cooling towers." Shouldn't the source of water be the "background" temperature?

2) On pages 4 and 5, of your pre-filed testimony you state, "On an annual average, the municipal treatment plants contribute 70 percent of the total flow exiting the Ship Canal at Lockport." Because 70 percent of the flow is from the municipal treatment plants, aren't these plants the source of water?

3) On page 13 of your pre-filed testimony you state, "the Agency discounted Mr. Yoder's analysis, and set the non-summer temperatures so that the MWRDGC would not have to install cooling towers." Did Mr. Yoder propose limits in his document titled "Temperature Criteria Options for The Lower Des Plaines River" (Exhibit 15)?

4) On page 13 of your pre-filed testimony you state, "No attempt was made to look at the Ship Canal temperatures at the edge of the mixing zones from these industrial discharges." Do any of these facilities have defined mixing zones?

5) On page 13 of your pre-filed testimony you state, "what about the 'optimum' amount of barge traffic for fish (undoubtedly zero)?" Should the Agency ignore the Clean Water Act and restrict barge traffic (a protected use)?

6) On page 14 of your pre-filed testimony you state, "Over the years there appears to be a general increase in its population." Is 100 °F protective for bluntnose minnow? Do believe the current standard will protect the bluntnose minnow? What about the proposed standards? You also state "There is no indication that the bluntnose minnow is being negatively affected by the current temperature regime in the Ship Canal." What evidence did you find that the temperature regime is not impacting the blunt nose minnow?

7) On Page 14 of your pre-filed testimony you state, "If thermal is what is limiting the fish quality/populations, then one should see a dramatic drop in fish diversity, IBI, and fish population at the downstream stations. At Cicero Avenue, immediately below two of the coal-fired power plants, the MWRDGC found the greatest fish diversity (19 species)." When was this sample collected?

8) On page 15, bullet point 1 of your pre-filed testimony you state, "If the bluntnose minnow is as sensitive to temperature as the laboratory studies indicate, why do they represent a significant

portion of the fish population?" Are temperatures in the CSSC the same from beginning to end?

9) Page 15, bullet point 4 of your pre-filed testimony you state, "If all eight fish species already exist in the waterway and are not shown through field collection studies to be negatively impacted by the current temperature regime, then given the documented habitat limitations on the Ship Canal, what benefits will be derived from more restrictive temperature limitations on the Ship Canal?" How have field collection studies shown that the fish species are not negatively impacted by the current temperature regime? What is the minimum amount of scientific information required to prove that aquatic life in CSSC are not being negatively impacted?

10) On your Page 11 of your pre-filed testimony you state that there are two methods for setting thermal water quality standards. Please identify a state that has set thermal water quality standards based solely on field data and what methodology was used?

Respectfully submitted,

Deborah J. Williams, Assistant Counsel

Dated: August 22, 2008
Illinois Environmental Protection Agency
1021 North Grand Avenue East
Post Office Box 19276
Springfield, Illinois 62794-9276
217-782-5544

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

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

ILLINOIS EPA'S PRE-FILED QUESTIONS FOR STEPAN COMPANY'S WITNESSES CARL ADAMS AND ROBIN GARIBAY

The Illinois Environmental Protection Agency ("Illinois EPA" or "Agency") by and through its attorneys, hereby submits pre-filed questions to Stepan Company regarding the pre-filed testimony of their witnesses in the above captioned case. The Agency reserves the right to ask additional follow-up questions if necessary.

1. Explain your analysis specifically with the impacts related to temperature, dissolved oxygen, disinfection?

2. When did you begin this study for Stepan?

3. Who participated in developing the task of this study?

4. What data was provided to you by Stepan for your analysis?

5. What other information did you obtain based on your knowledge and experience in the wastewater field?

6. Who did you consult with at the Millsdale plant to develop your findings?

7. When did you visit the Millsdale plant?

8. When you state that you supervised and requested efforts from

several individuals are you referring to individuals who work at ENVIRON?

9. What is ENVIRON?

10. Mr. Adams can you please explain your role in preparing this study?

11. Robin Garibay can you please explain your role in preparing this study?

12. What was the time period for the 600 results generated to monitor the quality of effluent discharged to the Lower Des Plaines River?

13. How did you come up with the conditions on page 4 of your Exhibit A?

14. Please provide the details of the evaluation you refer to on page 10 of Exhibit A with respect to the effluent bacteria standard proposed by Illinois EPA.

15. On page 11 of Exhibit A, you state the Illinois EPA has not developed the data to assess the assimilative capacity of the Upper Dresden Island Pool water for dissolved oxygen; in your opinion what data would be needed to do such an analysis?

16. What were the cross-media impacts your study found?

17. What is the margin of safety you are referring to in your analysis?

18. What environmental damage would be caused by having Illinois EPA's proposal adopted?

19. When did Stepan begin to evaluate whether additional controls would be necessary to assure compliance with certain metals and salt criteria?

20. What evaluation has been done with respect to this issue?

21. Have any controls been determined? If so, what?

22. What metals are you considered with?

23. Is road salt an issue in winter months for Stepan?

24. Why did your conclusions not address the impact on the river directly?

25. Why have you concluded Stepan will have no mixing zone for temperature?

26. What upstream river temperatures did you assume in drawing this conclusion?

27. On page 3 of your pre-filed testimony you state, "without the option of a mixing zone due to upstream sources of warm effluent and the general nature of the LDPR." What is the general nature of the Lower Des Plaines River that you are referring to in the context of the mixing zone?

28. Do you think Stepan will have trouble meeting both the summer and winter temperatures?

29. On page 4, bullet point 2 of the pre-filed testimony you state, "... engineering will be such that the daily temperature will be at the proposed 'period average temperature standards'. Therefore, the potential Outfall 001 temperature discharge limits are equal to the proposed 'period average temperature standards'. For engineering design, a margin-of-safety of 3°F would be applied." Based on this statement, are you saying that the design of the cooling would be to cool the effluent to 3°F below the period average? Where you aware that the daily maximum during the summer months is 3.6°F above the

period average? At what point does a conservative design become overly conservative?

30. Are both closed circuit and open direct contact cooling towers infeasible?

31. Why are the operational costs so high for the treatment technologies mentioned in your pre-filed testimony?

32. Why are all your emissions figures from electric generators based on coal-fired utilities? Does Stepan get power from the grid? Do you know if Illinois generates as much power from nuclear as from coal?

33. Why do you assume that dissolved oxygen standards will be needed at end of the pipe if they are not needed now to meet 4.0 mg/L?

34. Are you proposing to add dissolved oxygen before the effluent goes through the cooling tower? Wouldn't the process of going through the cooling tower add dissolved oxygen just based on the turbulence?

35. On page 9 of your pre-filed testimony you state, " Hence, installation of a disinfection system to achieve the effluent fecal standards will be required." How much internal dilution is available for the discharge from the septic systems? Is there enough dilution to meet an effluent limit of 400 CFU/100 mL?

36. On page 11 of your pre-filed testimony, you state, "Solid Waste: Generation is significant". Please explain the significant solid waste that would be generated by chlorination/dechlorination?

37. Figure 3 shows compliance with the proposed water quality standard from June through October, however, Figure 4 shows a line where cooling is required to attain discharge limits. Is this an error?

Respectfully submitted,

Stefanie N. Diers

Dated: August 22, 2008

Illinois Environmental Protection Agency
1021 North grand Avenue East
Post Office Box 19276
Springfield, Illinois 62794-9276
217-782-5544

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

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

Illinois EPA's Pre-Filed Questions for the Metropolitan Water Reclamation District of Greater Chicago ("MWRDGC") Witnesses

The Illinois Environmental Protection Agency ("Illinois EPA" or "Agency"), by and through its attorneys, hereby submits its Pre-Filed Questions for the Metropolitan Water Reclamation District of Greater Chicago ("MWRDGC") Witnesses for the September 8, 9 and 10, 2008 hearings in the above-captioned matter. The Agency reserves the right to ask additional follow-up questions as necessary.

Questions for Richard Lanyon

1. You state on page 3 of your testimony that of the 78 miles of the Chicago Area Waterway System ("CAWS"), 57 of those miles are man-made and the other 21 have been "deepened, straightened, and/or widened to such an extent that they no longer resemble a natural river or channel."

a. Do you see a difference in the biological potential of the 57 miles of man made channels and 21 miles of altered channels? Why or why not?

b. Do you see a difference in the recreational use potential between the 57 miles of man-made channels and 21 miles of altered channels? Why or why not?

c. In your opinion is the aquatic life and recreational use potential of the Chicago Sanitary and Ship Canal ("CSSC") different from that of the South Branch Chicago River and its South Fork, the Cal-Sag Channel or other man-made or heavily altered reaches?

2. You describe the features of a natural river on page 5, paragraph 2 of your testimony and explain that the CAWS does not have these natural features. How far downstream does this non-natural waterbody extend?

3. On page 5 of your testimony you state that 70 percent of the annual flow in this system is from the four MWRDGC sewage treatment plants and that dry weather (winter months) flow is virtually 100 percent from these four plants and other sewage treatment plants located on tributaries to the system. Explain the summer discretionary diversions from Lake Michigan. What is allowed and how does that change over time? How does this translate to a percentage of flow? Can the entire allotment be diverted in 1 week? What does the allotment decrease to in 2015?

4. You state in your testimony at the bottom of page 4 that "All outflow exits the CAWS at the Lockport Powerhouse and Lock and Lockport Controlling Works." Does water ever flow out to Lake Michigan? When?

5. On page 5, you testify that the wet weather/summer season flow in the CAWS is made up of 50 percent sewage treatment plant effluent. Of the other 50 percent of the CAWS flow in the summer (or the 30 percent over the year) what portion is made up from discretionary diversions? What portion is wet weather discharges or run off?

6. On page 6, you cite four texts related to the impact of impervious surfaces in the watershed on habitat quality and use attainability and you testify that Cook County has about 42 percent impervious surfaces.

a. How does that compare to the surrounding counties of DuPage, Lake, McHenry, Kane, Kendall and Will. What impact will the City of Chicago's plans for green infrastructure projects have on these figures?

b. Is it your testimony that 42 percent of all runoff to all CAWS waters originates from impervious surfaces? Does this take into account the impervious surfaces that are located in combined sewer areas where wet weather discharges do not reach the CAWS without treatment unless there are combined sewer overflows?

c. Is the reference to 42 percent impervious surfaces based on any data that characterizes the actual impervious component of runoff to the CAWS? If so, could you share the data?

7. You testify on page 8 as follows: "The District's treated wastewater has been demonstrated to have relatively low levels of pathogenic microorganisms." What is the basis for this statement? What are the typical concentrations of pathogenic or indicator organisms in the District's effluent? What would be the level in a typical effluent? Provide the citation or explain the data on which you base this statement.

8. In the second paragraph on page 8 of your pre-filed testimony you make the statement: "Moreover, the pathogenic microorganisms do not thrive well outside the human body and the freshwater's natural disinfection process is aided by exposure to indigenous bacteria and sunlight."

a. Are you suggesting that the best way to deal with pathogens from the District's treatment plants is to disinfect the effluents in situ in waters that experience human recreational use?

b. Can you describe how this method of disinfection would be consistent with the Clean Water Act and with your opinion that the CAWS is not natural?

9. On page 9 you explain that the District is currently averaging 43 days per year of Combined Sewer Overflow ("CSO") discharges. How many discharges or days per year of discharges will be expected after the completion of the Tunnel and Reservoir Project ("TARP")?

10. On page 3 of Attachment 4 to your testimony it states that "the Calumet River extends upstream of the OL&D to Lake Michigan. However, since the Calumet River is directly connected to Lake Michigan, it is not considered part of the CAWS." Is it your testimony that this reach should be left out of this rulemaking? Are there any other reaches the Agency has included in this rulemaking that you believe should be left out?

11. On page 5 of Attachment 4 it states that most of the discretionary diversions occur during the summer except for the North Shore Channel where "Some flow is scheduled throughout the year for the NSC due to more sensitive water quality conditions." What is meant by "more sensitive water quality conditions?"

12. Is it accurate that there are no USGS gauges to monitor enforcement of the discretionary diversion at the O'Brien Lock and Dam or Wilmette Pumping Stations due to lack of funds?

13. On page 10 of your testimony you state that "the District is prepared to take on new challenges to further improve our treatment plant effluent quality and water quality in the CAWS if sound scientific and engineering studies demonstrate feasibility, significant benefit and economic reasonableness."

a. What would be necessary to demonstrate feasibility of an improvement to the District?

b. What is your definition of a significant benefit?

c. How are you defining economic reasonableness in this context?

d. What evidence do you have that improvements in effluent quality will not result in significant benefits?

Questions for William J. Stuba

1) On page 2 of your pre-filed testimony you state that most of the scheduled runs were on Tuesday, Wednesday, and Thursday. What percentage of observations are made on the weekends?

2) Are the given observations representative of the weekends?

3) What percentage of the day are you at each site?

4) On page 3 of your pre-filed testimony you state that primary contact activity has been observed infrequently. How often would primary contact with the water have to happen for the District to consider disinfecting its wastewater?

5) On page 4 of your pre-filed testimony you seem to conclude that there is not a trend toward changing recreational use of the CAWS. Please explain how you come to such a conclusion?

6) It appears that the numbers for the recreational surveys you mention in your pre-filed testimony start in 2005 but your observations began in June 2003, can you please explain why you did not submit data from 2003 and 2004?

Questions for Sam Dennison

Sam Dennison (Bubbly Creek Testimony)

1) Can you please explain the difference you see between South Branch of the Chicago River and the South Fork of the South Branch Chicago River?

2) Is it your opinion that the South Fork of the South Branch Chicago River and the CSSC only differ due to dissolved oxygen levels seen in these two segments?

3) In your opinion, why would flow augmentation not enable the South Fork of the South Branch Chicago River to attain dissolved oxygen standards?

4) Please explain the need for a narrative standard?

5) Would this narrative standard only apply to the South Fork of South Branch Chicago River segment?

6) Do you envision language similar to what was used in the dissolved oxygen General Use rulemaking?

7) If not, is MWRD going to propose language for a narrative standard to the Board? If yes, please provide the proposed language.

8) On page 4 of your pre-filed testimony you state, "... the District measured a sediment oxygen demand (SOD) of 3.64 $g/m^2/day$ at Interstate I-55 ..." on the South Fork of South Branch Chicago River. Are there established criteria or guidelines that indicate sediment condition based on SOD concentrations (e.g., what levels of SOD are considered low, moderate, high?) What were the highest and lowest concentrations and where in the Chicago Area Waterway System were they found?

9) On page 4 of your pre-filed testimony you state regarding South Fork of South Branch Chicago River, "... chemical analysis of the sediments ... have detected

legacy organic contaminants ... (USACE, Chicago District, 2006, Attachment 2)". Is it indicated on pages 3 and 11 of Attachment 2 that sampled sediment does not exceed toxicity criteria established under RCRA or maximum allowable PCB concentrations under the Toxic Substances Control Act?

10) On page 4 of your pre-filed testimony you state, "High phytoplankton levels, sustained by abundant nutrient loads ..." How were "high phytoplankton levels" determined? Are you aware that the median chlorophyll a concentration in South Fork of South Branch Chicago River from January 2004 through May 2007 was 8:8 ug/L?

11) On page 4 of your pre-filed testimony you state for South Fork of South Branch Chicago River, "During 2006, dissolved oxygen was below the IPCB Secondary Contact dissolved oxygen standard ..." How many CSO events occurred in 2006? On pages 10 and 11 of Attachment 2, it is indicated that between 1996 and 2005 overflows at RAPS averaged 14/year, with the highest (21) in 2001 and the lowest (9) in 2005. What were continuous monitoring dissolved oxygen concentrations in South Fork of South Branch Chicago River in 2001 and 2005?

12) On page 5 of your pre-filed testimony you state for South Fork of South Branch Chicago River, "Increasing DO... by the use of artificial controls could make the waterway an 'attractive nuisance' to fish." Should this condition be the overriding factor for not improving any river environment? Could fish avoid the high flow and resulting low dissolved oxygen by re-entering South Branch Chicago River? At what rate does dissolved oxygen decrease throughout South Fork of South Branch Chicago River during CSOs from the Racine Avenue Pump Station?

13) On page 6 of your pre-filed testimony you state, "To this end the District recommends a narrative DO standard be developed that prevents fish kills ..." Are you aware that the U.S. EPA National Criteria Document (1986) included dissolved oxygen concentrations to avoid acute mortality? Is the proposed daily minimum dissolved oxygen standard less restrictive than the current Secondary Contact and Indigenous Aquatic Life Use standard?

14) On page 2 of your pre-filed testimony you state that flow in South Fork of the South Branch Chicago River primarily fluctuates as a result of the Racine Pump Station. How often does that pump station discharge? What is the range in flow values from that station?

15) Do you believe that the Aquatic Life Use potential of the South Fork of South Branch Chicago River is lower than that of the Chicago Sanitary and Ship Canal? Brandon Pool? Please explain through examples or general descriptions of types of aquatic life that could never be attained in South Fork of South Branch Chicago River?

16) You state on page 3 of your pre-field testimony that dissolved oxygen levels are low in dry weather. How low? What is the cause of this situation? Is it reversible? If so, how? If not, why not?

17) On page 4 of your pre-filed testimony you state, for South Fork of South Branch Chicago River, that dissolved oxygen recovery following wet weather events takes longer than in other areas of the CAWS. How much longer? Is this because of the size of the pump station? If not, what is the cause?

18) You state on page 4 of your pre-filed testimony that dissolved oxygen can fall to zero for 3 days during a typical wet weather event. What happens to the aquatic

life during these periods?

19) On page 4 of your pre-filed testimony you indicate that the second highest sediment oxygen demand value obtained by the District was found in South Fork of South Branch Chicago River. Where is the highest?

20) On page 5 your pre-filed testimony you indicate that efforts in 2006 to drawback water at the Racine Avenue Pump Station and send it to the Stickney Plant for treatment demonstrate that flow augmentation will not enable South Fork of South Branch Chicago River to attain the dissolved oxygen standard proposed. Would it result in attainment of the current Secondary Contact Standard in dry weather? If not, please explain why. Would supplemental aeration work alone or would both be necessary?

21) Attachment 2 on pages 11-12 you mention a sediment-capping project at the confluence of South Branch Chicago River and the South Fork of South Branch Chicago River. Can you tell us the status of this project?

22) On page 4 of your pre-filed testimony, you state with regard to South Fork of the South Branch Chicago River that "... chemical analyses of the sediments ... have detected legacy organic contaminants, such as polycyclic aromatic hydrocarbons ... and heavy metals...." What do you mean by legacy and how do you differentiate between legacy and contemporary contaminants?

23) Are the contaminants available to aquatic life? If so, what data do you have and what methodologies did you use to support that the contaminants are available to aquatic life?

24) Are the levels of listed contaminants in South Fork of South Branch Chicago River much different than the levels reported for other reaches of CAWS?

25) On page 5 of your pre-filed testimony you state for South Fork of South Branch Chicago River that "... low levels of DO concentrations prevailed .... during 2006 in spite of the district's efforts to limit stagnation by drawing ... water back through RAPS [Racine Avenue Pump Station]." Isn't supplemental aeration proposed along with flow augmentation to mitigate dissolved oxygen levels below the proposed standards?

26) On page 5 of your pre-filed testimony you state for South Fork of South Branch Chicago River: "Increasing DO...by the use of artificial controls could make the waterway an 'attractive nuisance' to fish." and "Resulting fish kills could create an odor problem that would be offensive to the area residents and would be very difficult to rectify." How long would it take for fish, if they were to die, to become odorous? Is dead fish odor a primary concern in determining appropriate aquatic life uses?

27) Do you know if Racine Avenue Pump Station generated flow would tend to push any fish, if they did die, out of South Fork of South Branch Chicago River?

28) Are you suggesting that it is better to allow lethally low or no dissolved oxygen in South Fork of South Branch Chicago River?

29) On page 5 and 6 of your pre-filed testimony you state regarding flow augmentation in South Fork of South Branch Chicago River: "The proposed high-volume pump station that would be required ... may create a situation of fish colliding with screens (impingement) and/or being sucked into pumps (entrainment), as well." Can you quantify impingement or entrainment situations at the existing SEPA stations?

30) Is it possible and customary to take impingement or entrainment potential into consideration when designing waterway intake pump stations?

Sam Dennison (Dissolved Oxygen Testimony)

1) On page 3 of your pre-filed testimony you state, "Results from the Continuous Monitoring Program show that many waterways in the CAWS do not comply with the DO standards proposed by IEPA." Are you aware that the proposed designated uses for CAWS "A" and "B" waters are below the Clean Water Act goal for aquatic life? Do you believe that use designations should be based on biological potential of the system or on meeting proposed standards?

2) Can you please describe the Winkler titration method mentioned on page 3 of your pre-filed testimony?

3) Why are you of the opinion that additional aeration systems will not increase the fish population in the CAWS?

4) On pages 3-4 of your pre-filed testimony you reference compliance statistics for continuous monitoring stations, with the lowest compliance rates for the proposed dissolved oxygen standards occurring during the years 2005-2007. Why is compliance with the proposal lower at the identified stations than at the other stations?

5) What do you recommend the dissolved oxygen standard be for CAWS Aquatic Life Use A waters? For CAWS and Brandon Pool Aquatic Life Use B waters?

Sam Dennison (Cal-Sag channel Testimony)

1) Please explain why you disagree with the Cal-Sag being classified as CAWS Aquatic Life Use A water?

2) Would you propose a stand alone classification for the Cal-Sag?

3) In your opinion is the Cal-Sag similar to the CSSC? If yes, explain how their similarities.

4) What additional habitat data are you preparing?

5) Why will this information not be completed until 2009?

6) On page 2 of your pre-filed testimony you state, "At Cicero Avenue ... a QHEI score of 37.5 was classified as a poor habitat." Are you aware that the correct score of 47.5 (fair habitat) was provided at the April 2008 hearing?

7) On page 2 of your pre-filed testimony you state, "At Route 83 ... the QHEI score (42) is still in the poor range." Are you aware that the correct QHEI score of 54 (fair habitat) was provided at the April 2008 hearing?

8) On page 2 of your pre-filed testimony you state, "The Calumet-Sag Channel and the Chicago Sanitary and Ship Canal share similar physical characteristics. For example ... each has limited shallow area along its banks ..." Edward Rankin in his report (Attachment R) indicated that "The Cal-Sag channel had QHEI scores in the fair range, largely because of the limestone rubble and coarse materials ... in the littoral areas ... this littoral habitat is not isolated, but occurs along much of the shoreline. This waterway had four positive attributes with the most important being the substrates and shoreline structure. Habitat in the CSSC ranged from poor to very poor. The sites at Lockport, Romeoville and Willow Springs Road were canal-like in nature with steep sides and little functional cover or substrate. The site at Lockport was wider and had some littoral habitat, however, this were very limited in scope and were extremely embedded with silty mucks and sand that were of poor

quality". Can you explain this difference in opinions of these two waterways between MWRDGC and Mr. Rankin?

9) On page 2 of your pre-filed testimony you state, "All of the QHEI scores calculated by the District's Aquatic Ecology and Water Quality Section for the Calumet Sag Channel and the Chicago Sanitary and Ship Canal ... have been in the "poor" range ..." Did all personnel involved go through QHEI training prior to the survey? The referenced MWRDGC reports for the above statement only provide QHEI scores. Individual metric scores are not provided. Could the District provide copies of the QHEI field sheets along with other pertinent field sheets?

10) On page 3 of your pre-filed testimony you state, "According to the Illinois EPA QHEI classification scale ..." This is an Ohio EPA not an Illinois EPA classification scale, correct?

11) On page 3 of your pre-filed testimony you state, "In addition, both the Chicago Sanitary and Ship Canal and the Calumet-Sag Channel are dominated by soft homogenous sediments that are not conducive to a balanced benthic invertebrate community." Has Illinois EPA proposed a designated use that represents a balanced benthic invertebrate community?

12) On page 3 of your pre-filed testimony you state, "In fact, the waterways are both dominated by pollution-tolerant invertebrates ..." How does the current condition of the waterway indicate potential aquatic life conditions?

13) On page 3 of your pre-filed testimony you state, "Since the physical habitats are not substantially different, there is no apparent reason why the Calumet-Sag Channel should not be classified as an Aquatic Life Use B Water, similar to the

Chicago Sanitary and Ship Canal." It appears that the only phycial habitat information provided by the District are QHEI scores. No information on positive and negative habitat attributes are provided as had been included with Mr. Rankin's report (Attachment R). So how was it determined that the physical habitat is not substantially different?

14) On page 3 of your pre-filed testimony you state, "Over the years, there has been extensive land use development (urbanization) in the Calumet-Sag Channel watershed". How many acres of forest preserve are available in this watershed? How many miles of the Calumet-Sag Channel are bordered by forest preserves?

15) On page 4 of your pre-filed testimony you state, "These conditions prevent the waterway from attaining a healthy biological community." What is meant by "healthy"?

16) Do you agree or disagree with the conclusion of the Agency that the Aquatic Life Use potential of the Chicago Sanitary and Ship Canal is lower than the potential of the Cal-Sag Channel?

17) You state that Factor 3 (Human Caused Conditions) is applicable to the Cal-Sag Channel with regard to the Aquatic Life Use A. Can you explain why these conditions cannot be remedied or would cause more environmental damage to correct than to leave in place?

18) You state that Factor 4 (Hydrologic Modifications) is applicable to the Cal-Sag Channel with regard to Aquatic Life Use A. Can you explain why the Channel cannot be restored to its original conditions or operated in such a way that would result in attainment of the use?

19) You state that Factor 5 (Physical Conditions) is applicable to the Cal-Sag Channel with regard to Aquatic Life Use A. Can you explain the applicability of this factor and why it is irreversible in the foreseeable future?

Sam Dennison (Recreational Uses Testimony)

1) You state in your pre-filed testimony an issue regarding decisions that local governments must make to protect their citizens from recreational safety hazards. How does this issue affect the decisions of the District in leasing its property for recreational uses such as boat launches?

2) What types of recreational boating activity should be protected in the Incidental Contact waters but not protected in the Non-Contact waters?

3) Is fishing on the South Fork of South Branch Chicago River occurring? In your opinion is it dangerous? Do humans that fish there need to be protected from potential harm to their health related to this use of the CAWS?

4) You state that the Agency should treat the Calumet River from Lake Michigan to Lake Calumet and the Chicago River mainstem in the same manner for recreational use purposes. Does the Calumet River also have evidence of existing hand-powered recreational boating?

5) On page 4 of your pre-filed testimony you state "The proposed Incidental Contact Recreation use designation for the Chicago Sanitary and Ship Canal is alarmingly inconsistent with Illinois EPA's realistic verbiage describing the CAWS on page 33 in the Statement of Reasons." Does the CSSC from South Branch Chicago River to the confluence with Calumet-Sag Channel have public access facilities, such as

boat rental and/or boat launches? Do these facilities restrict small crafts such as canoes, kayaks, jet skis, etc.?

6) Is there anything preventing canoes or kayaks from entering the Chicago River?

7) Page 4-46 of the CAWS UAA report indicates that sculling and hand-powered boating occur in the Chicago River. To your knowledge are there canoes or kayaks in the Chicago River?

8) On page 2 of your pre-filed testimony you speak about the dangers of how: "... (4) periodic draw downs of the water level cause an unexpected rapid increase in stream velocity ...." Can you quantify the degree to which velocities vary during "draw downs" and describe the reaches in which such velocities rapidly increase and present a hazard to recreational users? Do you disagree with the UAA observations and findings that incidental contact activities occur on these reaches?

9) Are you aware that the Summit and Western Avenue boat launches, which provide access to CSSC, are available to the public and that one is allowed to launch hand-powered paddle boats at these locations?

Questions for Susan O'Connell

1) Many figures have appeared in the various documents submitted and testimony regarding the actual number of CSOs in the CAWS and Lower Des Plaines River. Are the figures contained in your pre-filed testimony the most accurate and current available?

2) How many overflows are expected to occur after the completion of TARP?

3) How many times does an average CSO discharge per year? Can this average be estimated by multiplying the number of days of discharge (among all CSOs) per year by the average number of CSOs discharging on those days, and then dividing that product by the total number of CSOs?

4) Can you tell how many of the overflows you mention on page 2 of your pre-filed testimony occurred during the proposed recreation season?

Questions for Geeta K. Rijal

1. Is Attachment 3 to your testimony is the same as Exhibit 38 in the Record?

2. Your testimony indicates that the District performed various fecal coliform distribution studies to assist the Illinois EPA in determining what the appropriate bacteria water quality standards should be for the study area. (*See* page 2). Do you believe fecal coliform is an appropriate indicator on which to base a water quality standard to protect against pathogenic microorganisms in general or pathogenic bacteria in particular? What indicator would you recommend?

3. What would be an appropriate bacteria water quality standard for the Incidental Contact recreation waters? What about for the Non-contact recreation waters?

4. At the top of page 3 of your pre-filed testimony you conclude that the District's effluent "... was not adversely impacting the microbial quality of the DPR [Des Plaines River] downstream of the junction." What do you mean by "adversely"? Do you believe that the District's effluents "adversely" impact the microbial quality of any CAWS reaches?

5. You also state at the top of page 3 that the Chicago Sanitary and Ship Canal ("CSSC") is comparable in quality to the Des Plaines River with respect to Fecal Coliform concentrations. Does this conclusion include dry weather periods during the recreation season when other dischargers to the Des Plaines River are disinfecting their effluents?

6. With regard to report 07-79 you state on page 3 of your testimony, "The purpose of this study was to determine, from the collected data, whether disinfection of

the effluents from these WRPs would significantly reduce the FC [fecal coliform] load in the receiving streams during wet weather and how the FC concentration in the waterways compares to the effluent disinfection standard proposed in this rulemaking." Was there an effluent disinfection standard being proposed by the Illinois EPA at the time you began this study? If not, how could this be one of its purposes?

7. At the top of page 4 of your pre-filed testimony, you describe a wet versus dry weather study of fecal coliform in the waterways and define "light rain conditions in which no pumping station discharge occurred and heavy rain conditions in which pumping station discharge did occur."

a. Did you review CSO monitoring records and take into consideration whether other CSOs within, outside or upstream of CAWS, besides major pump station discharges, had occurred during "light rain" or "dry weather" events or periods? If not, could you do so?

b. Did you review and take into consideration whether heavier rains were occurring upstream of the CAWS during periods you defined as "light rain" or "dry weather" events or periods? If not, could you do so?

c. Did you review and take into consideration whether the disinfection exemption season for treatment plants upstream of CAWS were responsible for bacteria levels found?

8. On pages 5-6 of your testimony, you state "It is evident from this analysis that disinfection of the North Side and Calumet WRP [Water Reclamation Plant] effluents during wet weather would not improve the CAWS microbiological water quality downstream of these WRPs in terms of compliance with the proposed effluent

standard." If MWRDGC installed disinfection technology at these plants would they function in both wet and dry weather? Wouldn't the proposed effluent standard be met continuously by the District if it installed disinfection technology? Where is compliance with an effluent standard measured?

9. Based on the information you developed in preparing Exhibit 38 (Attachment 3 to your testimony), do you know what the significant sources of fecal coliform are to the Des Plaines River upstream of the CAWS during dry weather? Are the health risks to recreators from non-point sources of fecal coliform bacteria, such as from waterfowl, the same as the risks from raw sewage?

10. Do you have any information that would quantify ratio of non-point source to point sources loads of bacterial contamination in the CAWS? Can you differentiate during dry weather periods between the lingering effects of wet weather and tributary loads? Can you differentiate between CSOs and non-point sources or between CSOs and tributaries?

11. On page 4, paragraph 3 of your testimony, you indicate that "upstream of the North Side WRP" and upstream of CAWS at Albany Avenue the level of bacteria exceeded the proposed effluent limit of 400 CFU/100 mL a significant percentage of the time during heavy rain, light rain and dry weather.

a. How did you ensure that your upstream North Shore Channel samples were not contaminated by backflows of the plant effluent?

b. Did you review CSO monitoring records and take into consideration in your analyses whether other CSOs within, outside or upstream of CAWS, besides

major pump station discharges had occurred during "light rain" or "dry weather" events or periods? If not, could you do so?

c. Did you perform a mass balance of pathogen inputs from Albany Avenue and typical levels of pathogens in disinfected plant effluent to determine if in fact downstream levels of pathogens would fall below your target 400 cfu/100 ml comparison level? If not, would you perform this analysis?

d. Are your reported percentages based on geometric means?

12. Page 4 paragraph 3 of your testimony states, "We observed that upstream of the North Side WRP, fecal coliform densities were greater than the proposed effluent limit of 400 cfu/100 ml 88 percent of the time during heavy rainfalls ..." How is the concentration of fecal coliform in the receiving stream relevant to the technology-based effluent standard? Do you believe that fecal coliform is a good indicator to measure in the receiving stream? Do you believe there is a better measurement than 400 cfu/100ml fecal coliform to show that disinfection is being accomplished in the effluent?

13. On page 4, paragraph 4, you indicate that upstream of the CAWS at Ashland Avenue the level of bacteria exceeded the proposed effluent limit of 400 cfu/100 ml level a significant percentage of the time during heavy rain, light rain and dry weather. You also indicate that these percentages were much reduced "upstream of the Calumet WRP" at Indiana Avenue.

a. How did you ensure that your upstream Little Calumet River samples were not contaminated by backflows of the Calumet plant effluent?

b. Did you review CSO monitoring records and take into consideration whether other CSOs within, outside or upstream of CAWS, besides major pump station

discharges, had occurred during "light rain" or "dry weather" events or periods? If not, could you do so?

c. Did you perform a mass balance of pathogen inputs from Indiana Avenue and typical levels of pathogens in disinfected plant effluent to determine if in fact downstream levels of pathogens would fall below your target 400 CFU/100 ml comparison level? If not, would you perform such an analysis?

14. You state in paragraph 4 on page 5 of your testimony that "Estimated wet weather FC density, with or without disinfection, would not meet proposed effluent standards for at least a distance of 19 miles downstream from the North Side WRP in the North area or 8 miles downstream from the Calumet WRP in the South area." Page 6, paragraph 1 also states that "[disinfection during wet weather] would not improve the CAWS microbiological water quality downstream of these WRPs in terms of compliance with the proposed effluent standard."

a. Why would the stream ever need to meet the proposed effluent standard?

b. Is it your opinion that an appropriate in-stream water quality standard would be 400 cfu/100 ml for fecal coliform?

15. On page 6, paragraph 1 of your pre-filed testimony you state: "During wet weather, even light rainfall periods, the CAWS receive CSO, municipal separate storm water sewer system and non-point bacteria loads that result in elevation of FC concentrations in the CAWS to levels much higher than are observed during dry weather, such that disinfecting WRP effluents will not result in a substantial reduction in FC concentrations in the waterway."

a. Do you have data to support your inclusion of "municipal separate storm sewer system and non-point bacteria loads" in your statement? If so, what is it?

b. When you say "disinfecting WRP effluents will not result in a substantial reduction in FC concentrations in the waterway," do you mean at all times or only during wet weather?

16. Do your conclusions about the Des Plaines River upstream of the CAWS lead you to believe that disinfection by wastewater treatment plants that discharge into that waterbody is unnecessary or inappropriate?

17. You state in your testimony on page 6 that "the proposed disinfection standard should not be adopted until IEPA can demonstrate that reducing fecal coliform in the WRP effluents will result in some public health benefit." How would such a demonstration be successfully made? What evidence do you have that there will be no public health benefit?

18. Please explain Attachment 2 to your testimony. Is it a literature search that you conducted? Did you draft the explanatory text?

19. In Attachment 2 there is a discussion of "regrowth" of bacteria following disinfection. Can you explain this phenomenon?

20. Would disinfection significantly reduce CAWS bacteria concentrations during the dry weather conditions? Do dry weather conditions represent 60 percent of the year?

21. You testify on page 9 (paragraph 1) that "it is difficult to control water quality through disinfection of effluents." Is it your testimony that because disinfection is difficult it should not be required for wastewater treatment plants in Illinois?

Questions for Thomas E. Kunetz, P.E.

1. Is a Master Plan being prepared for the Lemont Plant?
2. Are the District's Master Plans subject to public notice and comment?
3. Were the Use Attainability Analyses for the Chicago Area Waterways and Lower Des Plaines River underway when these Master Plans were being developed?

Questions for Thomas Granato

Aquatic Life Uses and Criteria Testimony

1. What Aquatic Life Use studies should the Board wait for before completion of this rulemaking? When will these studies be completed?

a. When did the District determine that this additional information on aquatic life uses was necessary?

b. Was the Agency notified of your opinion that this additional information was necessary?

c. How will these studies assist the Board in setting designated uses and water quality standards for the CAWS?

d. Will they show that the uses and standards proposed by Illinois EPA are inappropriate? How?

2. When did the District decide to conduct its "Habitat Evaluation and Improvement Study"? Who is conducting this study? When were they hired and when did work begin?

3. In you opinion, how was the approach taken by Illinois EPA insufficient? What is wrong with the indices used?

4. On page 3 you explain that additional information has been collected by the District from 2001-2007 that was not incorporated into the Use Attainability Analysis. Has the data from 2001-2007 collected by MWRDGC been provided to the Board for inclusion in this Record?

5. What is the basis for the statement in your testimony on pages 3-4 that "Essentially it appears that only fish Index of Biotic Integrity (IBI) percentile was used to

classify waterways into Aquatic Life Use A or B"? What role do you believe physical habitat played in the determination?

6. What is meant by the term on page 4 of your testimony "sustainable aquatic populations"?

7. In your opinion, how did Illinois EPA fail to consider the uniqueness of the CAWS?

8. Please explain what you mean when you state that the Agency "has failed to also apply the narrative dissolved oxygen standard that was recently adopted for General Use waters to the CAWS"? Please specify which provisions in the Board's General Use Dissolved Oxygen standard are not included and would be applicable to the CAWS?

9. Please describe the narrative dissolved oxygen standard you envision for South Fork of South Branch Chicago River? Would it apply to other reaches of the CAWS as well?

10. What is the basis for suggesting on page 6 (middle paragraph) of you testimony that the Agency should have a "wet weather standard" or "eliminate the 7-day average" with regard to the dissolved oxygen standard? Why do you suggest eliminating the 7-day average proposed by Illinois EPA? Would the Dissolved Oxygen standard still be protective of the aquatic community without a 7-day average? Would it still be consistent with U.S. EPA's National Criteria Document? What do you base your conclusion on?

11. What are the District's plans for removing or capping sediment in the South Fork of South Branch Chicago River?

12. With regard to cyanide, on page 5, paragraph 3 you state that the proposed standards for the CAWS "are more stringent than General Use waters in Cook County for cyanide." By "General Use waters in Cook County," are you referring to the same waters where the District obtained site-specific water quality standards for cyanide? Do all General Use waters in Cook County have the same cyanide water quality standards?

13. On page 8, paragraph 1 of your aquatic life use testimony you state that the Agency "has ignored the many inherent physical limitations that CAWS has, which prior testimony has shown will prevent the chemical water quality improvements that the Agency seeks from supporting improved aquatic life use."

a. Which physical limitations are you referring to? Which chemical improvements are you referring to?

b. Haven't the proposed use designations for the CAWS taken these limitations into account by proposing aquatic life uses that do not represent attainment of the Clean Water Act aquatic life use goal?

c. If the reversible human impacts in the CAWS are mitigated, will the remaining physical limitations prevent attainment of the proposed Aquatic Life Uses? What do you base your answer on?

14. On page 7 of your testimony you raise the issue of conflicting uses between supplemental aeration and flow augmentation and recreational uses. Which use should have priority in such a conflict?

Recreational uses and standards testimony

1. What necessary studies are you referring to on page 2 of your pre-filed testimony? When would the Board be able to complete this rulemaking if it waits for the studies being conducted by the District related to Recreational Uses to be completed?

2. On page 2 you state that the Agency "requested that the District undertake and support a structured scientific assessment approach designed to evaluate this need, and if necessary, provide the basis for generating numeric water quality standards for the proposed recreational use designations." What do you mean by a "structured scientific assessment approach"?

3. On page 3, paragraph 2 of your pre-filed testimony you state, "CAWS presents many safety issues that may render contact recreational activities such as swimming, wading and hand-powered boating hazardous to individuals." What type of hazards are you referring to?

a. Specify which reaches of CAWS you are referring to for each of these hazardous features and which hazards apply in each reach?

b. You state that "[t]he man-made waterways do not have a substantial shallow area along the banks." Is the Calumet-Sag Channel devoid of shallow areas along the banks?

c. Explain which CAWS reaches experience "rapid increases in stream velocity" due to "draw downs"? What are the velocities and how do these velocities present a hazard to recreational users?

4. You testify on page 4 (paragraph 1) that safety factors are "persuasive grounds for restricting primary and incidental contact recreational activities such as swimming, wading and hand-powered boating in the CAWS."

a. How does the District enforce its policy that prohibits wading from land under its control?

b. Does the District have a policy prohibiting swimming and hand-powered boating for the reaches in which these safety factors apply? Is it possible for members of the public to launch hand-powered paddle boats from the Summit and Western Avenue boat launches on the CSSC?

c. Does the District have the authority to restrict these recreational activities? Does the Illinois EPA?

d. Are you aware of any other states that have used these safety factors in designating recreational uses? Can safety factors be used to eliminate designation of existing recreational uses?

5. On page 4, paragraph 3 you recommend "the following waterways be designated for Non-Contact Recreation, contrary to the proposed standards: the Chicago Sanitary and Ship Canal from the South Branch of the Chicago River to the junction with the Calumet-Sag Channel, the entire Calumet-Sag Channel, the Chicago River, and the South Fork of the South Branch of the Chicago River..." Do any of the listed segments have boat access to them? Do they restrict hand-powered boats?

6. Are you recommending that the following waters remain designated for incidental contact recreation: North Shore Channel, North Branch Chicago River, South Branch Chicago River, Calumet River (from Torrence Avenue to its confluence with

Grand Calumet River and Little Calumet River), Lake Calumet and its Connecting Channel, Grand Calumet River, Little Calumet River (from its confluence with Calumet River and Grand Calumet River to its confluence with Calumet-Sag Channel) and the Upper Dresden Island Pool.

7. In the last paragraph of page 4, continuing on to page 5 of your testimony, you state: "Furthermore, the presence of pathogens is mainly due to secondary loading of the waterway under wet weather conditions from CSOs and other discharges." Explain the meaning of "mainly" and "secondary loading" in this statement. Are pathogens absent except during wet-weather conditions?

8. You testify on page 4 that "the weight of scientific evidence against the proposed 400 fecal coliform cfu/100ml effluent standard is clear and overwhelming."

a. What scientific evidence are you referring to?

b. Do you agree that 400 cfu/100ml is an effective fecal coliform effluent standard to determine if disinfection is occurring properly?

c. What weight of evidence process did you use to reach this conclusion?

9. In paragraph 3 on page 5 it states "Previous testimony regarding the risk assessment study indicated that fecal coliform were not well correlated with presence of pathogens." What indicator organism does the District believe is well correlated with the presence of pathogens? Does disinfection kill pathogens? How does the District know that its seasonal disinfection at the Kirie, Eagan and Hanover Park Plants is working?

10. Explain how, when completed, the District's epidemiological study will be able to be used to develop ambient criteria to protect for incidental contact recreation?

Will it also be useful in developing a standard that's protective of non-contact recreation? Why or why not? Will the study identify which indicator organism is appropriate to protect non-primary contract recreation?

11. When you state on page 6 that "The proposed effluent standard is normally applied to treated wastewater effluents discharged to receiving waters that may be used for drinking water supply, swimming, or shell fishing" what does "may" be used for swimming mean?

a. Do any of MWRDGC's disinfecting facilities discharge to waters used for drinking water supplies? Swimming areas? Shell fishing areas?

b. Is it your opinion that disinfection should not be used at plants discharging to General Use waters generally?

12. Explain what you mean when you say on page 7, "IEPA acknowledges that the results of the CAWS epidemiological study, which is well underway, will provide the necessary scientific basis for protective bacterial water quality standards for the CAWS"? When or where did the Illinois EPA acknowledge that this study "will" provide the "necessary" scientific basis?

13. You testify on page 5, paragraph 3 "that the proposed effluent standard could not be attained in the CAWS..." Does the effluent standard have to be achieved in the receiving stream?

14. Page 6, paragraph 3, states, "USEPA's monitoring methods detect traditional fecal indicators that are not always associated with health risks." Do you know of an indicator that is always associated with health risks?

15. In the same paragraph you proceed to state, "The current rulemaking addresses fecal coliform bacteria, which have been determined by USEPA to be poor predictors of the presence or concentration of pathogens in water." What indicator would the District prefer the Agency to use to ensure that adequate disinfection is achieved? Should the Board consider adopting a technology requirement regarding the concentration and exposure time of chlorine or requiring that UV disinfection be performed for a specific amount of time with a specified wattage of bulb?

16. Page 7, paragraph 2, states, "There is evidence that no disinfection technology can offer a 100 percent guarantee of safe recreational water." Is a 100 percent guarantee of safe recreational water ever an achievable goal? What about a 100 percent guarantee for safe drinking water? Is the lack of perfection a reason not to attempt to make recreation safer?

17. Page 7, paragraph 2, states, "The infrastructure expenditure necessary to achieve a particular effluent fecal coliform level is not an efficient or productive use of limited public resources." How do you define "efficient", "productive" and "limited"? What measure would you recommend for insuring that disinfection is accomplished?

18. Explain the legal basis for the statement on page 8 (paragraph 2) that "These environmental impacts must be weighed when considering the appropriateness of disinfection requirements"? Who performs this weighing of the ancillary impacts?

Questions for Jennifer Wasik

Cyanide Testimony

1. You testify that MWRDGC is recommending a chronic cyanide standard of 10 micrograms per liter or higher. How much higher would you recommend?

2. Will the District be making a proposal for the proposed change?

3. The Agency's proposal would allow for cyanide to be analyzed as either the WAD (weak acid dissociable) or available cyanide forms. Do you agree with this recommendation? What analytical method does MWRDGC use? What cyanide form is reported by MWRDGC?

Sediment and Macroinvertebrate Testimony

1. On page 1 you state that "Twenty-eight of the stations are in the CAWS, whereas the other stations are located in the General Use, shallow draft waterways." Based on Attachments 1 and 2, there appear to be only 26 stations within CAWS reaches that are part of this rulemaking. Could you identify which 28 stations are in the CAWS?

2. You identify on page 2 that the stations in the "Des Plaines River System ... are not relevant to this rulemaking." Are there other waterways in the District's Ambient Water Quality Monitoring Network ("AWQMN") that are not part of this rulemaking?

3. "During biological collections, physical habitat is assessed at four locations at each sampling station: At the beginning and end of a sampling reach, at the side and center of the waterway." (*See* page 2). How long are the sampling reaches? Which side of the waterway is evaluated? How is this determined? Why aren't both sides

evaluated? Do you consider four locations at a site to be representative of the sampling reach?

4. You testify on page 2 that "A sediment evaluation is one component of the habitat assessment process." Describe the other habitat attributes that are assessed and how this assessment is conducted.

5. On page 2 you mention that fine grained sediment increases the probability of contaminant absorption and desorption, thus silt and sand generally support tolerant organisms. Other than the possibility of contamination, are there reasons why tolerant organisms predominate in silt and sand? Do tolerant organisms tend to predominate in uncontaminated silt and sand?

6. On page 3 of your sediment testimony it states that "In the absence of sediment toxicity data, the CAWS UAA report employed sediment screening levels from MacDonald, et al. 2000 in order to identify 'potential problem areas and constituents.'"

a. Do you agree that another sediment quality guideline developed by Morgan was also used?

b. Was the use of these guidelines agreed to by the members of the CAWS UAA work group?

c. Do you know if other possible impacts to aquatic life (such as water quality and habitat) were considered in the development of the Threshold Effects Concentrations (TEC) and Probable Effects Concentrations (PEC) or was it assumed that degraded biological conditions were caused exclusively by sediment contamination?

d. MacDonald, et al (2000) defined TEC as threshold effects concentration below which adverse effects are not expected to occur and PEC as probable effect concentrations above which adverse effects are expected to occur. Based on this, would you agree that potential biological effects in sediments with contaminant concentrations between the TEC and PEC are uncertain?

7. You testify on page 4 of your sediment testimony that "Hester Dendy samples tend to indicate benthic invertebrate taxa that might be present at a given location if there were habitat available."

a. Do Hester Dendy artificial substrate samples indicate taxa that are present when other collection techniques (such as petite ponar grabs) are inadequate to sample substrates such as coarse gravel (16 – 64mm), cobble, boulder or woody debris at a given location?

b. Do you agree that petite ponar grabs are more selective of finer grain substrates such as silt, sand and fine gravel because larger material can interfere with complete jaw closure of the ponar?

c. Is it your testimony that Hester Dendy samples in the CAWS attract macroinvertebrates from outside the CAWS?

d. Do you believe that a sample of macroinvertebrates collected only from fine bottom sediments provides useful indication of overall biological condition in the stream? Do you know of macroinvertebrate indexes that focus solely on samples from fine, bottom sediments in streams?

8. You indicate on page 4 that "Sand and silt dominated sediment throughout the North Shore Channel (NSC), and the depth of fines measured greater than 4 feet at

two stations." Can you identify these two stations? Are both of these stations located in upper or lower North Shore Channel?

9. When you indicate on page 4 that "Toxicity results showed significant lethality from exposure to NSC sediments from one station," are you referring to Foster Avenue?

a. Is it true that there were two samples from this site and only one sample showed a significant difference in percent survival compared to only one of the two control samples?

b. Is it also true that the other sample from this site had a survival of 94 percent? Did percent survival at the other sites on the North Shore Channel range from 79 percent to 96 percent?

c. How many different types (genera/species/taxa) of test organisms were used in these toxicity tests?

d. Are there sources of contaminants located upstream of this station, such as Combined Sewer Overflows or point source dischargers?

10. When you state on page 4 that "Concentrations of trace metals in NSC sediments were generally below the PEC, but most samples exhibited cadmium, copper, lead, nickel and zinc concentrations above the TEC." Are these results comparable with those for the North Shore Channel, as presented in the CAWS UAA (Attachment B to the Agency's Statement of Reasons)?

11. You also state on page 4 that "Oligochaeta was the dominant taxon collected from the NSC." Was this true for all sampling sites for both petite ponar and Hester-Dendy substrate samples? Was it true at Foster Avenue?

12. "Along the North Branch Chicago River (NBCR), sediments were less dominated by fine sediments at the furthest upstream location." (*See* page 4). Is this station located within the CAWS just downstream of the confluence with the North Shore Channel? What station are you referring to on page 4 when you testify that "Depth of fines at this station was as deep as > 5 feet"?

13. According to your testimony on page 5, "Five of six sediment samples from the NBCR during 2005 had PAH concentrations presumed toxic. Generally, trace metal concentrations in sediment samples were either above the PEC or TEC screening levels in all samples." How do these findings compare to those reported in the CAWS UAA (Attachment B to the Statement of Reasons)?

14. You state on page 5 that "Toxicity results showed significant lethality from exposure to Diversey Parkway and Grand Avenue on the North Branch Chicago River."

a. Is it true that there were two samples from both of these stations and that only one sample at each site showed a significant difference in percent survival compared to only one of the two control samples?

b. Is it true that the other samples at these sites had survivals of 86 percent and 93 percent with no significant difference when compared to the control samples?

c. Was survival at Wilson Avenue 84 percent and 93 percent with no significant difference compared to the control samples?

15. When you state on page 5 that "Pollution tolerant aquatic worms were the dominant organisms collected from the deep draft portion of the NBCR" do you mean

that this was true for all sampling sites for both petite ponar and Hester-Dendy substrate samples? Does this include the sites at Diversey Parkway and Grand Avenue?

16. Please indicate where in the record the data is located to support the statement that "Approximately 13 percent of midge specimens collected and examined from Grand Avenue in the North Branch Chicago River during 2002 exhibited head capsule deformities"? What types of deformities were found? What were the percent deformities at other sites in the North Branch Chicago River and North Shore Channel? What species exhibited these deformities?

17. Is the statement on page 5 that "Fine sediments dominated the Chicago River bottom, with 1 – 5 feet depth of fines" based on a physical habitat analysis of the sampling sites (such as QHEI) or the analysis of the petite ponar sediment samples? What was the predominant fine sediment - silt, sand, fine gravel or other?

18. When you state on page 5 that "Analysis of sediments from the Chicago River (main stem) sampling stations showed presumed toxic concentrations of PAHs and polychlorinated biphenyls (PCBs)," are these results comparable to what was reported in the CAWS UAA (Attachment B to the Statement of Reasons)? Did all eight toxicity tests indicate 88 percent to 99 percent survival with no significant difference compared to the control samples?

19. Was it true of both Hester-Dendy substrate and petite ponar samples at both Lake Shore Drive and Wells Street that a "majority of benthic invertebrates collected from the Chicago River were aquatic worms" (see page 5)?

20. You testify on page 5 that "Hester Dendy samples yielded a total of 22 species ...while ponar samples only had 5 species, as would be expected given the high quality lake water in this reach and the poor sediment habitat quality."

a. Of these 22 species how many are considered tolerant and intolerant?

b. Is it true that the Hester-Dendy substrate and petite ponar samples at Wells Street each consisted of more than 90 percent aquatic worms?

c. Did *Gammarus fasciatus* (an intolerant amphipod) make up 56 percent of the population in the Hester-Dendy sample at Lake Shore Drive but only 4 percent at Wells Street? Given the above statement about high quality lake water and poor sediment quality in this reach, how do you explain this decline?

21. On Page 6 of your testimony in reference to the South Fork of the South Branch Chicago River you state that "Tolerant benthic invertebrate taxa comprised over 99 percent ..." Was this true for both Hester-Dendy substrate and petite ponar samples?

22. On page 6 of your testimony in reference to the South Fork of South Branch Chicago River you state that "Sediment toxicity bioassays also confirmed toxicity to *Chironomus tentans* ..." Is it true that samples from 2006 had 66 percent and 75 percent survival and were not significantly different compared to the controls?

23. You testify on page 6 regarding the Sanitary and Ship Canal that "[a]t the three stations further downstream, the channel bottom was often scoured concrete." In your opinion, does this make the habitat better or worse than the areas with large

amounts of fine sediments? Where did the sediment that was scoured from the bottom go?

24. On page 7 of your testimony regarding the Calumet-Sag Channel you state that "The results from physical habitat characterizations in the Calumet-Sag Channel (CSC) clearly show that the sediments lack substrate heterogeneity." Is this statement based on a physical habitat assessment (such as the QHEI) or on the ponar grab samples?

25. On page 7 of your testimony regarding the Calumet-Sag Channel you testify that "Aquatic vegetation was absent during the surveys, except for attached green algae." This is the first mention of aquatic vegetation in your testimony. Was aquatic vegetation present in the other waterways previously discussed?

26. If one of two sediment toxicity tests conducted is significantly different from one control sample but not the other control sample, then would this mean the test was inconclusive? Why was the number of control samples for toxicity tests reduced from two controls to only one?

27. Are you familiar with tiered sediment screening methodologies that take into consideration specific chemical, aquatic life and bioassay lines and weight of evidence approaches to determine the effects of sediments on aquatic life? If so, please describe any such analyses the District has performed.

28. In your opinion, are toxics in sediments biologically available throughout the CAWS to the extent that you would conclude that sediment toxicity would prevent attainment of the aquatic life uses that Illinois EPA proposes for the CAWS?

29. With regard to your macroinvertebrate sampling methods, how deep were petite ponar samples in each of the waterways (side and center)? How deep were Hester-Dendy substrates deployed in the waterways (side and center)?

30. Is it true that *Oligochaeta* were the predominant organism in petite ponar grab samples, making up about 86 percent to 100 percent, from all CAWS sites except for the CSSC at Lockport and South Branch Chicago River? Would you agree that sediment contamination did not seem to make any difference in the relative abundance of *Oligochaeta*?

31. Are you aware that *Oligochaeta* were also the dominant organism in Hester Dendy Substrate samples at several CAWS sites including Grand Calumet River, CSSC, South Fork of South Branch Chicago River, Chicago River, North Branch Chicago River and the North Shore Channel?

32. You have indicated that Hester Dendy substrate samples had more *Ephemeroptera*, *Plecoptera* and *Trichoptera* (EPT) taxa than petite ponar grab samples.

a. How many taxa of *Trichoptera* and *Plecoptera* would you expect to be found in fine sediments such as silt and sand?

b. Is it true that only about nine EPT taxa were found on Hester Dendy substrate samples throughout CAWS from 2001 through 2004? Is it also true that each of these taxa made up les than 1 percent of the population at all sites except one?

c. How does the above information about *Oligochaeta* and EPT taxa in Hester Dendy samples indicate good water quality?

Questions for Christo Pertropoulou

1) You state in your pre-filed testimony the following: "For the last three years I have been the project manager for the Metropolitan Water Reclamation District of Greater Chicago Microbial Risk Assessment Study" and that "I have been intimately involved with every aspect of the MRA study." When you state "The main of objective of the MRA study was to evaluate the human health impact of continuing the current practice of not disinfecting the effluents from the District's North Side, Stickney and Calumet water reclamation plants versus initiating disinfection of the effluent at these three plants" did you formulate that objective?

a. If so, when did you formulate it and what did you base it on?

b. If not, who did formulate it? How did they communicate it to you? When did they communicate it to you?

2. Have you performed risk assessments in the past? Have these assessments evaluated risks attributable to microbial contaminants?

3. Have you performed sampling for microbial contaminants in the past? Which indicators organisms have you sampled and where?

4. Are you an expert in microbial risk assessment? If so, what makes you an expert?

5. You state that dry weather samples were taken in 2005. How did you define your dry weather period?

6. Wet weather samples were taken in the 2006 recreational season. Were any dry weather samples taken in 2006 also? How did you define the wet weather period for sampling purposes?

7. Why were there 75 dry weather samples compared to only 50 wet weather samples?

8. How were the sampling locations chosen?

9. Explain why the dry and wet weather results were integrated?

10. On pages 2 and 3 of your pre- filed testimony you list three specific objectives of the 2005 dry weather sampling. When were these objectives formulated? Who formulated them?

11. On page 3 of your pre-filed testimony you list four specific objectives of the 2006 wet weather sampling. When were these objectives formulated? Who formulated them?

12. The first objective of the wet weather sampling is stated as "Evaluate the impact of the reclamation plan wet weather flow on the microbial quality of the plant outfalls." Please clarify the meaning and intent of this objective?

13. Did you sample at different locations during wet weather than during dry weather? Why?

14. You state on page 4 of your pre-filed testimony that you tested for the "U.S. EPA-approved indicator microorganisms, such as *E. coli*, *Enterococci*, and fecal coliform." What makes these U.S. EPA approved? Where there others besides these three? If so, do you consider the other indicators sampled to be U.S. EPA approved indicators?

15. One of the criteria for selecting pathogens for the MRA study identified on page 4 of your testimony was "There are U.S. EPA-approved methods or laboratory standard operating procedures (SOPs) available for measurement of the selected

pathogens." Did all of the pathogens selected have U.S. EPA approved methods or procedures? If not, which ones did not?

16. Why did you take dry weather measurements at the surface and 1 meter depth, but not take wet weather measurements at these same depths?

17. Why did you notice significant differences in the E. Coli and *Enterococci* results by site during wet weather?

18. You state on page 6 of your pre-filed testimony that *Pseudomonas aeruginosa* is lower in the wet weather outfall samples than in the upstream and downstream samples and that this demonstrates that the source of this organism is not wastewater treatment plant effluent. What do you think the source might be?

19. Explain what you mean by the statement on page 6 of your pre-filed testimony that states, "The results indicate that there are no significant correlations between dry weather fecal coliform indicator bacteria and pathogens. The wet weather results indicate that there is a better correlation between fecal coliform and other indicator bacteria and pathogens."

20. Did you look at whether or not indicator organisms other than fecal coliform had better correlation with pathogens during dry weather?

21. What type of correlation did you find during wet weather between indicator bacteria and pathogens?

22. Do you know why both the Calumet reach and the Calumet outfall as you studied them had lower viable *Giardia* cysts than the Stickney and North Side reaches and outfalls?

23. On page 5 of your pre-filed testimony you state, "... results indicate the concentrations of bacteria, viruses and protozoa in the waterway increased during wet weather conditions." Will the bacteria, viruses and protozoa that are present due to CSOs decrease as CSO flows are decreased or eliminated with the completion of TARP? Will TARP be done in the 8-10 years that the District testifies it will take to build disinfection equipment?

24. On page 6 of your pre-filed testimony you state, "...there Are no significant correlations between dry weather fecal coliform indicator bacteria and other indicator bacteria and pathogens." Did *E. coli* or *Enterococci* have significant correlations with pathogens?

25. Did U.S. EPA provide comments on this study? If so, what were the comments you received? Provide U.S. EPA's comments for the record.

Charles P. Gerba

1. Please explain the difference between an indicator and a pathogen, as those terms are used on page 2 of your pre-filed testimony?

2. What does "enteric" mean?

3. On page 2 of your pre-filed testimony you state, "The indicators selected are those which have been traditionally used and those recommended by the United States Environmental Protection Agency and the World Health Organization for assessment of recreational water quality (NRC, 2004)." Please explain which organisms were chosen because they are traditionally used? Which organisms were chosen because they are recommended by U.S. EPA for assessment of recreational water quality? Which organisms were chosen because they are recommended by the WHO for assessment of recreational water quality?

4. On page 3 of your pre-filed testimony, you state that there are no U.S. EPA approved methods for detecting norovirus even though it is the most common cause of viral diarrhea in the United States. Why? Please explain your method for estimating the norovirus concentration?

5. On pages 3 and 4 of your pre-filed testimony, you state that there are no U.S. EPA approved methods for detecting adenoviruses even though they are the second leading cause of viral diarrhea in children and have been detected in greater concentration in wastewater than any other enteric virus. Why? Please explain your methodology for analyzing adenovirus in wastewater?

6. On page 4 of your pre-filed testimony you state that levels of pathogens found in the CAWS were equal to or lower than values you have observed in other

places with both disinfected and undisinfected effluents. Is it your professional opinion that the common practice of effluent disinfection at wastewater treatment plants in the United States is unwarranted by the science?

7. On page 5 of your pre-filed testimony you state that "Disinfection is warranted in situations where direct human contact in the immediate vicinity of an outfall is possible or where effluent is discharged to areas involving the production of human food." Please define "the immediate vicinity of an outfall"? What do you mean by "areas involving the production of human food."?

8. You state that "it is not clear that wastewater disinfection always yields improved effluent or receiving water quality." Is it your testimony that disinfection should only be required when it is demonstrated to yield water quality improvements?

9. Based on your extensive experience in the field, what indicator organism or organisms would you recommend that U.S. EPA use in the establishment of water quality criteria for the protection of primary and secondary contact recreational activities?

10. On page 5 of your pre-filed testimony you state, "In applying any disinfectant, it is important to strike a balance between risks associated with microbial pathogens and those associated with DBPs." What are the disinfection byproducts of UV disinfection?

11. Page 5 of your pre-filed testimony you state, "Therefore, it is uncertain if disinfection designed to remove indicators can be effective in the removal of pathogens and in the reduction of pathogen risks." Please explain what you mean by this statement.

12. On page 5, of your pre-filed testimony you state: "In applying any disinfectant, it is important to strike a balance between risks associated with microbial pathogens and those associated with DBPs. What methods of disinfection produce DBPs and what specific DBPs are produced?

13. Does ozonation or U.V. light disinfection produce DBPs?

Questions for Keith Tolson

1. On pages 1-2 you testify that "I was responsible for the calculation and interpretation of risks summarized in the April 2008 Geosyntec Report." Please explain your role on this study in more detail.

2. You conclude that the "risks for gastrointestinal illness associated with recreational use of the Chicago Area Waterway are low." What would be a high rate of risk of illness?

3. You also conclude that the risks associated with recreational use of the CAWS are "mainly due to secondary loading of the waterway under wet weather conditions from CSOs and other discharges..." What do you base this conclusion on?

4. How did you go about estimating the dose to the user based on the type of recreational activity on the CAWS? What recreational uses were considered?

5. Explain the difference between "quantitative microbial risk assessment" and "probabilistic microbial risk assessment"?

6. What assumptions were made in your risk assessment study regarding how frequently hand-powered boaters capsize? Have you reviewed the testimony from the June 16, 2008 Board hearing in this matter dedicated to recreational users for consistency with your assumptions? If so, what did you conclude?

7. Why have you concluded that conditions in the CAWS will not be improved by disinfecting the District's effluent?

8. What do you mean when you say you used "state-of-the-science methodology"?

9. What regulatory documents, industry white papers and peer-reviewed literature are you referring to on page 4 of your pre-filed testimony?

10. On page 3 you state that "Recreational survey studies were used to provide insight on the types and frequency of recreational exposure expected in the waterway." Which surveys specifically were used and who conducted them? How many recreators were surveyed? What were the results of these surveys? Did the surveys consider how frequently recreators used the CAWS or whether they fell in?

11. On page 6, paragraph 4 your testimony states that "Disinfection results in effluent pathogen risk decreasing from a low level to essentially zero from the water reclamation plants but has little impact in waterway pathogen concentrations affected by current or past wet weather conditions." Are you relying on the findings and conclusions in Mr. Gerba's testimony to make this statement? As TARP is completed and CSO events happen infrequently, will disinfection have more of an impact on the waterway pathogen concentrations?

12. On page 6, paragraph 3 of your pre-filed testimony you state: "Disinfection of the effluent outfall was predicted to result in a decrease in effluent pathogen loads from the water reclamation plants but have little effect on overall pathogen concentration in the waterway."

a. Does "overall" include wet weather? Does "overall" include dry weather?

b. Please describe and identify the data demonstrating that wastewater treatment plant effluents are not the dominant source of pathogens during the recreation season.

13. On page 7, paragraph 1 states that "Results demonstrate that, although indicator levels are relatively high at the water reclamation plant effluents and at

locations downstream of the plants and the North Branch Pumping Station and Racine Avenue Pumping Station, pathogen levels are generally low." Indicator levels are relatively high compared to what? Pathogen levels are generally low compared to what? Why do you think pathogens levels are low compared to indicator levels?

14. You testify that "Selection of input distributions relied on literature derived sources, site-specific use information and professional judgment." Which of these sources was used to estimate how long a canoeist or kayaker will be out on the water? And how often that person would participate in that activity? And how often an individual would ingest water?

15. On page 4 you testify that "Concentrations of pathogens in the waterway were selected for each simulation from the entire dataset of dry and wet weather samples collected." Does this statement mean that all of the data was used or that portions of it were used?

16. Explain what you mean when you state that "risks to recreational users is low and within the U.S. EPA recommended risk limits for primary contact exposure."

17. You conclude that the Calumet waterway has the lowest illness rate compared to the North Side and Stickney areas of the CAWS. Do you know why this is? Is it related more to the number of recreators, the type of recreation or the pathogen levels used in the assessment?

18. You state on page 5 that "It is important to note that the U.S. EPA has not developed any secondary contact water quality criteria. However, the U.S. EPA has proposed a range of primary contact acceptable risk thresholds and currently has primary contact water quality criteria protective of immersion activities that is based on

an acceptable risk threshold of 8 illnesses per 1,000 swimmers." This 8 in 1,000 risk level is expressed as a water quality criteria *E. coli* value of 126 cfu per 100 ml. What would be a corresponding ambient standard that would be protective of incidental or non-contact recreational uses that occur in the CAWS at the 8 illnesses per 1,000 swimmers risk level?

19. Can you explain how U.S. EPA came up with 8 illnesses per 1,000 swimmers? Do you agree with this risk level? Do you know if they are considering revising this risk level?

20. You testify that the highest risk is based on the proportion of users engaged in the activity and the pathogen load in the waterway segment. What about the length of time or frequency the individual engages in the activity?

21. You use the term "non-point discharges" on page 6 which you give examples of as CSOs, pumping stations and stormwater outfalls. Are these considered point sources under the Clean Water Act? Are they required to obtain NPDES permits?

22. On page 7 you testify that the weather and waterway sampling relied on are representative of the entire recreational year. How was the representativeness of the data determined?

23. Which of the three areas of the CAWS you looked at had the fewest recreators? Which area had the most?

24. Is this the first time you have conducted a risk assessment of illness from bacteriological contamination as opposed to risk from exposure to toxic substances?

25. If I recreate on the North Shore Channel, for example, and my activity is canoeing once per week from June through September, would I have to multiply the risk level by 12 to determine my personal risk from that activity?

Questions for Samuel Dorevitch

1. Page 1, paragraph 1 of your pre-filed testimony states that you are "a medical doctor, with training and board certification in Emergency Medicine and also in Preventative Medicine..." With your training and board certification in Preventative Medicine, would you recommend recreating (swimming, canoeing, etc.) in undisinfected effluent?

2. What scientific data are you referring to on page 2 of your pre-filed testimony?

3. Are you suggesting that the scientific consensus that air pollution causes illness is more settled than the scientific consensus that bacteria and pathogens cause illness?

4. In listing information "one would want to know" your testimony includes the following: "Are rates of illness higher among CAWS recreators compared to recreators doing the same activities on water that do not receive treated wastewater?" and "How does the contribution of water reclamation plants to microbial measures of water quality compare to the contributions of runoff and sewer overflows?" Why is it relevant to your analysis whether the risk to the recreator is from undisinfected effluent or some other source?

5. Another thing "one would want to know" is "Are the pathogens responsible for illness; bacteria, viruses or parasites, which may require different water quality treatment strategies." Why would it matter if one was dealing with a virus instead of bacteria? Explain what would be different about the treatment strategy if the responsible pathogen was a virus rather than bacteria?

6. Another question you pose in your testimony is "If the Pollution Control Board were to establish a water quality standard, rather than a disinfection requirement, is there a microbial water quality level above which risk is unacceptable and below which risk is acceptable."

a. Are you able to recommend such a microbial water quality level to the Board today? If so, what would you recommend? If not, will the CHEERS study result in such a recommendation when complete?

b. Can you identify what organism would be the best indicator for this type of ambient standard?

c. If you do not have a conclusion at this time, do you think you will have one at the conclusion of the CHEERS study?

7. You reference to an outbreak in Tazewell County, was that from immersion in a river or a swimming pool?

8. Explain what you mean by the terms "epidemic" and "outbreak" on page 3 of your testimony in the context of illnesses from recreational activity.

9. Page 3, paragraph 1, states, "Since 1978, the U.S. Centers for Disease Control and Prevention has monitored disease outbreaks linked to water recreation."

a. Are all illnesses reported to this data base?

b. Do all people that get sick, go to a doctor? If you don't go to the doctor, will your illness be included in this data base?

c. Are the outbreaks in the CDC database usually associated with a single swimming pool or bathing beach? How common would it be to identify an "outbreak" over a 78 mile waterway?

10. In your testimony on page 4 you refer to the "quantitative microbial risk assessment" to support your conclusion that immediate action is not necessary to address the risks from recreational activity on the CAWS. Do you understand the basis for the estimated 1 to 2 illnesses per 1,000 uses in that study? Is a "use" a person or an incident of recreating? Do I need to multiply my individual risk by the number of times I use the waterway to determine my individual risk? Have you relied on this study in developing the methodology for the CHEERS study?

11. Will you be assessing the impacts of wading and jetskiing in addition to fishing, boating, rowing and paddling which are listed in your testimony on page 4?

12. You testify that public comment 63 is from Daniel Woltering of WERF. Did you mean to say public comment #66?

13. What waters is the CHEERS study looking at for the General Use recreators group?

14. Can you explain for us how you feel that the CHEERS study will "in several respects, surpass the U.S. EPA's ongoing research about primary contact recreation known as the National Epidemiological and Environmental Assessment of Recreational Water (NEEAR) study"?

15. Can you point to a citation that supports the idea that U.S. EPA places considerable weight on epidemiological studies when establishing environmental standards?

16. When you testify regarding methods of ingestion on page 6, you indicate that capsizing or falling into the water is an "unlikely event". Can you quantify unlikely? Have you reviewed the testimony from the June 16th Pollution Control Board hearing by

recreational users of the CAWS? If so, does this change your opinion about the likelihood of this event?

17. Is it correct that one goal of CHEERS is to quantify how much water exposure occurs from various recreational activities? Could this information be used to review the results or rerun the models from the risk assessment study to determine a more accurate level of risk? How can we rely on the results of Dr. Tolson's model without accurate inputs for these variables?

18. Has U.S. EPA reviewed the methodology and preliminary data from the CHEERS study? If not, do you plan to request a review by US EPA? Will this study be peer-reviewed once completed?

19. What happens if you cannot get 9,330 people to enroll in this study?

20. What causes you to state that your preliminary observations suggest no danger to the health of limited contact recreators on the CAWS?

21. Once this study is completed can the information then be used to establish water quality standards for these waters? If the Board were to wait for completion of your study, would your study alone be sufficient information for the Board to conclude that MWRDGC does not need to disinfect its effluent? Will it be sufficient to establish incidental contact recreation water quality standards?

22. Explain what you mean by the statement "Preliminary analyses of 2007 data show that assumptions regarding the duration of various recreational activities were quite accurate." Were these same assumptions or different ones used in the probabilistic risk assessment?

23. "The conduct of an epidemiological and a risk assessment in tandem is unusual and this opportunity to evaluate the strengths and limitations of risk assessment methods is one reason that there is considerable national interest in applying the final results of this research to the development of water quality regulation." How would this type of information be applicable in the development of water quality regulations?

24. When you identify the participants recruited for CHEERS, are these all new people or could the same individual be included multiple times for different dates of recreational use?

25. On page 8 you state "Inconsistencies between our observations and those of the UAA regarding the frequency of specific recreational activities and the distinction between uses and users are likely due to difference in methodologies." What inconsistencies are you referring to?

26. Have you ever worked on an epidemiological study of gastrointestinal illness? Please identify these studies?

27. Are you also looking for illnesses from ear, nose and throat infections in the CHEERS study?

28. Your letter to Mr. Granato (Attachment 3 to your testimony) indicates that recreational observations were made while recruiting for CHEERS. How many researchers were present during the observation periods? How did they count recreators while simultaneously signing up CHEERS participants?

Questions for Ernest R. Blatchley

1) Why would the conditions of disinfection that are required to yield a low concentration of viable coliform not guarantee a low concentration of microbial pathogens?

2) Is it your testimony that even if waters are disinfected, those who come in contact with the disinfected water can still get sick?

3) How might chlorination/dechlorination or UV irradiation be detrimental to water quality, in terms of bacterial composition?

4) What recent research are you referring to on page 5 of your pre-filed testimony?

5) On page 8 of your pre-filed testimony, you state that it is unlikely that the disinfection process as applied to CSOs or non-point sources will yield substantial reductions in the risk of disease transmission associated with waterborne microbial pathogens. Why is this unlikely?

6) How are you defining "substantial" in this statement?

7) Are some reductions better than none?

8) Why will the performance of UV-based disinfection systems for CSOs be limited by water quality as you mention on page 8?

9) You state in your pre-filed testimony that coliform bacteria are poor indicators of disinfection efficacy. Is this because they are easy to kill (or inactivate) with chlorine? What would be a good indicator of disinfection efficacy?

10) You state in your pre-filed testimony on page 5 that "conventional" disinfection technology "systems deliver modest disinfectant doses, and accomplish

modest microbial inactivation." Please give an example of an effluent limitation that would provide for more than "modest" microbial inactivation?

11) On page 5 of your pre-filed testimony you state that "it appears the long-term effects of chlorination/dechlorination or UV irradiation may actually be detrimental to water quality, in terms of bacterial composition". Please explain this conclusion.

12) Define "minimal improvements in viral composition" and "control of protozoan pathogens may also be quite minimal" as you use these phrases on page 5 of your testimony. What disinfection technologies are most effective at dealing with viruses and protozoa?

13) Are you suggesting that viruses will be more prevalent in the CAWS if MWRDGC installs disinfection than they are currently? In the conclusion to your testimony (page 9) you state that compliance with the 400 cfu/100 ml fecal coliform effluent standard "may yield diminished water quality relative to a situation in which disinfection is not practiced." Please explain the basis for this statement?

14) What conclusion should be drawn from your pre-filed testimony that where wastewater treatment plant effluent is treated for reuse, exposure to disinfectants is ten times that of conventional wastewater treatment plant disinfection?

15) On page 4 of your pre-filed testimony you state: "Disinfection systems used in municipal wastewater treatment applications range from no disinfection at all, to conditions that accomplish extensive inactivation of nearly all microbial pathogens." What level of indicator pathogens would constitute "extensive inactivation?"

16) On page 5 of your pre-filed testimony you state: "... the populations of microbes in disinfected water will change with time. Many microbes have the ability to

repair sub-lethal damage, and therefore can recover post-disinfection." What do you mean by "populations"?

17) Are repaired microbes as infectious as pre-disinfected microbes? If so, do you have any data or papers to support that they are as infectious?

18) What is the conventional disinfectant used in Europe?

19) You state on page 7 of your pre-filed testimony that even if MWRDGC disinfected its wastewater treatment plant effluent, there would be sources of microbial contamination to the CAWS from CSOs and non-point sources. What are the non-point sources you are referring to? Are one or both of these contributions found everywhere the disinfection of wastewater treatment plant effluent is employed? Do you believe generally that presence of CSOs and non-point sources is sufficient reason to conclude that disinfection of wastewater treatment plant effluent is ineffective or unnecessary? When would it be appropriate in your opinion?

20) Please explain the basis of the following opinion on page 9 of your pre-filed testimony, "However, in many other developed countries, wastewater disinfection is not practiced, and it appears that the frequency of disease transmission associated with water contact is not substantially different that [sic] in the U.S., where wastewater disinfection is common." Define substantially. Do you think that there is as meaningful difference? More or fewer illnesses?

21) Are disinfection by-products created with UV disinfection? Ozone? Are they higher in waters that have been treated for reuse?

22) On pages 3-4, of your pre-filed testimony you state, "Although coliform bacteria are usually plentiful in untreated municipal wastewater, they are easily

inactivated by wastewater disinfectants such as chlorine, ozone, and ultraviolet (UV) radiation, as compared with many microbial pathogens. As a result, the conditions of disinfection that are required to yield a low concentration of viable coliform bacteria will not guarantee a low concentration of microbial pathogens." Is there an indicator organism that, if removed, will guarantee a low concentration of microbial pathogens?

23) On page 4 of your pre-filed testimony you state, "Disinfection systems used in municipal wastewater treatment applications range from no disinfection at all, to conditions that accomplish extensive inactivation of nearly all microbial pathogens. For purposes of this testimony, the term 'conventional disinfection' will be used to describe municipal disinfection systems that are designed to limit viable coliform concentrations to several hundred cfu/100 mL. On the spectrum of disinfection systems used for treatment of municipal wastewater, these systems deliver modest disinfectant doses, and accomplish modest microbial inactivation." If one wants to reduce microbial pathogens to make the water safer for recreation is "conventional disinfection" a sufficient way to do this?

24) On page 5 of your pre-filed testimony you state, "... or UV irradiation may actually be detrimental to water quality, in terms of bacterial composition". In what way will UV irradiation be detrimental to the bacterial composition?

25) On page 5 of your pre-filed testimony you state, "Recent research has demonstrated that "conventional disinfection" systems yield localized, i.e. zone near the effluent outfall, improvements in bacterial quality in receiving waters." How far downstream will this localized improvement in bacterial quality occur?

26) On page 6 of your pre-filed testimony you state, "For example, in most countries of western Europe, wastewater disinfection is practiced only at facilities where effluent discharge is to a public swimming area, or where other opportunities for direct human contact are likely (e.g., shellfish breeding grounds)." Does direct human contact include activities such as canoeing, kayaking, and fishing?

27) On page 6 of your pre-filed testimony you state, "These requirements are met through the use of reactors that are substantially larger than those that would be required for conventional disinfection, and with substantially greater quantities of disinfectant than would otherwise be required." Is it economically reasonable and technically feasible, in California, to remove pathogens so that water can be reused? How does this cost compare to that of "conventional disinfection"?

28) On page 7 of your pre-filed testimony you state, "Moreover, non-point source contributions to the CAWS will be largely unaffected by TARP. Therefore, irrespective of the effluent disinfection constraints that are imposed on the District facilities, the potential for inputs of microbial pathogens from other sources will still remain. These inputs to the system will limit the extent to which risk of disease transmission from microbial pathogens can be reduced in the CAWS." To what non-point sources do you refer? Do non-point source contributions have the same risks associated with bacteria as does non-disinfected effluent?

29) On page 7 of your pre-filed testimony you state, "A related point is that the development of disinfection processes for CSOs and non-point sources represents a difficult engineering challenge." Does the Illinois EPA proposal require disinfection of

CSOs and non-point sources? Would the effluent disinfection proposal represent a "difficult engineering challenge"?

30) On page 9 of your pre-filed testimony you state, "Irrespective of any measures that are used to control microbial inputs to the CAWS from municipal wastewater treatment facilities, inputs from other sources (e.g., CSOs and non-point sources) will remain. Moreover, it would be extremely difficult to implement control measures that would effectively mitigate against transport of microbial pathogens to the CAWS from these sources." Is this statement still accurate as TARP is completed and CSOs are removed?

Questions for Charles N. Hass

1) On page 5 of your pre-filed testimony, Opinion 1, states, "If chlorine (either as gaseous chlorine or hypochlorites) disinfection is used, there is a very high likelihood of producing organic disinfection byproductions, including those that are the subject of water quality guidelines and those that are regarded as likely carcinogens." Do you think that the Board should require all facilities that currently use chlorination to go to use a different disinfection method?

2) On page 3 of your pre-filed testimony you state, "It has long been known that some pathogens, such as viruses are more resistant than indicator organisms such as coliform to chlorine disinfection in wastewater." Is it your opinion that chlorinating of effluents should stop?

3) What was your role on behalf of MWRDGC in the Pollution Control Board rulemakings on the District's disinfection requirements in the early 1980's?

4) Is the problem of chlorinated disinfection byproducts an issue when using UV radiation or ozone as the disinfectant?

5) Are chlorinated disinfection byproducts a problem for community water supplies?

6) Do such byproducts exist at a level that pose risk to humans through dermal contact? If so, can you site specific research or data to support this?

Illinois EPA's Pre-Filed Questions for David R. Zenz, P.E.

Effluent Disinfection Studies

1. Explain the difference between a level 3 cost estimate and a level 4 cost estimate.

2. You testify on page 10 (paragraph 3) that "Therefore, the total estimated schedule for implementation is approximately 8 years to operation for the North Side and Calumet facilities and 10 years for the Stickney facilities." Explain why 8 years is necessary to construct disinfection at the North Side and Calumet plants and why 10 years is necessary for the Stickney plant.

3. What is the reason that the pilot study will take 2.5 years? This seems rather long, can the schedule be shortened?

4. You testify that preliminary and final design will also take 2.5 years? This seems very long even for a large, complex project like this one? Can this schedule be shortened?

5. Do you believe these construction schedules represent the "earliest reasonable date" MWRDGC could achieve compliance with a disinfection requirement?

6. Did you receive comments from U.S. EPA on these cost estimates? Are these comments included in the Record as Exhibit 12? Did you agree or disagree with the comments? Please explain which comments were included in the recommendations summarized in your testimony.

7. On page 5, paragraph 1 you mention that disinfection alternatives such as UV "have lower environmental and health impacts." What do you mean by "lower environmental and health impacts?"

8. You testify on page 6 (paragraph 2) that you "assumed that the effluent standards were those outlined in the UAA study ... 2740 e. coli." Was this value of 2740 cfu *E. coli* per 100/ml in the UAA study evaluated as a potential water quality standard rather than as an effluent standard?

9. Your testimony states on page 6, paragraph 3 that "It should also be noted that Attachment NN included an assessment of costs for disinfection with and without tertiary filtration. The CTE final report included costs for this additional process because the task force recommended that laboratory and/or pilot plant test be conducted to determine if tertiary filtration is required in order to have a properly and efficiently operated disinfection system."

a. Do the costs provided on page 8 and 9 of your testimony include tertiary filtration?

b. How will the decision be made of whether filtration is needed?

c. If it is decided based on the pilot plant tests that filtration is not needed, what are the potential savings in cost and energy usage?

11. Have you calculated these costs on a unit basis such as cost per million gallons treated or cost per household? Please provide these calculations for the Record.

Dissolved Oxygen Enhancement Studies

1. Explain why it will take so long for your final cost estimates to be available? Why the need for a new study?

2. On page 4, paragraph 2 of your pre-filed testimony you discuss use of the Marquette Model to determine the amount of flow augmentation and supplemental

aeration needed to achieve dissolved oxygen compliance targets. Are you satisfied that the Marquette or revised Marquette model is accurate enough to support the derivation of accurate and reliable cost estimates? Has the District considered using other more reliable models? If so, what other models and when will other modeling be completed?

3. Why did you to change the compliance target from 90 to 100 percent?

4. How do the improvements related to the completion of TARP factor in to your analysis of the amount of aeration and flow augmentation needed to achieve 100 percent compliance with the proposed standard?

5. On page 9, paragraph 2 of your pre-filed testimony you mention that supplemental aeration would not be effective in the Chicago River. Do you mean the main stem of the Chicago River? Is dissolved oxygen a problem in the main stem of the Chicago River?

6. Have you calculated these costs on a unit basis such as cost per million gallons treated or cost per household?

7. Why will it take over 8 year to construct Dissolved Oxygen ehancement in the CAWS? Would there be changes that could be made that could speed up this process? What options did you consider that could have shortened the time frame?

8. Do you believe these construction schedules represent the "earliest reasonable date" MWRDGC could achieve compliance with a disinfection requirement?

9. Do you know how long the existing SEPA stations took to construct?

10. On page 10, you testify that "It cannot be stated that it is technically feasible to meet the proposed standards under all waterway conditions." What conditions are you referring to?

Questions for Stephan F. McGowan

1. What do you base your assumption on page 4 of your Disinfection testimony that "These power plants are generally coal-based electric generating facilities?" Wouldn't your conclusions change drastically if the electricity powering these treatment technologies was generated at a nuclear facility?

2. On page 4 of your Disinfection testimony you state that you use emission factors from the Emissions & Generation Resource Integrated Database ("eGrid") specifically for Illinois. What do you mean by "specifically for Illinois." Where can copies of the eGrid database be obtained or found?

3. Can you explain in more detail what you mean when you state on page 5 of your Disinfection testimony "environmental impacts were identified through professional experience, literature reviews, input from manufacturers and brainstorming sessions"? Explain how the impacts were ranked and prioritized?

4. What are the assumptions made for the negative environmental impacts?

5. What are the baseline conditions you refer to on page 7 of your pre-filed Disinfection testimony?

6. For your UV impact estimates of transportation impacts, is it possible that delivery and waste transportation for this technology could be absorbed by existing deliveries and waste shipments with no increase in transportation emissions?

7. Have you calculated the air emissions impacts on a per customer or per gallon of water treated basis? If so, what is the result of these calculations? How does this compare to the emissions from a single vehicle? How does it compare to your calculation of emissions of carbon dioxide absorbed by a single tree?

8. You testify regarding the amount of land needed for the various treatment technologies and the amount of impervious surface that would be created. You also testify that stormwater runoff will increase. Could these impacts be eliminated or significantly minimized by using green infrastructure technologies for pavement, water and roof gardens, etc.? Isn't the City of Chicago encouraging these types of projects to meet its environmental goals?

9. With regard to Attachment 2, page 4-29, Table 4-23, what percentage of existing precipitation is currently run-off? Should the current run-off be subtracted from the total amount of water generated by the impervious area when estimating the impact from constructing disinfection facilities?

10. Did you consider the environmental benefit of reduced transportation emissions from providing safe recreational opportunities closer to the population center?

11. In what areas do you consider yourself an expert? Are you an expert in calculating air emission factors?

12. In your disinfection testimony, please refer to the calculations in Attachment 2, page 4-20 and pages 4-22 – 4-23, Table 4-11 and Table 4-13 – 4-15. Do the mercury calculations reflect pending and future reductions in emissions from coal generating power stations in Illinois or are they based on current conditions? Please answer the same question with regard to the calculations in your Dissolved Oxygen testimony.

13. On page 2-4 of your Environmental Assessment Report it states "The UV system proposed in the January 2008 estimates approximately twice the power consumption (11.9 kW/mgd) at peak hour design flow compared to the system in the

August 2005 report (6.1 kW/mgd). With all other key design parameters (flow and UVT) equal, the higher power requirement in the January 2008 report is due to the use of the lower *E. coli* value (400 cfu/100mL), which appears to be reasonable." Please explain the basis for this conclusion.

14. Why do you use a 400 *E. Coli* cfu/100 ml value? Isn't the effluent standard proposed by the Agency 400 fecal coliform cfu/100 ml? Does this error affect any of the figures in your report?

15. If a water quality standard were available that appropriately represented the highest level of indicator bacteria in the CAWS that would protect existing recreational uses, could MWRDGC's disinfection process be adjusted to reduce power consumption? Are there any other design changes of the proposed UV disinfection system that could reduce power consumption?

16. On page 5-5 of your environmental assessment report you refer to Chicago's Environmental Action Agenda. Does that Agenda recommend energy efficiency measures and green infrastructure?

17. When did the District ask CTE to develop an integrated approach for meeting dissolved oxygen standards? Why will the study take until 2009 to complete?

18. What is the time frame of the "historical data" you are referring to on page 2 of your Dissolved Oxygen pre-filed testimony?

19. With regard to supplemental aeration, if there is a change in the design assumptions regarding the frequency and duration the aeration stations would be in operation or regarding how many stations would be needed, how would that change your energy consumption and air emissions figures?

20. Have any Dissolved Oxygen treatment technologies been considered that would not have a long-term energy demand?

21. In Appendix B of your report in Table B-2 you identify variety of economic information you gathered for preparing your report from units of local government such as media household income, bond ratings and property taxes. Does this information appear anywhere in your study? How was it used?

22. What energy efficiency options were considered to reduce energy consumption from disinfection and Dissolved Oxygen enhancement? Were options for sustainable engineering concepts that could reduce energy consumption incorporated into the building design considered? Did you consider using a high-efficiency pump system? Did you consider a Variable Frequency Drive (VFD) mechanism added to the aeration blowers design to control/adjust output based on specific demand of work being performed?

23. In Section 4.5 of your report (page 4-17) you discuss the Labor Burden and indicate that the operators will have additional mental and physical challenges with the operation of the disinfection system and the additional mundane and tedious labor requirements associated with extensive bulb replacement or chemical deliveries. UV operations will require 16 hours per day, 80 hours per week at North Side and Calumet WRPs while it will require 20 hours per day to operate and maintain the chlorination/ dechlorination system at all three plants Stickney, Calumet and North Side.

a. Did you consider using a UV disinfection system design that includes automatic online cleaning to reduce O & M costs associated with manual cleaning for large scale plants?

b. Do most wastewater treatment plants with UV systems clean and replace the lamps after the disinfection season is over? Was this option considered in your analysis? Why not?

c. Did you consider using a UV Disinfection system designed with a Programmable Logic Control (PLC) system and the chemical disinfection system control system integrated with the Supervisory Control and Data Acquisitions (SCADA) system? Would this concept reduce the person hours required to operate and maintain the disinfection system?

24. Is it your testimony that if MWRDGC is required to implement disinfection technologies that MWRDGC will not have future options to address future treatment and alternatives? What are these treatment options and alternatives you are referring to?

Questions for John Mastracchio

Economic Assessment for Disinfection Facilities Testimony

1. In what areas do you consider yourself an expert?

2. Do you agree with the cost estimates for Disinfection by UV or chlorination/dechlorination as developed by CTE and Mr. Zenz? How would any mistakes made in developing these capital and O&M cost estimates affect your conclusions?

3. You identify in your testimony that the "increases to the District's property tax levy are limited to the lesser of: (1) 5 percent or (2) the change in the national consumer price index plus allowable increases for new property." Which of these two factors has been the lesser or limiting factor over the last decade?

4. You conclude on pages 4-5 "The District cannot generate sufficient revenues within the constraints of the Property Tax Extension Limitation Act, and the remaining funds needed would exceed the District's Tax Cap and non-referendum bonding authority." Could MWRDGC pay for the capital improvements necessary for disinfection through referendum bonds?

5. What type or level of phosphorus treatment is the estimate of $2.8 billion for nutrient removal based upon? Is the District facing any current regulatory requirements to implement nutrient treatment for either phosphorus or total nitrogen?

6. On page 5 of your report, Table 3 lists projections of expenditures into the future ending in 2017. Why do the State Revolving Fund (SRF) project projections stop prior to 2010 and 2011?

7. You testify that the three impacted MWRDGC plants cannot implement disinfection technologies within their existing financial limitations without obtaining

additional taxing authority from the legislature or bonding authority from the voters. Did you evaluate whether disinfection could be implemented at two of the MWRDGC facilities within the existing framework? Did you evaluate installing disinfection at only one of the facilities?

8. Are you able to express the costs of disinfection for MWRDGC in terms of affordability (i.e. as a percentage of median household income) to the sewer users served by MWRDGC? If not, is there another MWRDGC witness who would be better able to do this?

Economic Assessment for Dissolved Oxygen Enhancement Facilities Testimony

1. Based on the costs provided by Mr. Zenz and others, do you have an opinion on how many supplemental aeration stations could be built and operated by the District without exceeding the financial limitations you describe?

2. Do you know if the costs you relied on for your analysis took into account the improvements from TARP when establishing design treatment targets? Would your conclusions change if the cost figures had to be updated to address this or other issues?

3. How is the fact that there is more uncertainty in the Dissolved Oxygen cost estimates than in the Chlorination estimates reflected in your results and conclusions?

4. Why are the projects for which MWRDGC has committed to use its available funds more important than the ones being addressed in this proceeding?

5. Are you able to express the costs of supplemental aeration in terms of affordability (percent of median household income) of the sewer users served by MWRDGC?

Questions for Adrienne Nemura

1. In what areas do you consider yourself an expert?

2. What would you propose to the Board as a wet weather exemption? Are you talking about aquatic life or recreation? Are there water quality standards for bacteria in the Illinois EPA's proposal? If not, why do we need a wet weather exemption? If a wet weather exemption is for aquatic life, should the standards allow for the protection of aquatic life?

3. Does MWRDGC want to submit a UAA with its Long Term Control Plan?

4. Please provide specific citations to the State statutes and regulations you refer to in your testimony.

5. Where has U.S. EPA approved a dissolved oxygen standard less stringent than the National Criteria Document for wet weather?

6. Please elaborate on your role for NACWA in the Beach Act Case.

7. You testify that "It is my professional opinion that IEPA improperly established standards for aquatic life and recreational uses in the CAWS because the agency did not demonstrate that the uses are attainable when the system is impacted by wet weather discharges." Where does it state that this is the appropriate burden of proof?

8. Does this professional opinion take into account the anticipated improvements in wet weather water quality following the completion of TARP?

9. You state on page 2 that "IEPA failed to demonstrate that the proposed standards can be met..." Explain why you feel this is the burden of proof the Agency

needs to meet. How have you determined that the aquatic life uses proposed by Illinois EPA cannot be attained?

10. Page 2, paragraph 4 of your testimony states, "In particular, a provision is needed to inform the public that the waterways should not be used for recreation when impacted by wet weather discharges." Explain how your recommendation is different than the current signs posted along the waterway? Does the District also already have a brochure and a message on their web page informing the public of the health hazards associated with recreating on the CAWS? Does the District need to do more to get the message to the public? Why do you believe this should be part of a water quality standard regulation?

11. Are you recommending that the Agency propose a numeric bacteria criteria for the protection of incidental and non-contact recreation activities at this time? If so, what do you recommend that numeric criteria should be?

12. Page 3, paragraph 1, states, "Section 303(c)(2)(A) directs that new or revised standards 'shall consist of the designated uses of the ...'" and paragraph 2, states, "... a numeric bacteria standard to protect..." Would a narrative standard meet this requirement?

13. Page 3, paragraph 3, states, "IEPA has failed to define "dry weather" or what recreational activity can be attained at different locations or different times ..." Is there a need to define "dry weather"? Is "dry weather" used in the proposed rulemaking?

14. You testify on page 4 that "If no regulatory target is provided to address wet weather conditions, the public will not know when the water is safe for recreation

and when it is not..." Why is this issue not addressed sufficiently or appropriately by current signs posted in the waterway? How would a numeric bacteria criteria address this? How would a wet weather exemption for the numeric bacteria criteria help the public know when it is unsafe to use the CAWS?

15. Page 4, paragraph 2, states, "... there has been long-standing concern (as well as confusion) over the validity and implementation of US EPA's 1986 bacteria criteria (ASIWPCA, 2005)." What are the concerns? What is the confusion?

16. Page 6, paragraph 2, states, "IEPA did not document that it considered the need to establish realistic attainable targets for wet weather conditions in its proposed rulemaking." Where is documentation of this information required?

17. You testify that "Indiana allows for temporary suspension of the recreational uses if CSO discharges are in accordance with an approved long-term control plan and a UAA." Please provide the citations and information regarding whether any municipalities have received use designation changes under this process. Has U.S. EPA approved any standards changes under this provision? Does the MWRDGC have an approved Long Term Control Plan? Are the CSO discharges described in your testimony "in accordance with" that plan? How many overflows are expected to occur after TARP is completed under the District's LTCP? Does Indiana ever allow for suspension of aquatic life uses as a result of CSO discharges? Would you limit how many days following a rain event a wet weather exemption would be allowed to last?

18. You testify on page 7 that "Massachusetts allows for a partial use designation for recreational or aquatic life uses with a UAA or a variance." Please provide the citation? Explain what is meant when you quote the Massachusetts

provision as requiring that "criteria may depart from the criteria assigned to the Class only to the extent necessary to accommodate the technology based treatment limitations of the CSO or stormwater discharges."

19. Please provide the citation in support of your statement on page 7 that "Maine allows for a CSO subcategory where recreational and aquatic life uses may be temporarily suspended." For how long may the use be suspended and for what reason? Explain why you believe this applies to aquatic life uses? Have any use changes been approved by the Citizen Board and U.S. EPA under this provision?

20. Page 7, paragraph 3, states, "Several states have modified their water quality standards to reflect the challenges associated with attaining uses during wet weather (Freedman, 2007, p. ES-5)." Do any states allow for dissolved oxygen levels to go to zero during wet weather events?

21. You testify on page 8 that "Several UAAs have also been conducted that allow for suspension of recreational uses due to wet weather discharges." How many UAAs like this are you aware of and how many have resulted in standards changes approved by U.S. EPA. How long are the recreational uses suspended for in these UAAs? Are you aware of any UAAs that have allowed for the suspension of aquatic life uses due to wet weather discharges?

22. Do you believe the recreational uses proposed by the Agency are being attained? Are attainable? Do you agree that even if a higher use is unattainable, States are required by the Clean Water Act to designate existing uses as attainable uses?

23. Are you testifying to the contents of the Alp report attached to your testimony? If not, who is the best witness to ask about this report?

24. You testify on page 2 of Attachment 2 that the effect of CSO and pump station discharges can increase ambient bacteria levels for 3 to 5 days. How long are you recommending that a wet weather recreational use exemption last after a storm event? Can you provide an example of a similar wet weather recreational exemption in another state?

25. Explain why the storm events used in the model simulation are "representative."

26. Do you think a wet weather recreational exemption would belong in the use designation itself or in the water quality standard?

27. You testify that ORSANCO allows for alternative criteria when a long term control plan and UAA is developed by the CSO community. Does this involve a change in uses? Does it apply outside bacteria standards and recreational uses? Has anyone ever used this provision?

28. Does the wet weather proposal Indianapolis is attempting to use apply to aquatic life uses?

29. You testify that there are examples in California of suspending recreational uses during high flows. Have any been completed and formally approved? Explain what you mean by high flow suspension of recreational uses for Ballona Creek? Please identify where in the regulations recreation is "suspended"?

30. In Attachment 3 you cite to a letter from U.S. EPA as US EPA (2008). Please provide a copy of this letter.

31. Attachment 4 indicates that elimination of gravity CSO discharges may not result in attainment of the D.O. standard. If this is true, explain why wet weather discharges are the reason D.O. standards cannot be met. Does the District believe the proposed dissolved water quality standards will be met when TARP is completed?

32. Page 5, paragraph 3, states, "These data show that the dissolved oxygen can get very low (zero to two milligrams per liter) at times and these impacts can last several days to a week at some locations." Have there been fish kills associated with CSOs? Could there be fish kills associated with zero dissolved oxygen that last for several days? Would these fish kills be protective of aquatic life? If, as you suggest, we have wet weather exclusions for aquatic life, would there be fish kills?

Questions for Dr. Charles S. Melching

1. In what areas do you consider yourself an expert?

2. Is there a difference in the amount of aeration stations needed to achieve compliance in CAWS and Brandon Pool Aquatic Life Use B waters and CAWS Aquatic Life Use A waters?

3. Can you please explain the DUFLOW model? When was the DUFLOW approach accepted for publication?

4. You testify that you were selected by the District "to develop an unsteady flow water-quality model of the CAWS (DUFLOW model) in 2000." Explain what an unsteady flow water-quality model is? Is the model is used to show how long it takes for water to travel through this system? Does the model look at a typical day for the CAWS or is it more focused on the impact after a rain event?

5. What research are you referring to on page 5 of your testimony with respect to CSO events?

6. Can you explain the impacts of low velocities and very low slope limits on supplemental aeration?

7. What is the basis for this statement on page 5 of your testimony that Illinois EPA "appears to assume that the duration of storm effects on water quality lasts only as long as the causative rainfall, or the period of elevated flow rates?"

8. You testify on page 7 that "the long storm effects can negatively impact the aquatic community, and these long storm effects cannot be reduced until the reservoirs of the Tunnel and Reservoir Plan are fully on line." How will TARP reduce the long term storm effects? When will the reservoirs be fully on line? Is this before or

after the construction timeline for Dissolved Oxygen enhancement technologies from Mr. Zenz's testimony?

9. Have you modeled the improvements from TARP and their impacts on D.O. levels? How do the compliance results change from current conditions?

10. You make the following statement on page 7 of your testimony "The long effects of storm flows on water quality also indicate that it may be appropriate to consider wet weather standards for the CAWS." What are the impacts to the aquatic community associated with these long term storm effects?

11. When you say wet weather standards what do you mean? How would a wet weather standard assist in controlling these long term storm effects? Would these standards be intended to protect recreational uses or aquatic life uses? How can aquatic life potential vary before and after a storm event?

12. On pages 7-8 of your pre-filed testimony, you state that variation in habitat and substrate, including shelter areas for fish, are generally absent from the CAWS.

a. On what basis do you conclude that shelter areas for fish are absent from CAWS?

b. Do you also conclude that shelter areas for macroinvertebrates are absent? On what basis?

c. Are there not enough fish-shelter areas or macroinvertebrate shelter areas in the CAWS to support the aquatic-life use proposed by Illinois EPA? What biological information provides the basis for your answer?

d. Does every location in the CAWS have the same habitat and substrate characteristics? Why do you conclude this?

13. Explain why you think contaminated sediment prevents the CAWS Aquatic Life Use A from being attainable? Explain why you think contaminated sediment prevents the Aquatic Life Use B from being attainable? Why don't you think the limitations you discuss in your testimony are reflected in the proposed aquatic life uses that do not designate these waters for attainment of clean water act aquatic life use goals?

14. On page 9 of your testimony, you compare values of the Macroinvertebrate Biotic Index ("MBI") between macroinvertebrate samples collected with a hand-operated grabbing apparatus from bottom sediments to those obtained passively from artifical substrates that are placed in the water, left to be colonized, and then removed several weeks later. You conclude that the difference between the MBI values shows that "CAWS substrate prevents any further improvements in water quality from translating to a better macroinvertebrate community and will not likely result in improvements in aquatic life use."

a. Is it your testimony that this condition as you describe it is irreversible? If so, what do you base that on?

b. How would you define the aquatic life use potential of the CAWS Aquatic Life Use A waters? The CAWS and Brandon Pool Aquatic Life Use B waters?

c. Do you think the Agency proposal is expecting these waters to support a balanced, healthy benthic community? Why?

d. Are comparisons of MBI values between two macroinvertebrate samples valid if one sample was collected actively with a hand-operated grabbing

apparatus from bottom sediments and the other sample was obtained passively from artifical substrates?

e. Does an MBI value determined from a macroinvertebrate sample collected from bottom sediments indicate the "water quality" conditions in the water column? Isn't MBI designed to show whether organic pollution of the water present is and to what degree is it impacting the macroinvertebrates in the stream?

f. Is a macroinvertebrate sample from fine, bottom sediments sufficient to reliably determine the biological integrity of a stream?

g. How do you know that if water conditions were to improve in CAWS, the overall biological condition of the stream, as reflected by the macroinvertebrate community, would not also improve?

h. What are the water-column physicochemcial requirements of the macroinvertebrate taxa (and their various life stages) that potentially can live in CAWS?

i. Are the potential water-column physicochemcial conditions in CAWS insufficient to support the aquatic life uses proposed by Illinois EPA? What biological information supports this conclusion?

j. If one finds relatively tolerant organisms living in the fine bottom sediments of a stream, does this finding necessarily mean that the physical habitat of the stream cannot support a biological potential consistent with the Clean Water Act aquatic-life goal?

k. Weren't the macroinvertebrates obtained from the artificial substrates (Hester Dendy sampling) already present elsewhere in the stream before the sampling?

15. Explain why you testify on page 10 that the Agency's designated aquatic life uses do not take into account the flow velocity in the CAWS.

a. Are water velocities too low in the CAWS to support the aquatic life uses proposed by Illinois EPA?

b. On what biological information do you base this conclusion? What are the water-velocity requirements of Illinois fish species and macroinvertebrate taxa that potentially can live in the CAWS?

c. Are all streams that have average water velocity less than 0.4 ft/sec incapable of attaining the Clean Water Act aquatic life goal? If not, then at what water velocity threshold is a stream prevented from attaining the CWA aquatic-life goal?

16. Explain your testimony on page 10 that the CAWS falls at the lower extreme of the channel quality related factors of sinuosity, riffle/pool development and low gradient. How do you define lower extreme? How is this inconsistent with the Agency's recommendation that the CAWS be designated for two different aquatic life uses that fall below the Clean Water Act goals? Do you agree with the Agency that these waters do not meet the Clean Water Act aquatic life use goals?

17. You refer throughout your testimony and Exhibits to "Warmwater Aquatic Life Use A" and "Warmwater Aquatic Life Use B." These are not the terms given in the Agency's rulemaking proposal are they? Why have you renamed the uses proposed by the Agency in your testimony?

18. In Exhibit 5 included at the end of your testimony you provide a table titled "Habitat Characteristics of Modified Warmwater Streams (Warmwater Aquatic Life Use A) and Warmwater Streams (General Use Waters) in Ohio." When you use the term

"Warmwater Aquatic Life Use A" do you mean the Chicago Area Waterway System Aquatic Life Use A waters as defined in the Agency's rulemaking proposal?

a. What causes you to conclude that the Agency's CAWS Aquatic Life Use A designated use is equivalent to Ohio's Modified Warmwater Aquatic Life Use?

b. Why do you testify that Illinois' General Use designation is equivalent to Ohio's Warmwater Streams use?

c. Why doesn't your table include the Agency's proposed Chicago Area Waterway System and Brandon Pool Aquatic Life Use B or Dresden Island Pool Use? Where would these fit in your Table? Where would a Use lower than CAWS and Brandon Pool Use B (Use C, for example) fit in your table and in Ohio's methodology?

d. What do you base your testimony on that the Ohio Limited Resource Water use is equivalent to the Agency's CAWS and Brandon Pool Aquatic Life Use B designated use?

19. On what data or information do you base your testimony on page 11 that the physical habitat of Calumet-Sag Channel and that of CAWS Aquatic Life Use B waters are "...not substantially different"? Where is your cut-off line between a difference and a "substantial" difference?

a. Is it your testimony that there is insufficient physical habitat in Calumet-Sag Channel to support the aquatic-life use proposed by Illinois EPA for this waterbody? On what biological information do you base this conclusion?

b. What are the physical-habitat requirements of Illinois fish species and macroinvetebrate taxa that potentially can live in CAWS? Did you use QHEI or

fish-IBI information from Calumet-Sag Channel and from waters proposed for CAWS and Brandon Pool Aquatic Life Use B?

c. Aren't the typical IBI score of the majority of CAWS and Brandon Pool Aquatic Life Use B waters is less than 20? Are you aware that Rankin (1989) states that fish-IBI scores below 20 "...are rarely caused by habitat alone"?

20. On page 11, in reference to physical habitat in the CAWS, you state six features of stream physical habitat as being determined by QHEI documentation (Rankin 1989) to be "primary features" of a modified warmwater stream. Can you please identify where these six factors are documented as "primary" factors in Rankin (1989)? Is it correct that only three of the six features that you stated as "primary" features are not primary features as defined in Rankin (1989)?

21. You state on page 11 that "The U.S. Environmental Protection Agency has established a DO criterion of 3.0 mg/L for full attainment of warmwater life uses." Does the USEPA (1986) national criteria document for dissolved oxygen (Attachment X) also recommend a daily minimum of 3.5 mg/l rather than 3.0 mg/l for some situations?

22. On page 12 of your testimony you mention differing recommendations for use of a 3.0 daily minimum Dissolved Oxygen standard. Can you explain the difference between a daily minimum and a standard that can not be violated at any time?

23. On page 11 you state that Illinois EPA's basis for the DO standards proposed to support early life stages in CAWS A waters have "...no evidence that the habitat and physical characteristics of the CAWS could support such a use..."

a. What evidence do you have that early life stages do not occur in the CAWS Aquatic Life Use A waters? On what basis do you conclude that "the habitat

and physical characteristics" of CAWS Aquatic Life Use A waters cannot support early life stages of aquatic life?

b. Do you believe that there is no evidence in the Record that early life stages of any fish occur in CAWS Aquatic Life Use A waters? What about the MWRDGC fish data from 2001-2005 (Exhibit 48)?

c. What are the physical-habitat requirements of the early life stages of each of the fish species and macroinvertebrate taxa that potentially can live in CAWS Aquatic Life Use A waters?

24. You state on page 12 that "Consideration should then be given to whether the CAWS offers suitable habitat for early life stages of these fish species." What is your conclusion on this issue? What do you base that conclusion on?

25. Explain exactly why you think the conclusions of the UAA contractors regarding the aquatic life potential of the CAWS and Brandon Pool are inconsistent with the Agency's designated uses for these waterways?

26. Please define a "storm event" as it is used in your testimony. In the Exhibits attached at the end of your testimony, you present "storm events" that occur on 1 day and those that occur 1 week apart as single events. Explain how you accounted for these differences in determining the number of days it took the CAWS to "recover" from a "storm event."

27. Is it accurate to state that the DUFLOW model used a single value of 170,000 fecal coliform cfu/100 mL to simulate the concentration of fecal coliform discharged from CSOs on the CAWS? This was based on no measured data, correct? Did you use the same concentration for the pump station discharges as the individual

gravity CSO discharges? Weren't the actual values measured much higher than the assumptions used in your model?

28. Over all, didn't your model show that the stream will not meet the proposed standard more often than the measured values did?

29. On page 22 of the Report attached to your testimony, you say large storms have more homogeneous CSO load than small storms. Didn't you assume the same concentration for all storms?

30. Is it your opinion that the conditions in the CAWS waters that prevent full attainment of Clean Water Act aquatic life use goals is the fact that it is a man-made channel rather than its history of pollution from CSOs and industrial sources?

31. On page 31 of your report you state that there is "No evidence the habitat and physical characteristics of the CAWS could support such a use or attain the proposed criterion?" Identify the evidence that demonstrates the CAWS can't attain the proposed are use or meet the proposed dissolved oxygen water quality standards? Do you disagree that it's the Agency's obligation to designate waters for the CWS goals unless a UAA factor supports a downgrade? Do you agree that waters have to be designated for the highest attainable use?

32. Have you reviewed the work the Agency and the Department of Natural Resources conducted in developing the Illinois General Use dissolved oxygen standard? What Dissolved Oxygen standard are you recommending?

33. What do you mean by the term "target fish species" on page 32 of your report and page 13 of your testimony? What do you mean by "target DO criteria" and

"targets for the early life stages protection"? Does Illinois EPA mention that the proposed dissolved oxygen standards are based on a "target fish species" approach?

a. In what contexts and for what purposes does the USEPA (1986) national criteria document for dissolved oxygen specifically mention largemouth bass, channel catfish, and smallmouth bass?

b. Is it your testimony that adult largemouth bass are common through the CAWS?

c. How was it determined that the CAWS is poor habitat for early life stages for target species mentioned on page 13 of your pre-filed testimony?

d. Would the dissolved oxygen standards proposed by Illinois EPA for CAWS waters protect for species that are more sensitive to low dissolved oxygen than are largemouth bass or early life stages of channel?

34. On page 36 of Attachment 1, in referring to all waters of the CAWS, you state, "The largemouth bass and smallmouth bass most likely spawn and spend their early life stages in Lake Michigan and then colonize the CAWS as adults." What fish data did you interpret to reach this conclusion? What collection methods were used to document the presumed absence of early and subadult life stages of bass from all of the CAWS waters?

a. What sizes of largemouth bass occur in Calumet-Sag Channel? Do subadult largemouth bass occur in Calumet-Sag Channel?

b. On what do you base your conclusion that the largemouth bass in Calumet-Sag Channel "most likely" were hatched in Lake Michigan?

c. Can largemouth bass spawn successfully in habitat and water-chemistry conditions that have a suitability rating that differs from the ratings provided in Stuber et al. (1982)? How different does the habitat suitability rating of largemouth bass have to be from the rating provided in Stuber et al. (1982) to reliably conclude that the dissolved oxygen standards proposed by Illinois EPA are not appropriate for CAWS waters?

35. On page 36 of Attachment 1, you conclude that the CAWS is "...near optimal habitat for largemouth bass, which is consistent with the high abundance of this fish in the CAWS."

a. What numbers represent the relative threshold and the absolute threshold of what you refer to as "high" abundance of largemouth bass in CAWS?

b. For example, are largemouth bass ***relatively*** highly abundant in North Shore Channel? For example, are largemouth bass ***absolutely*** highly abundant in North Shore Channel? On what fish data and numeric thresholds do you base this conclusion?

c. Are largemouth bass in the CAWS highly abundant compared to their numbers in other waters of the midwestern United States? Within the geographic range of largemouth bass in North America, do waters that are attaining their designated aquatic-life uses have absolutely high abundances of largemouth bass?

36. Who calculated the "Habitat Suitability Index" metics for the CAWS referred to on page 13 of your testimony? What is the purpose of a Habitat Suitability Index? Is this index typically used to determine biological potential for the purpose of determining appropriate aquatic life uses? If so, where?

37. Is it appropriate to use this Habitat Suitability Index without the chemistry measures?

39. What Habitat Suitability Index rating (from 0 to 1) represents the level at which Illinois EPA's proposed aquatic life uses for the CAWS cannot be attained? How did you determine this threshold?

40. On page 13 you mention that a Habitat Suitability Index is a model that identifies the physical and chemical conditions of water bodies suitable for a fish species. Explain how a Habitat Suitability Index is developed for a life stage of a species.

a. How is it determined that a particular physical condition is more suitable, to the life stage of the species, than any other physical condition?

b. For largemouth bass in the CAWS, how does one determine that the suitability of a particular physical-habitat feature is 0.8 rather than 0.7 or 0.9? Was a representative sample of largemouth bass of each life stage in the CAWS observed for their preferences of various physical-habitat features?

c. If largemouth bass in the CAWS were presented with a physical-habitat condition to which they have not been exposed, how would their suitability rating change with respect to this not-yet-encountered condition or feature?

d. For a particular physical-habitat feature or condition, how does the suitability rating change (for a life stage of a species) when conditions other than physical habitat change? For example, if water-chemistry conditions were to change in the CAWS, is it possible that such changes could induce a change in how organisms relate to their physical habitat?

e. If so, how does the suitability rating for various physical-habitat features or conditions change accordingly?

f. How does the information from a Habitat Suitability Index for largemouth bass prove that the aquatic-life uses proposed by Illlinois EPA for the CAWS cannot be attained?

41. What work did you perform on the Lower Des Plaines UAA?

42. You conclude at the end of your testimony and report that the Board should disapprove the rules proposed by the Agency. Does that mean you believe there should be no upgrade of these waters from where they were designated 30 years ago?

43. On the bottom of page 8 of your pre-filed testimony you mention examples, in Rankin (1989) page 12, that a QHEI of 50 can be associated with either a low or high fish-IBI score. You then state, "whether the higher QHEI scores found in select portions of the CAWS are truly indicative of a higher potential ecological community for the CAWS requires further consideration."

a. Based on Rankin (1989), is it possible for a QHEI score of 45 or less to be associated with a fish-IBI score that represents attainment of Ohio's Clean Water Act aquatic-life goal use of "Warmwater Habitat"?

b. Based on Figure 19 on page 40 of Rankin (1989), does it appear that the majority of stream sites that have QHEI scores less than 45 are associated with a fish-IBI score of 24 or higher?

Questions for Scudder D. Mackey

1) Why do you believe that the sampling points used for the UAA were not a comprehensive assessment of physical habitat?

2) Can you explain the differences that you see between South Fork of South Branch Chicago River and the South Branch of the Chicago River?

3) You state that "the limited number and wide spacing between habitat sampling sites is a major deficiency" on page 7 of your pre-filed testimony. Please explain the reason for this conclusion.

4) How would you have selected and spaced the sampling sites?

5) Referring to fish IBI scores, on page 8 you mention that the coarse sampling interval and lack of bank-edge sampling limits the ability to draw any meaningful conclusions. Please explain.

6) Do you believe that the Cal-Sag Channel should be designated as a Use B water rather than as a Use A water? If so, why?

7) What methodology would suggest for the establishing aquatic life uses?

8) What specific inquiries are you referring to on page 13 of your pre-filed testimony?

9) When was it determined that the Habitat Evaluation and Improvement Study referred to on page 16 of your pre-filed testimony needed to be done?

10) Is this study re-doing the CDM report?

11) Is this study on track to be completed by 2009?

12) Was the need to fill in the gaps, mentioned on page 16 of your pre-filed testimony, ever discussed in the UAA stakeholders meetings when Illinois EPA was accepting comments on the draft CDM report?

13) On page 3 of your pre-filed testimony you mention that you will provide "...an alternative strategy that integrates all of the fundamental habitat characteristics necessary to maximize the productive and ecological capacity..." of the CAWS. You proceed to say on page 4 of your pre-filed testimony that "biological characteristics are also an important element of aquatic habitat, but will not be discussed in detail in this testimony and are not included in Figure 1." By not including biological characteristics, how are you integrating "all" characteristics? Do you believe that biological interactions are not a fundamental part of how an organism relates to its environment?

14) What do you mean by "...maximize the productive and ecological capacity"? How is maximizing productive and ecological capacity related to the need to determine the appropriate aquatic-life uses for the CAWS?

15) What is this strategy an alternative to?

16) If all detrimental, reversible human impacts were mitigated in the CAWS, do you believe that there would be insufficient "fundamental habitat characteristics" in the CAWS to support the aquatic life uses proposed by Illinios EPA for these waters? What are the fundamental habitat-characteristic requirements of the fish and macroinvertebrates that potentially can live in the CAWS?

17) On page 3 of your pre-filed testimony you mention that it is unlikely that the "current proposed standards will significantly improve fish community structure and diversity" in the CAWS. What "current proposed standards" are you referring to?

18) In your opinion, does the Clean Water Act require that a standard "significantly improve fish community structure and diversity" for the standard to be valid and appropriate?

19) Would the physicochemical water standards proposed by Illinois EPA, if met, fail to support attainment of the aquatic-life goals proposed by Illinois EPA for CAWS? On what information do you base your answer?

20) On page 4 of your pre-filed testimony you mention that fish will not propagate successfully if spawning habitat is not "connected" to suitable nursery and forage habitats. If all detrimental, reversible human impacts were mitigated in the CAWS, do you believe that there would be insufficient spawning habitat, nursery habitat, and foraging habitat in the CAWS to support the aquatic-life uses proposed by Illinois EPA for these waters? On what biological information do you base this conclusion? What are the spawning-habitat, nursery-habitat, and foraging habitat requirements of Illinois fish species and macroinvetebrate taxa—and of their various life stages—that potentially can live in CAWS?

21) What do you mean by "connected"?

22) If all detrimental, reversible human impacts were mitigated in the CAWS, do you believe that there would be insufficient connection in the CAWS to support the aquatic-life uses proposed by Illinois EPA for these waters?

23) For each Illinois fish species and macroinvetebrate taxon—and for each of their various life stages—that potentially can live in CAWS, what degree of connection is needed?

24) On page 4 of your pre-field testimony you mention that there are three major classes of variables that must be considered "when assessing aquatic habitat:" flow regime, substrate, and water chemistry and quantity. What do you mean by "...when assessing aquatic habitat"?

25) Do you believe that, unless one has comprehensive information on each of the many variables in each of these broad classes, it is not possible to determine appropriate aquatic life uses and associated physicochemical standards for the CAWS?

26) On page 4 of your pre-filed testimony you state, "All of these variables must be spatially and temporally connected by physical and biological processes in ways that support diverse aquatic communities..." What do you mean by diverse aquatic communities? Is it true that Illinois EPA is proposing an aquatic life use designation that is below the Clean Water Act Goal?

27) On page 5 of your pre-filed testimony you state, "This assessment should include an integrated analysis of current physical habitat, flow, temperature, water quality, and existing aquatic communities." Did the CAWS UAA (Attachment B) include water quality, sediment, temperature, habitat, biological and flow information?

28) On page 5 of your pre-filed testimony you state, "Unfortunately the CAWS UAA Report ... contain data errors ..." Do you know if these errors have been explained or corrected? If not, why not?

29) On page 6 of your pre-filed testimony you state, "These new Aquatic Life tiers were based on a comparison of IBI percentile scores and QHEI scores at each sample location." Are you aware that this was discussed at the hearings and Illinois

EPA indicated that current biological conditions were not the primary criteria used to determine the proposed aquatic life use?

30) On page 6 of your pre-filed testimony you state, "For example, IBI and QHEI metrics for Bubbly Creek ..." What water body are you referring to?

31) As you mention on pages 6 and 13 of your pre-filed testimony, in what way and for what purpose, do you believe, did Illinois EPA rely "almost exclusively" on fish-IBI scores?

32) In what way and for what purpose, do you believe, did Illinois EPA adopt the percentile approach to which you refer?

33) On page 6 of your pre-filed testimony you mention that the spatial distribution of the CAWS sites selected for QHEI analysis in 2004 "...was not based on an appropriate statistical sample design..." Does the QHEI data from these sites provide no useful information for determining the biological potential of the CAWS?

34) What statistical design guarantees that additional physical-habitat information from the CAWS will provide more accurate characterization of the biological potential of CAWS than does the currently available data?

35) How does a statistical design guarantee that the very best physical habitat conditions that truly occur in the CAWS are considered?

36) On page 7 of your pre-filed testimony you state that the channel morphology and flow characteristics of South Branch Chicago River differ distinctly from those of South Fork of South Branch Chicago River. What information is the basis for this conclusion?

37) On page 7 of your pre-filed testimony you criticize the Illinois EPA proposal for not including a "comprehensive habitat assessment" that includes knowing the "relative percentage, location, pattern, and distribution of shoreline types and bank-edge habitat" for each CAWS segment and knowing the "pattern and juxtaposition of different types of aquatic habitats" for each CAWS segment. Is it your opinion that the Clean Water Act requires this type of "comprehensive habitat assessment" for defining and designating aquatic-life uses in freshwater streams throughout the United States?

38) Is this type of "comprehensive habitat assessment" always necessary to determine the biological potential of a waterbody to a degree sufficient for establishing appropriate aquatic-life uses? If such a "comprehensive habitat assessment" were performed in the CAWS, would such an assessment be guaranteed to prove that the aquatic-life uses proposed by Illinois EPA for the CAWS are unattainable?

39) On page 8 of your pre-filed testimony you state, "However, Illinois EPA contends that these shallow water bank-edge habitats in the Calumet-Sag Channel should be considered to be spawning habitat, which is problematic given that no direct data are available to support that contention". Could you please point out, in the hearing record, where Illinois EPA "contends" that "shallow water bank-edge habitats in the Calumet-Sag Channel should be considered to be spawning habitat"?

40) Do you believe that "direct data" are always necessary to determine appropriate aquatic-life uses and associated physicochemical water standards? What do you mean by "direct data"?

41) Do you believe that no fish spawning and propagation are occurring in Calumet-Sag Channel?

42) How does one determine scientifically, with "direct data," that no fish spawning and propagation are occurring in Calumet-Sag Channel?

43) On page 8 of your pre-filed testimony you mention that the QHEI protocol is "...based on hydrogeomorphic metrics in a natural stream..." Then at the bottom of page 8 you mention, "Flows in the CAWS are regulated, controlled by man-made structures, and are not natural." Do you believe that QHEI cannot provide useful information in a stream impacted by human activities? Do you believe that relatively low QHEI scores in CAWS streams indicate that the QHEI is not functioning as intended?

44) On page 8 of your pre-filed testimony you state, "The QHEI protocol is not designed for use in low gradient, non-wadeable streams and rivers...". On page 9 you state, "The QHEI protocol was not designed to be applied to a flow-regulated artificial waterway system such as the CAWS." Do you believe that the state of Ohio is incorrect in using the QHEI to help determine aquatic-life use attainability in human-impacted streams throughout Ohio?

45) Do you believe that all chemical, physical, and biological properties of the CAWS are artificial? Do you believe that the aquatic life that inhabits the CAWS or can potentially inhabit the CAWS occurs there by artificial means and lives in entirely artificial conditions?

46) Do you believe that the aquatic-life uses proposed by Illinois EPA for the CAWS represent natural conditions?

47) Do you believe that the QHEI is not useful at all for evaluating physical-habitat conditions to help determine the best attainable biological condition in the CAWS?

48) Did part of the original development and application of the QHEI, as per Rankin (1989) include waters that were not natural?

49) On page 8 of your pre-filed testimony you state, "However, IEPA contends that these shallow water bank edge habitats in the Calumet-Sag Channel should be considered to be spawning habitat ...no direct data are available to support that contention." Is there any direct evidence that indicates it is not spawning habitat? What about indirect evidence? Can the presence of different size classes of fish indicate spawning?

50) On page 8 of your pre-filed testimony you state, "As a result, the QHEI scores ... may be of secondary importance to the attainment of a diverse, sustainable fish population." Is IEPA proposing a designated use consistent with a diverse, sustainable fish population?

51) On page 8 of your pre-filed testimony you state, "This assumption is not valid for low gradient, urbanized, artificial channels such as CAWS." Does the QHEI include metrics for channel morphology (e.g. channelization), flood plain quality (e.g. urban or industrial), current velocity (slow, moderate, fast, eddies, etc.?) and gradient (e.g. low 0 – 0.5 ft/mile)?

52) On page 9 of your pre-filed testimony you mention that there was "considerable uncertainty" in the QHEI scores from locations in North Shore Channel and locations in Calumet-Sag Channel. Later in that paragraph you mention that if the

QHEI score of 42 is correct for one of the North Shore Channel sites, then ..."the boundaries of the proposed Aquatic Life Use categories for the CAWS are invalid and should be redefined." Based on information in the hearing record, are the correct QHEI scores for North Shore Channel and for Calumet-Sag Channel depicted in Table 3 on page 5 of the Rankin 2004 report (Attachment R)?

53) What do you mean by "...the boundaries of the proposed Aquatic Life Use categories"?

54) On page 9 of your pre-filed testimony you state, "Proper application of the Ohio Boatable IBI requires identification of high quality reference streams which serve as yardsticks to measure the biological health in similar, regional waterbodies." Does every valid use of the Ohio fish-IBI for unwadable streams require one to identify "high quality reference streams"?

55) On page 10 of your pre-filed testimony you state, "The decision to include Cal-Sag Channel as a higher Aquatic Life Use 'A' water is not defensible, because the habitat indices for both monitoring stations were in the poor range, and the IBI percentile scores are below or a the bottom of the range established for IEPA's Aquatic Life Use 'A' tier." Based on the hearing record, do you believe that Table 3 on page 5 of the Rankin 2004 report (Attachment R) indicates the correct QHEI scores for Calumet-Sag Channel? Do you believe that these two QHEI scores are "in the poor range"?

56) To your knowledge, what range of fish-IBI scores did Illinois EPA establish for the aquatic-life use proposed for CAWS A waters?

57) On page 10 of your pre-filed testimony you state, "In fact, the minimum IBI scores observed at the two monitoring stations in the Cal-Sag Channel are among the

lowest in the CAWS." Do you believe that the minimum IBI scores from Calumet-Sag Channel provide useful information about the biological potential of this stream? Do you believe that the maximum fish-IBI scores from Calumet-Sag Channel provide useful information about biological potential of this stream?

58) On page 10 of your pre-filed testimony you state, "The Cal-Sag channel and the Chicago Sanitary and Ship Canal share similar physical characteristics ... limited shallow areas ..." How was this determined? Did Rankin's survey (Attachment R) indicate that the littoral habitat in the Cal-Sag channel "is not isolated, but occurs along much of the shoreline"? Did this report also indicate that the Chicago Sanitary and Ship Canal at Lockport "was wider and had some littoral habitat, however, this was very limited in scope and were extremely embedded with silty mucks and sand that were of poor quality"?

59) On page 10 of your pre-filed testimony you state, "The weathering of the bank walls provides a slight shallow shelf with limited habitat for fish." This statement is based on what? How did you quantify the terms "slight" and "limited"?

60) On page 10 of your pre-filed testimony you indicate that both the Cal-Sag Channel and Chicago Sanitary and Ship Canal have poor habitat based on Table 2 of Rankin's report (Attachment R). Are you aware that the QHEI scores for the Cal-Sag Channel in Table 2 of Attachment R were incorrect and were corrected at the April hearing (i.e. Rt. 83 QHEI = 54, Cicero Ave. QHEI = 47.5)? Do you agree that these QHEI scores are in the fair range? Do you also agree that the QHEI scores in Table 2 (Attachment R) for the Chicago Sanitary and Ship Canal ranged from 27 to 40.5 indicating very poor to poor habitat conditions?

61) On page 10 of your pre-filed testimony you state, "The small amount of rubble from the crumbling walls does very little to improve the overall physical habitat for fish and invertebrates in the Cal-Sag Channel" You determined this how? Can you provide any data that was used to arrive at this conclusion?

62) On page 11 of your pre-filed testimony you interpret that there is no "one-to-one correspondence" of IBI scores to QHEI scores. Do you believe that statistical relationships established for QHEI scores and fish-IBI scores, like those in Figures 1 and 2 on pages 7 and 8 in Rankin (1989), are not useful for informing the determination of appropriate aquatic-life uses for a stream?

63) Is it your opinion that quantitative graphs of the relationship between QHEI scores and fish-IBI scores, like Figure 19 on page 40 in Rankin (1989), are not useful for informing the determination of appropriate aquatic-life uses for a stream?

64) Do you believe that the Clean Water Act requires that aquatic-life uses represent "desired aquatic communities"?

65) Is it your opinion that the aquatic-life uses proposed by Illinois EPA for CAWS waters are not descriptions of biological potential?

66) In the context of the Clean Water Act, do you believe that CAWS waters have the capability to potentially support balanced populations of aquatic organisms?

67) In the context of the Clean Water Act, do you believe that loss of intolerant types of organisms is not a primary manifestation of the difference between balanced and imbalanced aquatic life?

68) Of the states that have aquatic-life uses based on the concepts of the "tiered aquatic-life use" approach, do you know of any aquatic-life uses that are defined

by lists of particular species or taxa of aquatic organisms? Can you provide some explicit examples?

69) Do you believe that a list of fish species or macroinvertebrate taxa validly and sufficiently represents the Clean Water Act concepts of aquatic-life use and biological integrity?

70) On page 11 of your pre-filed testimony you indicate that because the IBI scores were incorrectly calculated the proposed use designations need to be reconsidered. Are you aware that IBI scores were not used in proposing designated uses?

71) On page 11 of your pre-filed testimony you indicate that the CAWS UAA Report and other materials do not provide justification for using the 75 percentile IBI. Are you aware that IEPA did not use this method in proposing the designated uses?

72) On page 12 of your pre-filed testimony "...Figure 5-2 invalidates the justification provided for Illinois EPA's use of a QHEI score of 40 as a lower boundary for Aquatic Use "A" waters rather than a QHEI score of 45..." Where in the record does Illinois EPA indicate using QHEI of 40 as the boundary?

73) On page 12 of your pre-filed testimony you state, "The lack of a desirable (or expected) fish and benthic invertebrate species list..." How many other states provide species list in their designated uses? Is the use of terms such as tolerant and intolerant common?

74) On page 13 of your pre-filed testimony you state "IEPA's current methodology relies almost exclusively on the boatable IBI scores and does not adequately consider physical habitat, flow regime, or existing aquatic communities ..."

Are you aware that the proposed aquatic life use designations were based primarily on habitat and not on IBI scores?

75) Did Mr. Rankin in his report (Attachment R) indicate "...that because of effects of often multiple stressors the biological results may underestimate the potential attainment that could be expected in the absence of such stressors. In these cases the QHEI and metric scores at a site, scores of nearby reaches, and accrual of important limiting habitat factors and the loss of positive habitat factors are used as evidence in support of a given aquatic life use along with the knowledge of the feasibility of restoring the limiting factors."?

76) On page 13 of your pre-filed testimony you state, "In the Statement of Reasons, the IEPA hypothesizes that increased DO and reductions in temperature will significantly improve fish diversity and community structure within the CAWS." Would you please identify the specific part, in Illinois EPA's Statement of Reasons, to which you refer?

77) Is it your opinion that the Clean Water Act requires that, when determining appropriate aquatic-life uses and protective physicochemical water standards, all such uses and standards must first be proven to be attainable?

78) On page 14 of your pre-filed testimony you state, "Physical limitations such as lack of shallow bank edge habitats and riparian cover; lack of instream cover and diversity ..." Are you aware that these types of habitat attributes are taken into account in the QHEI?

79) On page 14 of your pre-filed testimony you state, "Other investigators have recognized these potential limitations as well." How has the Illinois EPA proposal

not taken the above into consideration? Do you understand that the proposed aquatic life "A" and "B" designated uses are below the Clean Water Act goal?

80) On page 14 of your pre-filed testimony you state, "The CAWS UAA Report also found that a lack of suitable habitat may be a factor that limits the attainment of diverse, sustainable fish communities" By "diverse, sustainable" are you implying Clean Water Act goals? Is the Agency proposing a CWA goal (i.e. General Use) for these waterways?

81) On page 15 of your pre-filed testimony you state, "For much of the CAWS, fish richness and diversity has improved markedly since effluent chlorination was terminated in 1984 ..." Is it true that MWRDGC did not de-chlorinate prior to this time? Would you consider the addition of nitrification to waste water treatment plants to also be a major factor? Has physical habitat conditions improved over this time?

82) On page 15 of your pre-filed testimony you state, "Moreover, the existence of active angler groups and bass fishing tournaments on the waterway also suggests that for many species, water quality (DO and temperature) for much of the CAWS is *not a significant limiting factor.*" What is the scientific basis of this statement? What species are you referring to?

83) On page 15 of your pre-filed testimony you state, "Certainly there continue to be DO and temperature limitations for other desirable, less-tolerant species ..." Do you understand that the proposed dissolved oxygen standards are based on protecting early life stages as sensitive as channel catfish and other life stages as sensitive as largemouth bass (USEPA 1986)? Are the current Secondary Contact and Indigenous

Aquatic Life Use dissolved oxygen standards protective of these life stages in all areas of CAWS?

84) On Page 15 of your pre-filed testimony you state, "In fact, fair to good Macroinvertebrate Biotic Index (MBI) scores from the "in-water column" Hester Dendy samplers and very poor MBI scores within CAWS sediments (Ponar grab samples) suggest that water quality improvements *may already be sufficient* to support a more robust and diverse macroinvertebrate community if suitable habitats were present in the CAWS (Wasik testimony)." Is it true that the Wasik testimony does not discuss nor provide any MBI data? What is the MBI based on? Was the MBI designed to be used with ponar grabs or with other types of sampling devices? What do you mean by robust and more diverse? Compared to what?

85) On page 15 of your pre-filed testimony you state, "...the substantial investments needed for infrastructure to provide incremental increases in DO and/or reductions in temperature will not yield a proportionate biological response with respect to attaining sustainable fish communities and/or other beneficial uses." What is the "...substantial investment..." to which you refer? Have you performed an analysis that compares infrastructure investment to "biological response"? What level of "biological response" represents a "proportionate" return on investments for infrastructure?

86) On page 16 of your pre-filed testimony you state, "The lack of diverse bank-edge and instream habitats within the CAWS may be a much more significant limitation on the development of sustainable fish communities than current levels of DO or temperature." Do you believe that current levels of DO and temperature in the

CAWS are having no detrimental impact on the present fish community? What information is the basis for your answer?

87) Do you believe that the chemical, physical, and biological information available from the CAWS indicates that physical habitat degradation is the primary reason for the existing low fish-IBI scores in the CAWS?

88) Is it your opinion that this habitat index will show that the aquatic life uses proposed by Illinois EPA for the CAWS are not attainable?

89) In the context of the Clean Water Act's aquatic-life goal and in the context of the Clean Water Act concepts of aquatic life and biological integrity, how will a CAWS-specific habitat index be used to determine biological potential, i.e., the best-possible biological conditions assuming that all reversible detrimental impacts are mitigated?

90) On page 16 of your pre-filed testimony you state, "The lack of diverse bank-edge and instream habitat within CAWS may be a much more significant limitation on the development of sustainable fish communities than current levels of DO or temperature." Based on what information? Are you aware that the proposed aquatic life use "A" and "B" designations for CAWS are based primarily on habitat differences including bank-edge and instream habitat? Are these proposed designated uses less than Clean Water Act goals (i.e. General Use designation)?

91) On page 18 of your pre-filed testimony you state that the objective of the Habitat Evaluation and Improvement Study is "...to identify the most efficient and cost-effective means to further protect and enhance Aquatic Life Use waters and associated beneficial uses in the CAWS." Is the primary objective of the Habitat Evaluation and

Improvement Study to determine the best-attainable aquatic life uses required by the Clean Water Act in the CAWS?

92) Do you believe that the aquatic life uses proposed by Illinois EPA for the CAWS are not attainable?

93) What is the minimum amount of scientific information and analysis required to determine that the aquatic-life uses proposed by Illinois EPA cannot be attained in the CAWS?

Questions for Marcelo H. Garcia, Ph.D

1) How might density currents affect water quality and transport low-oxygen, sediments-laden water and containments for long distances?

2) What distances are you suggesting?

3) When you say your recommendations have been implemented, are you referring to MWRDGC excepting the recommendations?

4) What recommendations did you provide to the District?

5) What research are you currently working on for the South Fork of South Branch Chicago River?

6) When did this research begin?

7) Who is involved in this research?

8) What other options where there besides the Environmental Fluid Dynamics Code (EFDC)?

9) What conditions might cause the South Branch Chicago River to act as a barrier to the flow coming out of the South Fork of South Branch Chicago River?

10) Are you working on the modeling, laboratory and field observations simultaneously? When will the results of this information be completed?

Questions for Paul L. Freedman, P.E.

1) Why are you of the opinion that Illinois EPA's proposal is inappropriate aquatic life standards for the CAWS?

2) What would you propose for aquatic life in the CAWS?

3) What studies should the Board wait on to assist with establishing aquatic life uses for the CAWS?

4) Are you suggesting that the general use daily minimum and 7-day minima for the CAWS is unwarranted? If yes, please explain.

5) Would this be consistent with the USEPA 1986 National Criteria document? If yes, please explain.

6) What dissolved oxygen standard would you propose for these waters?

7) What are the "significant impacts" you are referring to on page 4 of your pre-field testimony?

8) What scientific publications are you referring to on page 5 of your pre-filed testimony?

9) What do you deem as significant effects in the CAWS due to wet weather impacts?

10) What would you propose for a wet weather standard?

11) What errors are your referring to with respect to the UAA QHEI and IBI scoring and analysis?

12) In your pre-filed testimony on page 11, in the last sentence you state that Illinois EPA has not provided an adequate demonstration that the proposed aquatic-life uses can be achieved. In the second paragraph on page 12 of Attachment 2 to your

pre-filed testimony, this concern is reiterated in the statement that Illinois EPA "...did not show that the proposed beneficial uses can be attained in the forseeable future." Have you performed an analysis that proves that the aquatic-life uses proposed by Illinois EPA cannot be attained in the waters for which they have been proposed? If yes, what biological, physical, and chemical information did you use and how did you interpret it to arrive at your conclusions? If no, on what basis do you conclude that the aquatic-life uses proposed by Illinois EPA cannot possibly be attained in the waters for which they have been proposed?

13) On page 13, in the first paragraph of your "Conclusions" of your pre-filed testimony, you recommend that the Illinois Pollution Control Board "...establish a separate use classification for Bubbly Creek..." (i.e., South Fork South Branch Chicago River) that differs from that proposed by Illinois EPA. Additionally, you recommend that the Board designate Illinois EPA's proposed "Use B" rather than "Use A" for Calumet-Sag Channel. Have you performed a scientific investigation to arrive at these recommended use designations?

a) If yes, on what biological, physical, and chemical information and interpretations is that analysis based?

b) If no, how did you determine that the biological potential of South Fork South Branch Chicago River is less than the biological potential represented by Illinois EPA's proposed aquatic-life use for this water?

14) How do you define this new aquatic-life use that you recommend for this water?

15) Do you know the dissolved-oxygen requirements of each species or taxon of aquatic organism that occurs or can reasonably potentially occur in the CAWS? If no, what is the scientific basis for concluding that the Illinois EPA proposed dissolved oxygen standards for CAWS are inadequately justified, as you mention in the first full paragraph on page 5 of your pre-filed testimony?

16) How did you determine that the biological potential of Calumet-Sag Channel is less than the biological potential represented by Illinois EPA's proposed aquatic-life use for this water?

17) How did you determine that the biological potential of Calumet-Sag Channel is no greater than that represented by the aquatic-life use proposed by Illinois EPA for the most-modified of the CAWS waters, CAWS "B" waters?

18) In the first sentence on page 4 of your pre-filed testimony and again in the second paragraph on page 2 of Attachment 2 to your pre-filed testimony, you state that the Chicago Area Waterways System is unique, with no other comparable system in Illinois or in the entire United States. Do you believe that no other waterbody in the United States has the same potential level of biological condition as the CAWS? If yes, what defines this unique level of biological condition that could serve as the biological potential of the CAWS?

19) Of the states that have aquatic-life uses based on the concepts of the "tiered aquatic-life use" approach, do you know of any aquatic-life uses that are defined by lists of particular species or taxa of aquatic organisms? Can you provide some explicit examples?

20) Do you believe that all of the CAWS waters have the same potential level of biological integrity? If yes, why do you recommend a different use for South Fork South Branch Chicago River than for Calumet-Sag Channel?

21) Do you agree that the dissolved-oxygen standards proposed by Illinois EPA for CAWS B waters differ from those proposed for CAWS A waters?

22) Do you agree that the dissolved-oxygen standards proposed by Illinois EPA for CAWS A waters differ from those recently adopted by the Illinois Pollution Control Board for the majority of General Use waters of Illinois?

23) Do you know the dissolved-oxygen requirements of each species or taxon of aquatic organism that occurs or can reasonably potentially occur in the CAWS? If no, what is the scientific basis for concluding that the Illinois EPA proposed dissolved oxygen standards for CAWS are inadequately justified, as you mention in the first full paragraph on page 5 of your pre-filed testimony?

24) In the middle of the first full paragraph on page 11 of Attachment 2 to your pre-filed testimony, you quote part of a sentence from the 1986 USEPA national-criteria document for dissolved oxygen (which is Attachment X of Illinois EPA's Statement of Reasons). Specifically you state that in all cases, the dissolved oxygen criteria recommended by USEPA in their 1986 document were developed "to protect the more sensitive populations of organisms". What organisms are being referred to in this quote from the USEPA criteria document?

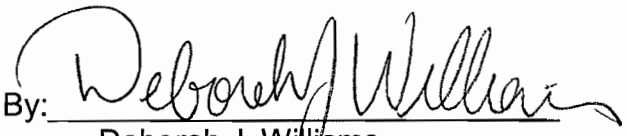
25) For the Cuyahoga River shipping channel in Ohio, do you believe that this waterbody differs meaningfully from the CAWS with respect to its biological potential? Why or why not?

26) Do you know what are the Ohio standards for dissolved oxygen in this waterbody? If so, please state those standards and when these dissolved oxygen standards adopted? If you know what the standards are do you know how these dissolved oxygen standards are consistent with the information and recommendations in the USEPA national-criteria document (Attachment X)?

27) Consistent with your reasoning for suggesting the Cuyahoga River shipping-channel dissolved oxygen standards are appropriate for the CAWS, do you believe that the Ohio dissolved-oxygen standards for Ohio's "Warmwater Habitat" use are appropriate for most of Illinois' General Use waters?

Respectfully submitted,

ILLINOIS ENVIRONMENTAL
PROTECTION AGENCY

By: 

Deborah J. Williams
Assistant Counsel

Dated: August 22, 2008

1021 North Grand Avenue East
P.O. Box 19276
Springfield, Illinois 62794-9276
(217) 782-5544

STATE OF ILLINOIS)
) **SS**
COUNTY OF SANGAMON)
)

PROOF OF SERVICE

I, the undersigned, on oath state that I have served the attached Illinois EPA's Motion to Preserve Opportunity to Submit Pre-filed Questions for Julia Wozniak and Illinois EPA's Pre-Filed Questions upon the person to whom it is directed by placing it an envelope addressed to:

John Therriault, Clerk
Marie Tipsord, Hearing Officer
Illinois Pollution Control Board
James R. Thompson Center
100 West Randolph Street, Suite 11-500
Chicago, Illinois 60601

and mailing it by Overnight Mail from Springfield, Illinois on August 22, 2008, with sufficient postage affixed and by mailing it by First Class U.S. Mail from Springfield, Illinois on August 22, 2008 with sufficient postage affixed to the **ATTACHED SERVICE LIST.**

SUBSCRIBED AND SWORN TO BEFORE ME

This 22nd day of August 2008

Notary Public

OFFICIAL SEAL
BRENDA BOEHNER
NOTARY PUBLIC, STATE OF ILLINOIS
MY COMMISSION EXPIRES 11-3-2009

Service List for R08-9

Elizabeth Schenkier
Keith Harley
Chicago Legal Clinic, Inc.
205 W. Monroe, 4th Floor
Chicago, IL 60606

Ann Alexander
Senior Attorney, Midwest Program
Natural Resources Defense Council
101 North Wacker Dr., Ste. 609
Chicago, IL 60606

Susan M. Franzetti
Nijman Franzetti LLP
10 South LaSalle St.
Ste. 3600
Chicago, IL 60603

Fredrick M. Feldman
Ronald M. Hill
Margaret T. Conway
Metropolitan Water Reclamation District
of Greater Chicago
111 East Erie Street
Chicago, IL 60611

Katherine D. Hodge
Monica Rios
Matthew C. Read
Hodge Dwyer Zeman
3150 Roland Ave.
P.O. Box 5776
Springfield, IL 62702

William Richardson, Chief Legal Counsel
Illinois Department of Natural Resources
One Natural Resources Way
Springfield, IL 62705-5776

John Therriault, Assistant Clerk
Illinois Pollution Control Board
James R. Thompson Center
100 West Randolph, Ste 11-500
Chicago, IL 60601

Marie Tipsord, Hearing Officer
Illinois Pollution Control Board
James R. Thompson Center
100 West Randolph, Ste 11-500
Chicago, IL 60601

Susan Hedman
Andrew Armstrong
Office of the Attorney General
Environmental Bureau North
69 West Washington Street, Suite 1800
Chicago, IL 60602

Albert Ettinger, Senior Staff Attorney
Jessica Dexter
Environmental Law & Policy Center
35 E. Wacker Dr., Suite 1300
Chicago, IL 60601

Jeffrey C. Fort
Ariel J. Tesher
Sonnenschein Nath & Rosenthal LLP
7800 Sears Tower
233 S. Wacker Drive
Chicago, IL 60606-6404

Jennifer A. Simon
Kevin Desharnais
Thomas W. Dimond
Thomas V. Skinner
Mayer Brown LLP
71 South Wacker Drive
Chicago, IL 60606-4637

Service List for R08-9 Continued

Fredric P. Andes
Carolyn S. Hesse
David T. Ballard
Barnes & Thornburg LLP
One North Wacker Drive
Suite 4400
Chicago, IL 60606

Stacy Meyers-Glen
Openlands
25 E. Washington, Ste. 1650
Chicago, IL 60602

Kristy A.N. Bulleit
Brent Fewell
Hunton & Williams LLC
1900 K Street, NW
Washington, DC 20006

Jack Darin
Cindy Skrukrud
Sierra Club, Illinois Chapter
70 East Lake Street, Ste 1500
Chicago, IL 60601

Marc Miller
Office of the Lt. Governor, Pat Quinn
Room 414 State House
Springfield, IL 62706

Traci Barkley
Prairie Rivers Network
1902 Fox Drive, Suite 6
Champaign, Illinois 61820

Cathy Hudzik
City of Chicago, Mayor's
Office of Intergovernmental Affairs
121 North LaSalle Street
City Hall Room 406
Chicago, Illinois 60602

Lyman C. Welch
Alliance for the Great Lakes
17 North State Street, Suite 1390
Chicago, Illinois 60602