

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

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

R08-09
(Rulemaking – Water)

NOTICE OF FILING

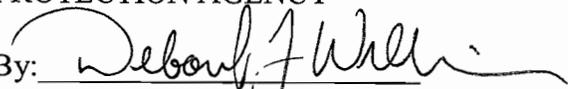
To: John Therriault, Clerk
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Illinois Pollution Control Board
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Pollution Control Board

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PLEASE TAKE NOTICE that I have filed today with the Illinois Pollution Control Board Illinois EPA's Pre-Filed Questions for Midwest Generation Witnesses, a copy of which is herewith served upon you.

ILLINOIS ENVIRONMENTAL
PROTECTION AGENCY

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THIS FILING IS SUBMITTED ON RECYCLED PAPER

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ILLINOIS EPA'S PRE-FILED QUESTIONS FOR MIDWEST GENERATION WITNESSES

The Illinois Environmental Protection Agency ("Illinois EPA" or "Agency"), by and through its attorneys, hereby submits its pre-filed questions for Midwest Generation Witnesses in the above-captioned matter. The Agency reserves the right to ask additional follow-up as necessary.

Questions for Julia Wozniak

1. In your pre-filed testimony you state that part of the responsibilities of your position at Midwest Generation include "modeling the complex thermo-hydrodynamics of power plant and waterway interactions" and "overseeing thermal compliance monitoring and developing and running complex models that are used to optimize station loads during critical generation periods, while maintaining environmental compliance." Please explain your role in these activities. What training have you received related to modeling of thermo-hydrodynamics?

2. You refer to the Joliet Stations on the study area as Joliet 6 and Joliet 7 & 8. Please explain the numbering system for the Joliet facilities.

3. Which reaches of the CAWS do the Fisk, Crawford and Will County stations discharge to? Which reaches do they impact?

4. Please identify the other 2 Midwest Generation generating stations in Illinois. What type of cooling is utilized at these 2 stations and the Western Pennsylvania station?

5. Why were cooling towers installed in 1999 at the Joliet 7 & 8 facilities?

6. Explain how "The towers are also used to meet near-field thermal standards during critical low flow periods that occur in the Dresden Pool. (See pages 4-5). What happens at the other facilities during these periods?

7. Who developed the thermal models used? What are the inputs of the model and what data are they obtained from? How are the results of these models tested against real world conditions?

8. Where is the 26 acre mixing zone applicable to the Midwest Generation's CAWS and Lower Des Plaines River facilities found? How is compliance with the Secondary Contact temperature limits measured?

9. Page 4, paragraph 2, of your pre-filed testimony states, "Unit 6 ... The design maximum temperature rise in the circulating water is approximately 10.7°F ... Units 7&8 ... The design maximum temperature rise in the circulating cooling water is approximately 12.4°F." Does this take into account the cooling towers? Why are these numbers different from the Board opinion AS 96-10, page 3, last paragraph, which states "The station has two thermal discharges to

the Des Plaines River; ... The maximum design temperature rise in the circulating cooling water is approximately 9.4°F.”?

10. Page 4, paragraph 3 of your pre-filed testimony you state, “The cooling towers for Units 7&8 were voluntarily installed in 1999 at a cost of approximately \$23,000,000...” In the AS96-10, Com Ed determined the cost of cooling towers to be \$68 million. Why the discrepancy in the cost? Why the change of position in installing cooling towers after you told the Board it was not economical?

11. AS 96-10, March 16, 2000, page 4, last paragraph states, “Based upon the assurances of ComEd and Midwest that the management and operation of the Generating Stations will continue unchanged...” Did deregulation change the operation of the Generating Station?

12. You state on page 6 of your pre-filed testimony “In 1996, IEPA did not view the thermal discharges as limiting aquatic diversity in the receiving waters.” Which receiving waters are you referring to in this statement?

13. You also state on page 6 of your pre-filed testimony “the Agency ultimately concluded as part of the AS 96-10 proceeding that the cost of providing this cooling was not economically reasonable...” Did you think the cost of \$23 million in 1999 to voluntarily provide cooling at the Joliet 7 & 8 units was economically reasonable? Did Midwest Generation notify the Board of its plans to install these cooling towers during the Adjusted Standard proceedings?

14. Is there anything in the Agency’s proposal to the Board that would impact the language of Midwest Generation’s regulatory relief at the I-55 bridge?

15. On page 9 of your pre-filed testimony you state “Through subsequent studies and modeling efforts, MWGen determined that the Joliet facilities (and not the three CAWS stations) had the greatest influence on water temperature at the I-55 Bridge. Therefore, efforts by MWGen to maintain thermal compliance at the I-55 bridge revolve mostly around the operations at the Joliet facilities.” Are there any activities at the CAWS facilities that are used to regulate temperature at the I-55 bridge or is this exclusively done by the Joliet stations?

16. You testify on page 12 of your pre-filed testimony that “The model has been field-verified and has been shown to be accurate within 2°F (assuming that model input parameters are also accurate).” What happens to the accuracy when model inputs are not accurate?

17. Please explain what you mean when you state on page 12 of your pre-filed testimony that “the model has been field-verified”?

18. What values are used in the model for intake and ambient water temperatures?

19. If the model can be off by 2°F when the inputs are accurate and more than 2°F when those inputs are inaccurate, how is Midwest Generation certain that violations of the Secondary Contract temperature standards have not occurred? What about the I-55 Bridge Adjusted temperature standard?

20. You state on page 14 of your pre-filed testimony, “It was not until January 2007, when IEPA issued its draft UAA proposal that MWGen became aware of the intended thermal water quality standard values for the Lower Des Plaines River.” Weren’t two alternative thermal limits submittal to the

stakeholders for review in January 2007? Wasn't one of the alternatives submitted to the stakeholders drafted by Midwest Generation?

21. You also state on page 14 of your pre-filed testimony that, "The IEPA meetings on March 20 and 22, 2007, were the first public forum in which the proposed thermal standards were publicly discussed." Did Midwest Generation meet privately with Illinois EPA to discuss their concerns with the thermal report prepared by Mr. Yoder?

22. Do you believe the heat from the Midwest Generation facilities is having any impact on the aquatic life in the CAWS and Lower Des Plaines River?

23. What experience and first hand observations through the UIW studies helped you formulate your conclusion that the Adjusted Standards provide an adequate level of protection for the aquatic community below I-55 and provide a more representative normal, seasonal fluctuation that either the Secondary Contact or the General Use numeric standard?

24. What UIW studies are you referring to in your pre-filed testimony?

25. Please explain why it is more often than not that Adjusted Standard's compliance needs that dictate unit deratings and the use of cooling towers?

26. Specifically what data and information are you referring to on page 15 of your pre-filed testimony?

Pre-filed questions for Greg Seegert

1. Please explain your “extensive experience” with the waters that are part of the Illinois EPA’s proposal.
2. Please explain how you are defining the CAWS waters and the Lower Des Plaines River.
3. How long has EA been employed by Midwest Generation?
4. When were you hired by Midwest Generation to specifically review Illinois EPA’s regulatory proposal?
5. What do you mean when you say that you have been “engaged by Midwest Generation to review and analyze information and data to assess the use designation issues relating to aquatic life goals for the CAWS and Lower Des Plaines River ...”?
6. In your opinion how has the Illinois EPA failed to adequately consider and assess the unique aspects of the CSSC and Upper Dresden Island Pool in determining whether these water bodies are capable of attaining CWA aquatic life goals?
7. What would you have done differently from the Agency when looking at the CSSC and the Upper Dresden Island Pool? Is this reflected in the report attached to your pre-filed testimony?
8. What do you mean when you say “balanced population”?
9. What are the “limiting physical and biological conditions of these waters”?

10. How did you go about assessing the potential applicability of the UAA factors (excluding Factor 6) to the CSSC and Lower Des Plaines River with respect to aquatic life uses?

11. Did you in essence attempt to redo the UAAs done for these waters? Have you performed or participated in other UAAs?

12. You testify on page 2 of your pre-filed testimony that one of your tasks for Midwest Generation was to conduct "a review of the aquatic habitat suitability for the CSSC and Upper Dresden Island Pool ("UDP") directly relevant to Illinois EPA's Proposed UAA rules..." You also title Exhibit 2 to your testimony Report on the Aquatic Life Use Attainability Analysis for the South Branch of the Chicago River, the Chicago Sanitary and Ship Canal and the Upper Dresden Island Pool. Why do you not mention the Brandon Pool as part of this analysis?

- a. Please define the starting and ending point of the CSSC.
- b. Please define the starting and ending point of the UDP.
- c. Did you review the aquatic habitat suitability for the Brandon Pool?
- d. Are your conclusions on the Brandon Pool included with your testimony?

13. Page 2, states, "Due to the limiting physical and biological conditions of these water bodies (conditions wholly unrelated to thermal discharges), the present fish community in the CSSC and the UDP is limited in diversity and quality and does not represent a balanced population. Therefore, it is my professional opinion, based on extensive experience and firsthand knowledge of these waters, that the limiting conditions adversely affecting them

preclude the attainment of CWA aquatic life goals.” Did you purposely exclude the Brandon Pool?

14. Based on your understanding of the Agency’s proposal: Is the South Branch of the Chicago River expected to meet the CWA aquatic life goals? Is the Chicago Sanitary & Ship Canal expected to meet the CWA aquatic life goals? Is Brandon Pool expected to meet the CWA aquatic life goals? Is Upper Dresden Island Pool expected to meet the CWA aquatic life goals?

15. What is a limiting “biological condition” as you use that term on page 2 of your pre-filed testimony?

16. Why do you conclude that the “limiting physical and biological conditions of these water bodies” are “wholly unrelated to thermal discharges.” See page 2 of pre-filed testimony.

17. On page 2 of your pre-filed testimony you state “Under U.S. EPA’s rules, the existence of any one of the six UAA factors alone is sufficient to demonstrate that a water body is not capable of meeting CWA aquatic life use goals.”

- a. Is it correct that you analyzed 5 of the 6 UAA factors and found 4 of them applicable to the CSSC, South Branch Chicago River and Upper Dresden Island Pool?
- b. Do you agree that there is no requirement in U.S. EPA’s rules to examine all 6 factors?
- c. Do you know if Midwest Generation has asked someone else to perform a Factor 6 analysis?

- d. Explain why Factor 1 was found to be not applicable.
- e. Explain in more detail how you think the “natural, ephemeral, intermittent or low flow conditions or water levels prevent attainment of the use?” Aren’t the issues that you raise under Factor 2 more appropriately reflected in Factors 3 or 4? You discuss high flow conditions and their impact on the aquatic life. How is this relevant to a Factor 2 analysis?
- f. You also state on pages 2 and 3 of Exhibit 2 “Peak flows, in particular, adversely affect certain fish...” Explain where Factor 2 addresses high flow conditions.
- g. You state on page 3 of your pre-filed testimony that “Similarly, low flow regulation, which is controlled by the U.S. Army Corps of Engineers in anticipation of flooding, can also adversely affect fish by exposing fish nests and eggs to ambient air and causing stranding in shallow areas, which leads to increased predation on fish.” Please provide an example of this phenomenon on the CAWS or Lower Des Plaines River.
- h. Can you compare environmental flow characteristics in the CAWS with that of other regulated rivers in the Midwest? Have you examined specific variables of flow (e.g., The Nature Conservancy IHA variables) and are these significantly different than other regulated rivers that perform in a way to minimally meet CWA objectives? How would you describe the gradient of flow conditions

as you pass from the CSSC to the UDP? Do you have any direct evidence of nest abandonment or nest stranding due to flow variation in the CSSC or UDP? Are variables such as flashiness of flow less severe in large vs. small waterways because of volume?

18. In describing the applicability of factor 2 you only reference conditions in the CAWS. Is it your testimony that factor 2 is applicable to the Lower Des Plaines River also?
19. Please explain how high flow affects aquatic life? And for low flow?
20. Do you have data, from the waters addressed in this rulemaking, showing that these flows adversely affect fish by causing nest abandonment and displacement of recently hatched fish and by causing sediment deposition that buries and suffocate eggs?
21. How high does the flow need to be to cause these problems?
22. How low does the flow need to be to cause these problems?
23. Do you have any data, from the waters addressed in this rulemaking, showing that “barges produce wakes or waves that push water into the backwater channels, causing rapid changes in the water levels and stirring up harmful sediment”?
24. What “extensive studies” are you referring to on p. 4 of your pre-filed testimony with respect to sediments?
25. What “higher quality fish” are you referring to on P. 4 of your pre-filed testimony?

26. How did you come to the conclusion reached on P. 4 of your pre-filed testimony that the removal of one limiting factor, such as sediments would not improve aquatic habitat? How many factors would need to be eliminated before one sees improvements in aquatic habitat?

27. What areas were sampled in 2003 that helped you come to the conclusion that sedimentation was moderate to severe in 70% of the area where QHEI scores were assessed?

28. What was the percentage of sedimentation that was moderate or severe for 2008?

29. What "extensive studies" are you referring to on P. 5 of your pre-filed testimony with respect to contaminated sediments?

30. Do you know why contaminated sediments are predominantly found in the side-channels and backwater areas?

31. It is your professional opinion that the sediments will not improve in these waters?

32. On P. 8 of your pre-filed testimony you state "most experts conclude ...", what experts would disagree with Mr. Rankin that streams with QHEI scores 60 or greater are generally capable of supporting a balanced indigenous fish population that are consistent with the goals of the Clean Water Act?

33. Why do you not sample the navigational channels?

34. How are you defining "viable population" as used on p. 12 of your pre-filed testimony?

35. Please explain your conclusion that the Upper Dresden Island Pool has far more in common with Ohio's modified warm water use designation than with Ohio's warm water use designation.

36. Besides Midwest Generation, what other industrial facilities has EA conducted aquatic studies for?

37. What Ohio streams has EA reviewed with respect to use attainment and non-attainment?

38. You testify on page 4 about heavy barge traffic. Are you testifying that barge traffic is a 'protected use' or a 'limiting factor' to aquatic life or both?

a. If barge traffic is a protected use, what standards are necessary to protect that use?

b. If it is a limiting factor, are you saying it is a human caused condition or source of pollution pursuant to UAA factor 3? If so, would it cause greater environmental harm to remove this factor or leave it in place?

39. Why do you consider sedimentation in the CAWS, particularly the UDP, "unpreventable" and "irreversible"? Do you have data to support this?

40. You mention that contaminated sediments exist in all three navigational pools; do you have evidence that more recent sediment that is being deposited is more or less contaminated? Were the samples collected randomly throughout the pools or were they targeted to areas of depositional sediment?

41. You testify that "the fine, silty, and organic nature of sediments in the CSSC and LDR are not suitable for many higher quality fish species which

require hard, clean substrate for spawning and reproduction.” Isn’t it true that many natural waterbodies have this same condition of silty sediments not suitable for certain species of fish?

42. Please define “excess sediments” as you use that term near the bottom of page 4 of your testimony.

43. You state on page 4 of your testimony that “Studies, including those conducted by Mr. Chris Yoder, have documented that streams in highly urbanized areas typically do not achieve CWA’s ‘fishable/swimmable’ goals due to the multiple stressors and physical limitations.” Which studies are you referring to? Why do you mention Mr. Yoder specifically here?

44. Do you mean to indicate the urban areas have a harder time meeting CWA recreational use goals?

45. On page 4-5 of your pre-filed testimony you state, “Even the removal of one limiting factor, such as sediments, would not improve aquatic habitat, as the urban nature of the CAWS and the many sources of pollutants would continue to cause additional fine, silty sediments to be deposited, thus preventing the improvement of aquatic life habitat.” You say “such as sediments”, so does your conclusion in this statement apply to every limiting factor? Is “urban nature” the only relevant limiting factor? Do you mean that no streams in urban areas are capable of meeting Clean Water Act aquatic life goals?

46. Explain your statement on page 5 of your pre-filed testimony where you state that “Deleterious sedimentation in the CAWS is both unpreventable and

irreversible and will remain a major impediment to biological improvements.”

What makes it unpreventable? What makes it irreversible? Where is the deleterious sedimentation coming from? Can you quantify this sedimentation? Do you agree the deposition of new sediments has decreased over time? Do you agree this has resulted in aquatic life improvements? What amount of sedimentation would lead you to conclude the Clean Water Act aquatic life goals could be met?

47. You state on page 5 of your testimony that “extensive studies have found that contaminated sediments occur in all three navigational pools (Brandon, Dresden, and Lockport), but predominantly in the side-channels and backwater areas.” Please identify the extensive studies you refer to. Please identify the side-channels and backwater areas where these studies sampled sediment. Which of these studies addressed areas included in the Upper Dresden Island Pool aquatic life use designation?

48. Your conclusions are stated with regard to the CSSC, South Branch Chicago River and Upper Dresden Island Pool. Do you think factor 3 is met in the Brandon Pool also?

49. Do you see a difference in the impacts of impoundment on the habitat quality of the Brandon Pool from the Upper Dresden Island Pool? Doesn't the Upper Dresden Island Pool have more habitat variety and fewer areas impacted by the impoundments?

50. On page 6 you state that “extensive studies of the nearby Fox River, funded in part by U.S. EPA, documented significant and widespread

adverse impacts on the aquatic communities due to the effects of impounding.”

Is it your testimony that these ‘extensive studies’ concluded these impacts are irreversible? Should Illinois be promoting dam removal as you point out on page 12 of Exhibit 2 which is occurring in Wisconsin and Michigan? What about fish ladders?

51. You testify that the Brandon Pool is 100% impounded and the Dresden Pool is 93% impounded. Are Upper and Lower Dresden included? Where did these figures come from?

52. Explain why you conclude on page 7 that the impacts on the CSSC and Upper Dresden Island Pool from dams is irreversible?

53. Have you sampled impounded waters elsewhere where fish communities are able to “minimally” achieve CWA goals?

54. Have you concluded that Factor 5 applies throughout the CAWS and Lower Des Plaines River?

55. Based on your conclusion that Factors 2, 3, 4 and 5 apply to the CSSC, South Branch Chicago River and Upper Dresden Island Pool, which of these factors apply to the Brandon Pool? Why?

56. Did you rely on any data to conclude that Factor 5 is applicable?

57. Do all “natural” large rivers have riffle/run segments in each sampling reach or are some rivers predominated by pool and other non-riffle habitats? Are these pool and other non-riffle habitats and factors such as cover then the determining factors for fish species diversity? Could enhancement of

such features result in creating habitat for sensitive species characteristic of warmwater rivers capable of attaining the CWA aquatic-life goal?

58. Could you foresee some limited restoration, short of removing the locks and dams that could enhance the UDP? For example could restoration of littoral areas increase habitat heterogeneity and create habitat that could support some of the species associated with waters that “minimally” attain the CWA aquatic-life goal?

59. Based on your extensive experience with the Lower Des Plaines River, please give your professional opinion on the highest attainable aquatic life use for the CSSC. For the South Branch Chicago River? For the Brandon Pool? For the Upper Dresden Island Pool?

60. Page 8, states, “In 1993 and 1994, QHEI scores were derived at 169 locations in the Lockport, Brandon Road, and Dresden Pools, and were on average, found to be low (mean scores in the 40s), demonstrating that habitat generally was of poor quality.

- a. Why did you lump the data from these 4 stretches to be included in the average?
- b. What was the average (and highest and lowest values) of the different segments at Lockport, Brandon Road and Dresden Pools (above and below 1-55)?

61. Are the habitat data collected by EA Engineering in 1993-1994 part of the Lower Des Plaines UAA report and the record of this proceeding? What about the data collected in 2003?

62. How can the QHEI scores from 1993 and 1994 be from 169 locations, but the total sites were “over 100”?
63. Please explain what you mean by a “low” QHEI score?
64. You testify on page 8 that QHEI scores were below 60 in most of the Dresden Pool. Where there any above 60?
65. You testify on pages 8-9 that “These low scores are a strong indication that the majority of the habitat in the UDP is not sufficient to support CWS aquatic life goals.” How much good quality habitat is required to support a balanced aquatic life population in the Upper Dresden Island Pool?
66. You call habitat in the UDP “less poor” but aren’t the scores you generated generally considered “fair” in a narrative sense as stated in the QHEI manual?
67. You state that the habitat quality in the UDP was poor – but weren’t a moderate number of these sites in a range that might be considered “fair”? For example later on page 8 you describe habitat as being on average between 45-50 in the UDP isn’t this considered fair?
68. You also state that cover was a limiting factor in the UDP, is this correct? What did cover scores average in the UDP? Of all of the habitat components which metric would you consider to be the most amenable to enhancement? If cover scores average less than 10 and enhancement could boost scores to 14-15 in the UDP would that increase QHEI scores toward to the upper range of habitat that has the ability to support CWA goals in the UDP?

69. Do you have a citation for your statement on page 10 regarding “the 45-point cutoff that, under Ohio EPA’s use classification protocol, would automatically qualify the UDP as a limited or modified use category...”? What do you mean by “automatically qualify”?

70. On Page 10, you state “the vast majority of habitat in UDP is poor or occasionally fair.” What is a vast majority? Is the vast majority poor or is the vast majority poor or fair?

71. Please explain where you got the following numbers: the navigational channel makes up 50% of the Upper Dresden Island Pool and that it would have scored well below 45 had it been evaluated? Would that be true of all navigational channels in large, navigable rivers?

72. You state at the bottom of page 10 that “Balanced indigenous fish populations that are consistent with CWA aquatic life goals must have suitable habitat, including, for example, sufficient riffles, boulder/cobble substrates, and fast water areas to spawn and reproduce.” Do all large rivers have typically these attributes? What about the Fox River, Mississippi River, Illinois River, Kankakee River, etc.? Are you saying that a water body must have the characteristics of a small stream to be capable of attaining CWA aquatic life use goals?

73. You state on page 11 that the adverse effects of dams on aquatic life in river systems are well documented. Do you believe these adverse effects always result in the inability to attain the Clean Water Act Aquatic life use goals?

Are you suggesting we should downgrade the large rivers in Illinois that have dams from the General Use category?

74. Explain why the habitat limitations you refer to (page 12) are permanent and irreversible?

75. Why do you conclude the population of minnows, darters and suckers in the Upper Dresden Island Pool is not balanced?

76. Do you make a distinction between UDI Pool's ability to support "habitat specialists" and UDI Pool's ability to support viable populations of "habitat specialists"?

77. You testify on page 13 with regard to errors in IBI scores by MBI that these errors "call into question the reliability of MBI's IBI scores and incorrectly portray a higher biological integrity than actually exists in the UDP." Assuming this statement is true and the scores portray higher biological integrity than actually exists in the Upper Dresden Island Pool, doesn't that mean that the disparity between what is existing and what is attainable is that much greater? Doesn't this bolster the Agency's conclusion that controls must be placed on temperature discharges to allow the aquatic community to attain its biological potential?

78. Please explain your understanding of how the Agency relied on IBI data generally? Please explain your understanding of what sources of IBI and QHEI data the Agency relied on? Didn't the Agency rely on [as much/more] data collected by EA than collected by MBI? (page 13)

79. Please provide a reference for your statement on page 14 that Illinois EPA is “contending that the UDP shares characteristics with Illinois General Use waters that enable it to attain CWA aquatic use goals.”

80. You state on page 14 that “General Use waters do not have the combination of channelization, impoundment, commercial navigation, irregular flows, and significant inputs from urban storm water and wastewater discharges that characterize the UDP.” What is the basis for this statement? Don’t General Use waters have each of these characteristics? Aren’t there three General Use segments in the study area?

81. Are you recommending that Illinois EPA adopt Ohio’s use classification system? Should this apply state wide? Is it appropriate to base a statewide use classification system based on the CAWS and Lower Des Plaines River?

82. Please explain how Ohio defines “Limited Warm Water”? Modified Warm water? Impounded (I) subclassification? Do you agree that “Warm Water” is a misleading and outdated terminology? Which Ohio EPA use categories represent attainment of Clean Water Act goals? Do any impounded waters fit into these categories in Ohio?

83. Please explain what use classification under the Ohio system you would give to the Upper Dresden Island Pool? Brandon Pool? Chicago Sanitary and Ship Canal? South Branch Chicago River? What temperature standard would apply to each of these waterbodies under the Ohio regulations?

84. Please explain your statement on page 15 where you state that, “Despite agreeing with Mr. Rankin’s conclusion, the Agency without explanation has completely ignored Mr. Rankin’s recommendation and instead determined that UDP can attain the CWA aquatic life goals.” Should the Agency have ignored the conclusions in the Lower Des Plaines UAA regarding the Upper Dresden Island Pool’s ability to attain the Clean Water Act aquatic life goals? Why?

85. You mention Mr. Rankin’s suggestions about the UDP as a potential “Modified Impounded” use. Did Mr. Rankin make this suggestion based on habitat data alone? Does Ohio consider the biota the “ultimate arbiter” of aquatic life use potential? Did he imply that his conclusion was preliminary given that he did not assess biological data in his study?

86. On page 17 you title section 5 of your testimony “Extensive Fish Surveys Confirm that the CSSC, Including the UDP, is Dominated by Pollutant Tolerant Species, Reflecting Degraded Habitat Conditions.” Are you now trying to say that the Upper Dresden Island Pool is part of the Chicago Sanitary and Ship Canal?

87. Do you know if water quality criteria may differ between an Ohio “Impounded” vs. a CWA goal stream (i.e., Ohio warmwater). Would a modified use be closer in intent to a “Limited” or to a “Warmwater” use?

88. Where in the CAWS has EA conducted fish surveys since 1980? (page 17). How many of the 3,159 collections have been in the Lockport Pool? Have you collected samples in the CAWS upstream of the Lockport Pool?

89. Do you agree that bluntnose minnow are very common in the areas you have collected fish samples? (page 18). Do you agree that temperature standards throughout the CAWS must be protective of this common species?

90. Page 19 of your pre-field testimony you state, "The fish communities in the Upper Dresden Pool and the five mile stretch, Dresden Pool downstream of the Kankakee River, and downstream of the Dresden Lock and Dam were relatively similar to each other and noticeably better than those upstream of Brandon Lock and Dam." What conclusion do you draw by these comparisons between the Upper Dresden Island Pool and the General Use waters downstream of it?

91. Page 19 of your pre-filed testimony you state "Results at thermally-influenced sampling stations were comparable to those at other stations." What do you mean by comparable? How did you determine which sampling stations were thermally-influenced? Can we identify this in your report?

92. Please provide a citation for the following statement "For large rivers like the UIW [Upper Illinois Waterway], any site with >3% DELT [deformities, erosion, lesions, and tumors] anomalies receives the lowest possible IBI metric score." Do you have DELT scores more recent than the 1990's?

93. On page 21 of your pre-filed testimony you discuss the fish sampling conducted following the AS96-10 Adjusted Standard opinion. Do you agree that fish diversity and balance has increased since the earlier sampling?

94. Page 21 of your pre-filed testimony you state, "And although there has been a modest improvement in the UDP in terms of fish abundance since 1993, the same ten species continue to dominate the community of the UDP and the 5-mile Stretch and remain unchanged since before the Adjusted Standard went into effect."

- a. Define modest.
- b. Are there any new species?
- c. Has the habitat improved since 1993?
- d. Has the sediment improved since 1993?
- e. Is this a one time improvement or is it still improving?
- f. What was the percent improvement in fish abundance?
- g. Have fish abundances improved since cooling towers were installed?

95. Would reduction of pollutant loads, reductions in sedimentation, and even moderate enhancement of habitat features result in some recovery of fish assemblages in the UDP? Couldn't this be sufficient to minimally meet CWA goals? Wouldn't such a use provide better recreational activities in the UDP and better protect downstream waters (Illinois River)?

96. On page 22 of your pre-filed testimony you state that MBI QHEI scores do not fall within an "acceptable range of difference compared to the EA QHEI score." What is considered an acceptable range?

97. On page 24 of your pre-filed testimony it appears you claim that the difference in the QHEI scores between the summer and spring seasonal variation

would only count for, at most 3 points. Is this for every season? Do you have any data to support this claim? If yes, please provide that data.

98. You state on Page 29 of Exhibit 2, "...General Use waters in Illinois do not have the combination of ... a much altered winter temperature regime because of those wastewater inputs..."

a. Are the wastewater inputs the only reason for the much altered winter temperature regime?

b. Do the MWGen facilities add excess heat in the winter?

99. With respect to the QHEI scores it seems that you have Des Plaines 283.0 LB, Under Substrates, Quality, $(-2+1)/2=-0.5$ and not -1 repeated twice. Therefore shouldn't the QHEI should be 50.5 and not 49.5?

Questions with respect to Exhibit 2

100. On page 2 of Exhibit 2 of your pre-filed testimony, you state that the present fish community in Lower Des Plaines River does not represent a balanced population. Do you include the Des Plaines River downstream of the Interstate 55 bridge in this opinion?

101. With respect to balance, what is the future attainable condition of the fish community in Lower Des Plaines River? ...in Upper Dresden Island Pool? ...in Lower Des Plaines River downstream of the Interstate 55 bridge?

102. Please explain the statement on page 3 of Exhibit 2 that "Urbanization . . . leads to a variety of factors that are not well understood but whose collective influence is widely accepted."

103. On page 3 of Exhibit 2 (last paragraph) of your pre-filed testimony, you state that Upper Dresden Island Pool does not resemble an Illinois General Use water because General Use waters do not have the combination of the following features that exist in Upper Dresden Island Pool: commercial navigation, receipt of wastewater, altered winter temperatures due to wastewater inputs, extensive urbanization, reversal of flow, periodic but irregular flow alterations, an electric barrier, extensive sedimentation, and "...an almost complete loss of riffles and fast water.". For each of these features that you identified, what direct comparisons have you made that indicate the extent to which the feature differs between Upper Dresden Island Pool and General Use waters of Illinois or between Upper Dresden Island Pool and waters across the U.S. that are designated for aquatic-life uses consistent with the Clean Water Act interim aquatic-life goal?

104. Do reversal of flow and an electric barrier exist in Upper Dresden Island Pool? Where and at what times?

105. Has the Upper Dresden Island Pool portion of Des Plaines River almost completely lost riffles and fast water due to the effects of Dresden lock and dam and Brandon lock and dam? On what information do you base your answer?

106. On Page 4 of Exhibit 2 you state that the Upper Dresden Island Pool "clearly does not have the extent of good or great habitat that is characteristic of General Use Waters..." What do you base this characteristic on? Aren't the General Use waters merely defined as those waters not

classified as Secondary Contact and Indigenous Aquatic life? Is it your testimony that all General Use waters have good or great habitat?

107. You testify in Exhibit 2 that you identified several surveys that have documented direct mortality of fish as a result of propeller strikes. Are you referring to the one study cited on page 8 of Exhibit 2? This study was not conducted in the waters subject to this rulemaking was it? Do you think there are more or fewer fish in the UAA area than in the area where this study was conducted? Is there more barge traffic in the UAA area than in the area where this study was conducted?

108. Do you consider mortality from propeller strikes to be a significant source of mortality in the CSSC? If yes, has this been shown to limit aquatic life use attainment in other rivers with ship traffic (e.g., Ohio or Mississippi Rivers??)

109. You state on page 4 of Exhibit 2 "In this regard, the Ohio EPA's use classification approach of describing categories of streams, such as "Limited Warm Water", "Modified Warm Water" and its use of subclassifications, such as "Impounded", for streams like the CSSC, is a more workable and clearer approach to establishing a multi-tiered use classification under state water quality regulations." Are the water quality standards that Ohio EPA uses for these classifications also appropriate for these waters?

110. You state on page 4 of Exhibit 2, "Also, to the extent that there are those waterways in the state that may share these same stream characteristics, an approach that describes categories and subcategories of use classifications would allow similar waterways to be similarly classified, thereby

eliminating the need or risk of having to continually develop new use classification categories because the Illinois EPA's currently proposed aquatic life use designations are effectively site-specific use descriptions rather than classifications of aquatic life uses." Are the current water quality standards "effectively site-specific use descriptions"? Do you believe that this waterway should be grouped with other waterways in the state that share these same stream characteristics?

111. On page 5 of Exhibit 2 (first full paragraph) of your pre-filed testimony, you state that impoundment is the main factor preventing attainment of Clean Water Act goals in Upper Dresden Island Pool and that remediating the impounded nature of the waterway would require removing or greatly modifying the locks and dams now present. In this context, when referring to Clean Water Act goals, are you referring to the Clean Water Act interim goal for aquatic life?

112. In a waterbody, if impoundment is the main factor that is preventing aquatic life from reaching a more natural condition, is removing or greatly modifying the impoundment structure the only way that aquatic life can attain a more natural condition?

113. Can flow in a river impounded by lock and dam structures be altered without removing or greatly modifying those structures? Short of removal or greatly modifying the lock and dam structures, are there alternative ways to operate these structures that can result in differences in the extent of impacts on aquatic life?

114. Do you know if the current operation of the locks and dams in Lower Des Plaines River accounts for various alternative operating strategies based, in part, on the potential effects of each strategy on the biological condition of the river?

115. In the context of attainability of Clean Water Act goals, on page 5 of Exhibit 2 (second full paragraph) of your pre-filed testimony you mention the potential for instream habitat improvements that could improve the biological potential of Upper Dresden Island Pool. You state that for such improvements to have a measurable effect on fish populations and species, they would have to occur on an unprecedented scale. Do you know how much habitat improvement would be necessary to have a measurable effect on fish populations and species in Upper Dresden Island Pool?

116. Do you know how much habitat improvement would be necessary to have a measurable effect on aquatic-life populations and species, other than fish, in Upper Dresden Island Pool?

117. To determine the appropriate aquatic-life use for a waterbody, is it first necessary to prove that effects of potential habitat improvement on fish populations and species must be measurable?

118. Referring to conditions in Upper Dresden Island Pool on page 5 of Exhibit 2 (second full paragraph) of your pre-filed testimony, you state that "...lack of riffles, fast water, clean cobble/boulder areas, and impoundment..." prevent "...the species that depend on such areas from establishing viable populations."

Do you mean *lack of fast water* and *lack of clean cobble/boulder areas* and the *presence of impoundment*?

119. Is the Clean Water Act interim aquatic-life goal not attainable if viable populations of species that depend on riffles, fast water, and cobble/boulder areas are absent?

120. On page 5 of Exhibit 2 you state that "Here, the main limiting factor in this waterway system is the impoundments." Similarly on page 10 of Exhibit 2 you state "It is the impounding effect caused by these dams that has the greatest effect on the fish community." Please explain what the "main" limiting factor is in your view?

121. Do you agree temperature is also a limiting factor?

122. How many limiting factors can there be at one time?

123. On page 6 of your report (Exhibit 2) you state "It was agreed that the adverse effects of such extreme variations in water level on habitat, by disrupting fish spawning and feeding, are greater than the potential effects of temperature (UAA hearing 1/31/08 at p. 227)." Please identify where this is found in the transcript page cited? Do you agree that this statement in your testimony incorrectly characterizes the testimony of Mr. Yoder on page 227?

124. Referring to conditions in Upper Dresden Island Pool on page 7 of Exhibit 2 (middle) of your pre-filed testimony, you state that the unnatural flow conditions will prevent establishment of a community consistent with the Clean Water Act aquatic-life goals. Is the Clean Water Act interim aquatic-life goal not attainable if flow is unnatural?

125. On page 8 of Exhibit 2 you state “there are no known plans for reducing sedimentation in either waterbody and the contributing sources will continue to add sediment to the waterway.” Are you familiar with the Tunnel and Reservoir Project? Won’t that project result in a significant decrease in sediment loading to the waterway?

126. On page 9 of Exhibit 2 you state again “The unpreventable and irreversible accumulation and physical quality of the sediments that will always be present in the system is limiting further biological improvements in the CSSC and UDP, with existing, depositional area sediment contamination exacerbating the fundamental siltation problem.” Why is the accumulation and physical quality of the sediments unpreventable? Why is it irreversible?

127. On page 9 of Exhibit 2 (top) of your pre-filed testimony, you state that the presence of barges located near the stream bank has adverse effects on fishes. You cite the photographs in attachment 2a. How do these photographs indicate adverse effects of barges on fish?

128. How many barges over what length of stream bank are required to determine that a stream is unable to attain the Clean Water Act interim aquatic-life goal?

129. On page 9 of Exhibit 2 (first full paragraph) of your pre-filed testimony, you state that the sediments in Upper Dresden Island Pool are not suitable for many higher quality fish species. Is the Clean Water Act interim aquatic-life goal not attainable if the stream bottom is not suitable for many higher quality fish species?

130. At the top of page 10 of Exhibit 2 you discuss sediment data ratings in the Upper Dresden Island Pool. You state that in 2003, 23 of 34 sites had moderate to severe sedimentation and in 2008 the figure was 33 sites out of 50. How many sites in each year were moderate? How many were severe?

131. You state on page 10 “Based on the observations of EA field crews during the 2003 and 2008 Upper Dresden Pool field surveys, sedimentation appears to have gotten worse over the past 5-10 years in some areas (e.g. DuPage Delta).” How does this compare to results from the 1990’s? Have the results also improved over the last 5 years in other areas? Is the DuPage River delta part of the waters addresses in this rulemaking?

132. On page 10 of Exhibit 2 (middle) of your pre-filed testimony, you state that in Lower Des Plaines River, flow is controlled entirely by Lake Michigan diversions, effluents from large POTWs, and water-level manipulation to accommodate barge traffic. You also state that only 1 mile of Dresden Island Pool is not impounded. Are you saying that the entire flow of Lower Des Plaines River is accounted for by these three factors?

133. On page 11 of Exhibit 2 of your pre-filed testimony, you state that impoundment effects in Upper Dresden Island Pool eliminated or greatly reduced large groups or classes of fishes, including all that are obligate riffle dwellers and other species that spend much of their life in fast water over hard substrates. What obligate riffle dwellers and other species of fish that spend much of their life in fast water over hard substrates were eliminated, from the part of Des Plaines

River that is now Upper Dresden Island Pool, by creation of the Dresden and Brandon locks and dams? On what information do you base your answer?

134. Is the Clean Water Act interim aquatic-life goal not attainable if fish species that are obligate riffle dwellers are absent?

135. On page 14 of Exhibit 2 of your pre-filed testimony, you state that the dams prevent the attainment of Clean Water Act aquatic life goals in the Upper Dresden Island Pool because dams have changed the system from a river to a series of lakes. What criteria did you use to determine that Dresden Island Pool is a lake?

136. On page 14 of Exhibit 2 of your pre-filed testimony, you state that the dams prevent the attainment of Clean Water Act aquatic life goals in the Upper Dresden Island Pool because dams have eliminated riffles, except in the Brandon tailwaters. Is the Clean Water Act interim aquatic-life goal not attainable if riffles are absent?

137. On page 14 of Exhibit 2 of your pre-filed testimony, you state that the dams prevent the attainment of Clean Water Act aquatic life goals in the Upper Dresden Island Pool because dams interrupt fish migration. Is the Clean Water Act interim aquatic-life goal not attainable if fish migration is interrupted?

138. Do dams interrupt migration of aquatic life, other than fish, as much as they interrupt fish migration?

139. On page 16 of Exhibit 2 of your pre-filed testimony, you state that fishes identified as simple lithophils by Ohio EPA require cobble/boulder

substrates to spawn. Does Ohio EPA's definition of simple lithophil include the requirement of cobble/boulder substrate for spawning?

140. You state on page 16 of Exhibit 2, "Some may contend that because these studies have shown the presence of spawning activity in the CSSC and UDP, this translates to the conclusion that better water quality conditions in these waters will result in an aquatic community that attains the Clean Water Act aquatic life goals." Do you agree that the Clean Water Act requires protection of early life stages of species where attainable? Do you agree that where early life stages are an existing use that they are an attainable use? What are the dissolved oxygen requirements of the early life stages you have found in the Upper Dresden Island Pool?

141. What is the IWBmod criteria? (Page 17 of Exhibit 2).

142. "The fact that the same 10 species dominated the area before the current ComEd/MWGen Adjusted Standard went into effect as have dominated after it went into effect indicates that the slightly higher thermal standards allowed by the Adjusted Standard did not affect fish populations." What do you mean by "slightly higher thermal standards"? Do you have any data comparing the ambient temperatures of the Upper Dresden Island Pool, Brandon Pool or the CAWS before and after AS96-10 took effect?

143. You state on P. 18 of Exhibit 2, "Ohio EPA (1987, plus 2006 update) classifies fish based on their tolerance to environmental perturbations such as decreasing water and habitat quality. How are these classifications related to thermal impacts?"

144. On page 18 of Exhibit 2 you testify regarding the number of tolerant, moderately tolerant and intolerant fish species found in the Dresden Pool. What source or sources did you look to for classification of these species? Why do you conclude on page 18 that "The preponderance of moderately tolerant and highly tolerant fishes reflects the degraded habitat of Dresden Pool."? How do you know it's not because of the thermal pollution? Or low dissolved oxygen levels?

145. On page 18 of Exhibit 2 of your pre-filed testimony, you state that the present fish assemblage in Upper Dresden Island Pool is more abundant, has more species, and has higher scores for the modified Index of Well-Being ("IWBmod") than in 1993-1995. You also state several times throughout your testimony and associated documents that physical-habitat factors related to impoundment currently are the primary limiting factors to fish in Upper Dresden Island Pool. In 1993-1995, was Upper Dresden Island Pool impounded and subject to similar impoundment-related physical-habitat factors as occur presently?

146. On page 19 of Exhibit 2 of your pre-filed testimony, you state that attainment of Clean Water Act goals in upper Dresden Island Pool will not occur absent removal of locks and dams and cessation of barge traffic. Is the Clean Water Act interim aquatic-life goal not attainable if locks, dams, and barge traffic are present?

147. On page 20 of Exhibit 2 you state "When Mr. Rankin, the developer of the QHEI, visited the area in 2004, he concluded that the appropriate

classification for the UDP would be 'Modified Warmwater Habitat, Impounded.'

Do you agree that a "visit" to the area is sufficient basis to make a use classification recommendation that is other than a preliminary at best?

148. On page 21 of Exhibit 2 of your pre-filed testimony, you state that a QHEI score of 45 is the cutoff that automatically pushes an area into Ohio EPA's limited or modified use category that is intended for waters that cannot attain the Clean Water Act aquatic life goal. Are all Ohio waters that have QHEI scores less than 45 designated for an aquatic-life use less than the Clean Water Act interim aquatic-life goal?

149. You state on p. 22 of Exhibit 2 of your pre-filed testimony that, at RM 279.5 in July 2008, EA did not observe aquatic macrophytes. Referring to RM 279.5, you state that "...this area does not have...aquatic macrophytes." Why does the QHEI fieldsheet (in Attachment 2E to your pre-filed testimony) of EA observations at this site (RM 279.5) in July 2008 indicate the presence of aquatic macrophytes for the "Cover" metric?

150. If two trained QHEI observers are scoring the "Cover" metric in a section of river, which of the two following scenarios is more likely: One observer misses seeing one or more cover types that are actually present (and were noted by a second observer), thus resulting in an underestimate of the correct "Cover"-metric score; or one observer imagines seeing one or more cover types that are actually not present (and were not noted by a second observer), thus resulting in an overestimate of the correct "Cover"-metric score?

151. On page 23 of Exhibit 2 of your pre-filed testimony, you state that the QHEI score determined by MBI in year 2006 is “too high” at River Mile 279.5 of Des Plaines River (in Upper Dresden Island Pool). On page 22, you provide two columns of QHEI metric scores for comparison. For the second column of metric scores on this page, which you identify as EA’s metric scores observed at “RM 279.5,” why do these metric scores differ from the metric scores on EA’s QHEI fieldsheets (in Attachment 2E to your pre-filed testimony) for River Mile 279.5?

152. On page 26 (last paragraph) of Exhibit 2 of your pre-filed testimony, you criticize MBI for not including the fish species, black crappie or white crappie, in the count of sunfish species for the corresponding IBI metric. If one undercounts the number of sunfish species for a stream location, what is the probability that such a mistake would result in overestimating the correct number of sunfish species present and consequently overestimating the fish IBI score at a location?

153. For how many fish samples collected by MBI in 2006 at locations in Upper Dresden Island Pool or in Brandon Pool did this purported mistake result in underestimation of the correct fish IBI score at a location?

154. Specifically where, in the rulemaking record, did you find that MBI did not include black or white crappie in the count of sunfish for the corresponding IBI metric?

155. You state on page 27 of Exhibit 2 “Further, EA cautions that the usefulness of the QHEI data in Exhibit 32 is minimal due to differing methods of

how QHEI values were calculated...” Is it your testimony that older habitat data from EA is of minimal usefulness due to the subsequent change to the QHEI calculation methodology? Why would we ever update or refine these methods if the historical data immediately became unusable?

156. You state on page 27 of Exhibit 2 that the 1 mile of habitat in the Brandon tailwater makes up only 7% of the Dresden Pool. What percentage does it constitute of the Secondary Contact and Indigenous Aquatic Life portions of the waterway?

157. You state that since EA has used the QHEI to evaluate many streams and rivers in Illinois, Indiana, Ohio, and elsewhere, including thin the Lower Des Plaines River (LDR).” Have you had any training by Ohio EPA on the methodology? Do you know if Joe Vondruska received training? Which EA staff has been trained to perform QHEI assessments? Which ones have been certified?

158. On page 27 of Exhibit 2 (second paragraph) of your pre-filed testimony, you state that attainability of Clean Water Act aquatic-life goals requires presence of “...a variety of habitat types...” and amounts (of each habitat type) that are “...sufficient to support viable populations of various fishes.” Is the Clean Water Act interim aquatic-life goal not attainable in a waterbody if most or many members of each and every one of the following species groups are not able to flourish: darters, walleye and sauger, suckers, madtoms?

159. Is the Clean Water Act interim aquatic-life goal not attainable in a waterbody that cannot support most species of darters, most species of madtoms, many species of suckers, walleye, and sauger?

160. How many habitat-specialist species of fish and habitat-specialist taxa of non-fish aquatic life are required to determine that a stream is unable to attain the Clean Water Act interim aquatic-life goal?

161. On page 28 of Exhibit 2 (top paragraph) of your pre-filed testimony, you state that habitat limitations in Upper Dresden Island Pool will not improve, regardless of whether and how water quality standards are changed. To define and designate appropriate designated uses, is it first necessary to prove that improvement in biological conditions will occur?

162. On page 29 of Exhibit 2 (middle paragraph) of your pre-filed testimony, you state that the presence of silt reduces biodiversity. You also state that excessive amounts of silt reduce or eliminate desirable fish species and provide advantage to undesirable fish species. Do all waters in which silt is present lack an acceptable amount of biodiversity?

163. Is the Clean Water Act interim aquatic-life goal not attainable in a waterbody if desirable fish species are absent?

164. What part of the Clean Water Act interim aquatic-life goal addresses the desirability of each fish species? What part of Illinois EPA's proposed aquatic-life use for Upper Dresden Island Pool addresses desirability of each fish species?

165. On page 30 of Exhibit 2 (second paragraph) of your pre-filed testimony, you state that in your year-2008 survey of Upper Dresden Island Pool, silt was moderate to heavy at 66% of locations and that embeddedness was moderate to extensive at 66% of locations. Do these results indicate that silt and embeddedness were less than moderate at 34% of locations in Upper Dresden Island Pool?

166. What quantity of silt represents a "moderate" condition? What quantity of silt represents a "heavy" condition?

167. What quantitative amount of embeddedness represents a "moderate" condition? What quantitative amount of embeddedness represents an "extensive" condition?

168. Is the Clean Water Act interim aquatic-life goal not attainable if the amount of silt is moderate or greater?

169. On page 30 of Exhibit 2 (second paragraph) of your pre-filed testimony, you state that in your year-2008 survey of Upper Dresden Island Pool, silt was the only substrate at 24% of locations. At these 24% of locations, did you observe the entire stream bottom?

170. Do these results indicate that bottom types other than silt were present at 76% of locations in Upper Dresden Island Pool?

171. Which 1-mile part of Dresden Island Pool is not impounded? How did you determine that this mile is not impounded while the remainder is impounded?

172. On page 32 of Exhibit 2 when referring to the requirement to address the possibility of remediation of a limiting factor you state “Here, the main limiting factor in the waterway system is the impoundments.” Did you consider and examine remediation of other “limiting factors”?

Questions for Dr. Alan Burton

General Questions

1. Please explain how you are defining the term Upper Illinois Waterway (UIW) and Upper Illinois Waterway System in the context of your testimony?
2. When were you retained by Midwest Generation to provide technical support concerning Illinois EPA’s proposal?
3. What other projects have you done on behalf of Midwest Generation?
4. What other Use Attainability Analyses have you been involved with or performed in the Midwest?
5. Who conducted the extensive sampling in the Upper Illinois Waterway from 1994 to 2008 referenced on page 5 of your pre-filed testimony? Were you involved in this sampling? If yes, please explain your role.
6. What studies, authored by you and others, are you referring to on the top of page 5 of your pre-filed testimony with respect to urban and agricultural storm waters?
7. Please explain the basis for the statement on page 4 of your testimony that “The Upper Dresden Pool (“UDP”) area just like many areas in the

Des Plaines watershed has multiple causes and sources of use impairment.”

Which Illinois EPA 305(b) reports, 303(d) reports and Integrated reports did you review?

8. On page 3 of your testimony you state “As documented by the Illinois EPA in its recent integrated water quality assessment reports submitted to the U.S. Environmental Protection Action [sic] (“U.S. EPA”), the Des Plaines River is heavily polluted and ranks among the most impaired water bodies in Illinois.” Are you referring to the Draft 2008 report in this statement? What specifically is this statement based on in that report? Are you referring to the entire Des Plaines River?

9. On page 4 of Attachment 1 you make the following statement “The quality of the Des Plaines River ranks among the worst in the state (and likely the nation), in number of impaired reaches (USEPA 303d Fact Sheet).” What do you base this statement on? What is the citation to the U.S. EPA Fact Sheet you refer to here? How many impaired reaches are you referring to and for which uses are they impaired?

10. On pages 10-11 of Attachment 1 and page 8 of your pre-filed testimony you discuss a recent USGS study of the Illinois River Basin. When was this study performed? Please identify what area you are referring to in the following statement “These recent findings soundly document that this is one of the most (if not the most) impaired watersheds in the nation.” Please explain why you think this USGS study is relevant to this proceeding and why the Illinois EPA has “not considered the important results and findings of the USGS study”?

What other river basins did USGS compare the Illinois River Basin to in this study?

11. On page 4 you discuss the causes of impairment in Hickory Creek. Are you suggesting that because that waterbody is not currently in attainment with the General Use designation that it is incapable of attaining these uses? Isn't it true that many waters are not currently attaining their highest attainable use?

12. On page 5 of Attachment 1 you discuss four tributaries to the Lower Des Plaines River and the sources of impairment of aquatic life uses in these streams. The streams discussed are: Hickory Creek, Grant Creek, Jackson Creek and DuPage River.

- a. Are each of these waterways designated as General Use waters? Is it your testimony that these waters are having a negative impact on the Lower Des Plaines River?
- b. If so, what portion of the flow of the Lower Des Plaines River do these sources make up? What impact will Total Maximum Daily Load allocations for these waterbodies have on the Lower Des Plaines River?
- c. Is it your testimony that the Upper Illinois Waterway is the source of impairments and cause of inability to attain Clean Water Act aquatic life use goals in the Lower Des Plaines River and CAWS?
- d. What tributaries are impacting the CAWS?

13. Please explain the following statement from page 4 of your testimony and page 5 of Attachment 1 that “there is no documented evidence of significant improvement in beneficial use attainment” in the Upper Illinois Waterway since the 1970s.

- a. What do you mean by “beneficial use attainment” in this sentence?
- b. Is it your testimony that there has been no improvement in the CAWS and Lower Des Plaines River since the 1970s?
- c. Has there been any progress towards beneficial use attainment for any of the stressors?
- d. Have you relied on any biological data to reach your opinion? Does biological data show improvement in the numbers and diversity of fish species since the 1970s? What about since the 1990s?
- e. Have the ammonia levels reduced since the 1970s?
- f. Hasn't the quality of the CAWS and Lower Des Plaines River in fact improved greatly since the 1970s?

14. When you state on page 2 of Attachment 1 that one important component of a “weight-of-evidence” approach is that dominant stressors (including their spatial and temporal patterns) are clearly defined.

- a. Describe what you mean by “weight of evidence?”
- b. How does this approach deal with multiple stressors?

- c. If you conclude that multiple stressors are preventing attainment how do you determine their relative dominance?
- d. What should be done to address a situation with multiple stressors present?

15. Please explain what is meant on page 4 of your pre-filed testimony when you state, "it is important to understand that with many urbanized watersheds, such as the Des Plaines, the removal of one stressor alone will not be sufficient to restore a watershed to beneficial use attainment."

- a. Identify other urbanized watersheds, such as the Des Plaines, that you have studied previously.
- b. How many stressors would have to be removed before you are able to restore a watershed to beneficial use attainment?
- c. Can you identify the "one stressor alone" that you think that the Illinois EPA's proposal is removing?
- d. Can you identify stressors that have already been removed from this system in the last 30 years or are in the process of being removed?
- e. Will the completion of TARP continue to remove stressors from this system? Since you have identified improvement in water quality with its initial construction, why don't you think future completion of this project will improve water quality further?

16. Mr. Seegert has testified that UAA Factor 2 which refers to “natural, ephemeral, intermittent, or low flow conditions or water levels [that] prevent the attainment of the use...” applies to these waterways.

- a. Did you look at this factor?
- b. Do you believe that this factor is applicable?
- c. Do you agree this factor only addresses low flow conditions that cannot be mitigated by the discharge of sufficient volumes of effluent discharges?

17. When you state that three of the six UAA factors apply to the Upper Illinois Waterway, please explain exactly which waters you are referring to? What waters besides those currently designated as Secondary Contact and Indigenous Aquatic Life Use are you recommending for a downgrade?

18. At the top of page 4 of your testimony you state: “Until the stressors causing the beneficial use impairments are reduced significantly, there will be ongoing risks to the aquatic biota and to humans that consume fish in the CAWS and Des Plaines River.” Explain what you mean by “reduced significantly”? Which specific stressors and what degree of reduction are you referring to?

19. When you say it is not “feasible to correct these factors or limitations sufficient to attain the CWA goals” what do you mean? Is feasible the same as physically possible? Are the conditions irreversible? How far in the future does your conclusion apply?

Temperature Questions

20. On page 3 of your testimony you state “Importantly, thermal modification has never been identified by the Illinois EPA as a cause of impairment.” What do you mean by the term “thermal modification”? Is this term the same or different than “thermal pollution”?

- a. Why do you testify that this is “important”?
- b. Do you know the methodology used to determine whether this parameter, or any chemical parameter, is listed as a cause of impairment for Secondary Contact and Indigenous Aquatic Life Use waters?
- c. Do you know if any of the Secondary Contact and Indigenous Aquatic life waters in Illinois are listed as impaired for their designated use? If so, which reaches in the CAWS and Lower Des Plaines River have been found to be impaired? Does Illinois EPA list causes of impairment when a waterbody is found to be attaining its designated use?
- d. In order for temperature to be listed as a cause of impairment in the Upper Dresden Island Pool wouldn't the Illinois EPA need to have data demonstrating violations of the Secondary Contact and Indigenous Aquatic Life standard of 100°F?

- e. Do you know what data is available for assessing compliance with the Secondary Contact and Indigenous Aquatic Life temperature standard in the CAWS and Lower Des Plaines River?

21. On page 11 of your testimony you state, "The authors of the LDR UAA Report incorrectly imply and over-generalize that high temperatures are always detrimental." You also state on page 16 of Attachment 1 that "While temperature can certainly be a stressor, a literature review found that warm temperatures can be both advantageous and detrimental to aquatic biota (IEQ 1995)."

- a. What high temperature do you believe that the authors of the Lower Des Plaines River UAA are referring to?
- b. Did you find any literature sources that indicated temperatures of 100°F in the receiving stream can be advantageous to the aquatic community? What about temperatures above 93°F?
- c. What high temperatures do you believe can be advantageous to aquatic life? Can you cite to a literature reference for this opinion?
- d. What are the highest "warm temperatures" that were found to be advantageous to aquatic life likely to be found in Northern Illinois?

22. On page 16 of Attachment 1 you state “Another concern not discussed in the Lower Des Plaines River UAA Report is that there are winter maximum temperatures which are impacted by municipal wastewater effluents and may impede some fish reproductive processes.” You also state on page 11 of your pre-filed testimony that “... another concern regarding temperature is that there are winter maximum temperatures which are impacted by municipal wastewater effluents and may impede some fish reproductive processes.”

- a. Is it your testimony that the winter temperatures in the CAWS and Lower Des Plaines River impede fish reproductive processes?
- b. Which municipal wastewater effluents have temperatures which may impede some fish reproductive processes?
- c. What literature data are you relying on to make this statement?
- d. Should the proposal be revised to have lower maximum temperatures in the winter?
- e. Are you aware of any municipal wastewater treatment facilities, in the Midwest, that cool their effluent prior to discharge?
- f. Is it your testimony that winter temperatures in the CAWS or Lower Des Plaines River are preventing attainment of Clean Water Act aquatic life use goals?

23. When you state that the Lower Des Plaines River UAA Report did not consider winter temperatures, did you also review the report titled

"Temperature Criteria Options for the Lower Des Plaines River" by Chris Yoder?

24. What action would you recommend taking to address thermal stressors in the CAWS and Lower Des Plaines River?

25. Is it your testimony that temperature inputs are not a stressor to aquatic life in the Lower Des Plaines River? Do you think thermal inputs are a barrier to ultimate recovery of the Lower Des Plaines River?

26. You state on page 12 of your testimony that "Outside the thermal discharge plume, temperature was not observed as a factor of *in situ* toxicity."

- a. Was temperature observed as a factor of *in situ* toxicity inside the thermal discharge plume?
- b. What was the temperature of the location inside the thermal discharge plume during the *in situ* study?
- c. What have you assumed about the size of that plume in the Upper Dresden Island Pool, Brandon Pool, CSSC and South Branch Chicago River?
- d. What was the purpose of the study? Where you looking for thermal impacts?

27. Can you provide examples of pollutants and species where increased temperatures during summer months can make toxicity worse?

28. Have you evaluated the temperature ranges necessary to maintain a balanced, indigenous population of aquatic life in the Upper Dresden Island

Pool? Have you evaluated the temperature ranges necessary to maintain the proposed designated aquatic life uses for the CAWS Aquatic Life Use A waters and CAWS and Brandon Pool Aquatic Life Use B waters? If not, how can temperature alone be excluded as a critical stressor? How can its relationship to other stressors be evaluated?

Sediment, Turbidity and Non-Point Source Questions

29. On page 3, paragraph 1, of your pre-filed testimony you state: “In 2004, Illinois EPA identified more than 800 causes and sources of impairments. The most common sources of impairment are municipal point source discharges, combined sewer overflows (“CSO”), urban runoff/storm sewers, contaminated sediments, channelization, flow regulation, hydro-modification, and habitat alteration.”

- a. How did you reach the figure of 800 causes and sources of impairments? Aren't there only 65 possible causes of impairment and 55 possible sources of impairment?
- b. What areas of the Des Plaines River does your statement take into account?
- c. Do you know what methodology Illinois EPA uses to list waterways as impaired by contaminated sediments? If so, please explain.
- d. How does the weight of evidence approach you relied upon differ with Illinois EPA's procedure for listing contaminated sediments as a cause of impairment?

30. What conclusions about the sediments were reached based on the work you did for Commonwealth Edison in the mid-1990s?

31. Did you review other sediment bioassay data or studies involving the CAWS, Brandon Pool or Upper Dresden Island Pool? If so, what do those data or studies conclude?

32. Have you conducted or participated in any sediment data generation or studies not contained in the record involving CAWS, Brandon Pool, Upper Dresden Island Pool or any of their tributaries? If so, what were the conclusions of such data or studies?

33. Can you compare the likelihood of impacts from sediment contamination in a small stream compared to a large river? For example, does the degree of available dilution and the ability to avoid toxic hotspots in large rivers make them potentially more resilient than small streams?

34. What are the major sources of pollutants that are found in contaminated sediments in streams and rivers? Is there a general relationship between contaminants measured in the water column and concentrations in the sediment?

- a. Has there been an improvement in water column chemistry related to reductions in loadings from industries and wastewater treatment plants over the last 30 years?
- b. Would you expect that the highest sediment pollutant levels would not be found in more recently deposited sediments?

35. Do you know exactly where sediment samples were collected in the Upper Dresden Island Pool? How were the sites selected? How was it determined that these sites were representative of the reach being sampled? Were certain areas of the Lower Des Plaines River intentionally left out of the sampling design?

36. Do sediment collectors try to find areas most likely to have fine sediment deposition and likely to be “hotspots” of contamination? Does this make it difficult to determine whether sediment contamination is truly limiting to assemblages since organism such as fish may be avoiding the most contaminated sediments? Do you know of rivers with elevated levels of sediment contamination that maintain good aquatic assemblages?

37. Are you suggesting that the fine sediment areas where contamination is high below the Brandon Lock & Dam are the same areas where fish would be spawning? (See page 8 of pre-filed testimony).

- a. Were the sediment samples from the Brandon Lock & Dam taken from the riffle/flowing areas or in depositional areas next to the bank?
- b. Your report on the sediment study suggests there is great spatial heterogeneity in results between samples. How certain can you be about trends or lack of them between the two time periods as a result?

38. What studies are you referring to, on page 9, that showed that “turbidity is a major stressor in both the CSSC and the Upper Dresden Island Pool?”

- a. Explain how these studies showed turbidity in CSSC and Upper Dresden Island Pool is affecting the aquatic life?
- b. Explain how turbidity studies mimic conditions throughout and utilize an array of species present in Upper Dresden Island Pool and Brandon Pool?
- c. What other evidence can you present that demonstrates turbidity is a “dominant stressor” in Brandon Pool and Upper Dresden Island Pool?
- d. Do turbidity and suspended solids exist in streams achieving Clean Water Act goals? What level of turbidity needs to be present for Clean Water Act aquatic life use goals to be unattainable?
- e. Is the turbidity in Lower Des Plaines River significantly different from other large Midwest rivers many of which have the ability to support biological assemblages that can attain the Clean Water Act aquatic life goal? If so, how?

39. On page 4 of your pre-filed testimony you state that “Despite reductions of untreated discharges of sewage from the Metropolitan Water Reclamation District of Greater Chicago’s (“MWRDGC”) tunnel and reservoir

plant (“TARP”), significant loading of raw sewage with associated solids, nutrients and chemical contaminants will continue into the foreseeable future.”

- a. Will you quantify “significant loadings” and explain what levels constitute significance?
- b. What additional control measures does this statement take into account?
- c. What do you mean by the foreseeable future in this context?
- d. Do you know when TARP will be completed? If not, would it change your statement to know that the first phase of the McCook basin will be completed by 2015 and the second phase in 2024 and the Thorton basin will be completed by 2014?

40. Explain how “significant loadings and associated pollutants from ...agricultural nonpoint source storm water runoff, containing harmful chemicals, will continue to impact the aquatic ecosystem.” (See, page 4, paragraph 2).

- a. Where are these agricultural sources located? What portion of the flow to the Upper Dresden Island Pool do these sources make up in dry weather? In wet weather? Is agricultural use increasing or decreasing in the Lower Des Plaines River and CAWS watersheds?
- b. What percentage of the flow and loading to Lower Des Plaines River and CAWS can be attributed to storm water runoff?

- c. How do agricultural and storm water runoff loadings to Lower Des Plaines River differ from other water bodies designated for uses that represent the ability to achieve the Clean Water Act aquatic life goal uses?
- d. What specific levels of agricultural and storm water loadings to Lower Des Plaines River preclude attainment of the Clean Water Act goal aquatic life uses?

41. You state on page 5 of your pre-filed testimony that “The sheer magnitude of urbanization and agriculture in the UIW and lack of effective NPS [non-point source] controls means that NPS-related degradation will be the dominant source of impairment for the foreseeable future.”

- a. What non-point sources are you referring to here? What does foreseeable future mean in this context?
- b. Does the predominance of combined sewers in this area impact your conclusion?
- c. Will plans to reduce the combined sewer overflows to less than four per year impact these pollutants? Is the completion of TARP part of the foreseeable future?
- d. On page 9 of your testimony you call suspended solids and turbidity “This dominant stressor of the UIW, aggravated by barge and navigation traffic...” Is this the same stressor you are referring to above as “NPS-related degradation”? If so,

please explain. If not, which stressor is more dominant in your opinion?

- e. Later on page 9 of your testimony you also state that “When nitrogen is elevated, another stressor of particular concern is ammonia, which can be particularly toxic to certain aquatic species” and “studies have found ammonia to be a primary sediment stressor in the UIW and Brandon Pool area.” What studies have found ammonia to be a primary sediment stressor? How does this stressor rank in dominance compared to non-point source related degradation and turbidity?
- f. What do you mean by lack of effective “NPS” controls?

42. In the first paragraph on page 5 of your pre-filed testimony you testify that “as reflected in recent census data, increased urbanization and population growth in the greater Chicago area is expected to continue.” What data are you relying on in this statement? What portion of this expected growth is going to impact the CAWS or Lower Des Plaines River?

43. At the top of page 5 of your testimony you state: “As I have studied and documented in prior studies, and as well documented elsewhere, urban and agricultural storm waters are often acutely toxic to fish and other aquatic species.”

- a. What “prior studies” are you referring to? Do any of these specifically involve the Lower Des Plaines River?

- b. Are the “prior studies” a part of the rulemaking record?
- c. Will you provide studies or “documentation elsewhere” supporting that urban and agricultural storm water related components of Lower Des Plaines River are acutely toxic to fish and other aquatic species within Lower Des Plaines River?
- d. Does this statement mean that aquatic life are routinely killed off in waterbodies where urban and agricultural stormwater runoff occurs? If so, which studies that you refer to document this?

44. You further state at the top of page 5 that: “U.S. EPA has identified sediment loading from urban, construction and agricultural storm water runoff as one of the most significant pollutants of river systems.” What data or study by U.S. EPA are you referring to in this sentence? What data or studies are you relying upon to conclude that this general statement about runoff is applicable to the Lower Des Plaines River?

45. On page 5, paragraph 2 of your testimony you state: “... depositional sediment in the UIW, including those in the UDP, are severely contaminated”

- a. What data do you rely on for this statement?
- b. Does any of the data include ecological assessments?
- c. How do you classify sediments as “severely contaminated?”

- d. Do toxics in sediments have to be available to the aquatic life before one can classify the sediments as “severely contaminated?” How is toxic availability determined?
- e. Have you demonstrated that sediment in Lower Des Plaines River is “severely contaminated” and that toxics in these sediments are available to and accumulated in the aquatic life?
- f. If you determine a waterbody is “severely contaminated” by sediments does that mean it is always incapable of attaining Clean Water Act goal aquatic life uses?
- g. What level of sediment contamination would prevent Clean Water Act aquatic life goal uses from being attainable?

46. In paragraph 2 of page 5 of your testimony you mention fate and transport mechanisms and processes such as resuspension, advection, bioturbation and diffusion and that all of these processes exist on the Lower Des Plaines River today.

- a. Do these processes exist in most waterways?
- b. What impact does resuspension have on sediment or water quality toxicity?
- c. What data demonstrates that resuspension is resulting in deleterious effects on aquatic life in Upper Dresden Island Pool? What data demonstrates these effects are significant

enough to prevent the Upper Dresden Island Pool from attaining Clean Water Act aquatic life goals?

- d. What effect does advection have on sediment or water quality toxicity? What data that demonstrates advection is resulting in deleterious effects on aquatic life in Upper Dresden Island Pool significant enough to prevent that waterbody from attaining Clean Water Act aquatic life uses?
- e. What effect does bioturbation have on sediment or water quality toxicity? What data demonstrates that bioturbation is resulting in deleterious effects on aquatic life in Upper Dresden Island Pool that is significant enough to prevent that waterbody from attaining Clean Water Act aquatic life goal uses?
- f. What effect does diffusion have on toxicity? What data that demonstrates diffusion is resulting in deleterious effects on aquatic life in Upper Dresden Island Pool significant enough to prevent that waterbody from attaining Clean Water Act aquatic life goal uses?

47. You mention on page 5, paragraph 2 of your pre-filed testimony that contaminant sediment concentrations can steadily increase in depositional sediments.

- a. Are sediment contaminant concentrations actually increasing in this system? What evidence do you base your answer on?
- b. Can contaminant sediment concentrations also steadily decrease in depositional sediments? How?
- c. Do you agree that the levels of contaminated sediments in this system will decrease over time? Why or why not?
- d. Is it your testimony that natural attenuation processes will not occur at this site? Why or why not? What do you base your answer on?

48. Of the four sediment studies you mention on page 6 of your testimony (yours and 3 others) provide the reference for where in these studies it says that “these sediments are often acutely toxic to benthic invertebrates, causing substantial decreases in growth or survival.”

- a. Which U.S. EPA data are you referring to? Is it part of the Record in this proceeding?
- b. Do you believe the source of the contaminants causing this level of toxicity is urban and agricultural runoff?
- c. Do you believe the source of these contaminants is historic or still continuing?

- d. Do any of these sediment surveys contain ecological assessment data such as bioassays? If so, which ones and what did they find?

49. On page 7 you state “Although some of the sediment contamination of the Des Plaines River is attributable to historical discharges and human activities, much of it is on-going...” How much is historical and how much is on-going? Do you agree that the source of the existing legacy contaminated sediments has been eliminated? What about PCBs, for example?

50. In footnote 1 of your testimony you state “SQGs commonly accepted benchmarks that have been widely used in the U.S. for many years to establish ‘clean-up’ levels for federal and state remediation activities and to determine which sediments are toxic and thus represent a threat to aquatic biota.” Why is it called a sediment quality guideline? What do you mean by a commonly accepted benchmark?

- a. How would an SQG be used in setting clean up levels?
- b. How would an SQG be used to determine which sediments are toxic?
- c. How would an SQG be used to determine if sediments represent a threat to aquatic biota? Would no violation of an SQG mean no impairment to aquatic life would be expected? Does a violation automatically mean aquatic life use impairment is present?

- d. Would bulk sediment chemistry benchmark SQGs be used in establishing clean up levels?
- e. What happens next if the SQGs you refer to in your testimony are violated at a contaminated site? What happens if they are not exceeded?
- f. Are these SQGs based on effects to humans from drinking water or fish consumption, impacts to fish or impacts to macroinvertebrates?
- g. Does the presence of sediments that exceed the SQGs mean that fish will not be able to reproduce within that habitat?
- h. Have any recent toxicity studies been conducted to confirm that these sediments are actually toxic to aquatic life? If yes, what were the results? If no, why not?
- i. If you believe the violations of SQGs listed in your testimony would make Clean Water Act aquatic life goal uses unattainable, what aquatic life use would be attainable under these conditions?

51. On page 8 of Attachment 1 you state that SQGs “have been used in Superfund, RCRA and State investigations for many years and are frequently used to establish ‘clean-up’ levels for remediation activities (*Wenning et al. 2005*).” Can you provide a page citation to the Wenning document for this statement? Doesn’t that document state that SQGs are meant for screening

purposes and should not be used to set site-specific clean-up standards or remediation goals?

52. On page 7 of Attachment 1 you state with regard to sediment sampling “All have shown typical high degrees of riverine spatial heterogeneity (i.e., natural variation across the river and longitudinally). This high degree of spatial heterogeneity makes determinations of improvements through time extremely difficult.”

- a. Are the variations in the sediment samples in the CAWS and Lower Des Plaines River “typical” or “high”?
- b. Do you agree that there is not enough data to determine whether sediment levels are decreasing over time? What data would be necessary to make that determination?
- c. You also state on page 7 of Attachment 1 that “high levels of sediment contamination and exceedances of internationally accepted sediment quality guidelines (SQGs) are as common now as in the early 1990s.” What do you base this statement on?
- d. Why do you conclude on page 9 of Attachment 1 that U.S. EPA’s 2001 sediment survey, MWRDGC’s 2007 sediment survey and EA’s 2008 sediment survey found sediment contamination levels “similar to the levels we found in the mid-90’s UIW work (Burton 1995)” ? How are the levels similar? How are they different?

- e. How do you conclude from these studies that “it is likely that depositional sediments are not being cleaned out, capped, or significantly degraded”? (See bottom of page 9 of Attachment 1).
- f. What is the basis for your conclusion on page 9 of Attachment 1 that “In fact, it appears that there has been no improvement in sediment contaminant levels”? Isn’t it true that most samples were lower in 2008 than in 1994-1995?
- g. You state at the top of page 10 of Attachment 1 “For the detected metals . . . the sediment quality has remained the same or has degraded in several areas.” Did more samples degrade or improve? How do you define “remained the same” in this context? Using your definition of “remained the same” wouldn’t it be more accurate to say “sediment quality has remained the same or improved”?
- h. Do sediment levels need to improve in the Brandon Pool for the CAWS and Brandon Pool Aquatic Life Use B designation to be attainable? How high would sediment levels have to be in the Upper Dresden Island Pool for the Clean Water Act aquatic life use goals to be unattainable?

53. When you state on page 7 of your testimony and page 8 of Attachment 1 that “There are no known plans to remove contaminated sediments in the UDP area.” What do you consider the UDP area? Are you aware of any

plans to cap contaminated sediments in the Chicago Sanitary and Ship Canal or the South Fork of South Branch Chicago River? Would plans for capping of contaminated sediments change any of your conclusions regarding the reversibility of impacts to aquatic life from contaminated sediments in the CAWS and Lower Des Plaines River?

54. You go on to state on page 8 of attachment 1 that “even the removal of significantly contaminated and acutely toxic sediments from depositional areas identified throughout the UIW (Burton 1995) would provide but a temporary improvement” because contaminated sediments would re-accumulate. Is it your testimony that the cause of sediment contamination is current discharges of contaminated sediment to the CAWS rather than legacy sediment? What do you base this statement on? Please provide citations to support this conclusion?

55. On page 7 you state: “Further, the fact that the 2008 Sediment Survey reveals highly contaminated sediments similar to what I observed in the mid-90’s, strongly suggests that depositional sediments remain significantly degraded and are not being reduced, contrary to the Illinois EPA’s assumption that sediment quality in the CSSC and UDP is improving.”

- a. When you say the sediments are similar what do you mean? Are the continued loadings you discuss of the same quality as those forming most of the sediments in place now? Is the contamination level increasing? Is the contamination level the same? What do you base your conclusion on?

- b. How did you perform the analysis of the two time periods of sediment sampling? Was the data put through a quality assurance and quality control process? Was the process peer reviewed?
- c. Were any sediment core profiles taken to support the above statement?
- d. Did you collect sediment samples in the CSSC? Did you conduct an analysis that compared the current and historic sediment conditions in the CSSC?

56. You state on page 8, paragraph 1 that “Based on my experience, most depositional sediments that are acutely toxic are located in areas suitable as fish habitat...” Which areas and which sampling sites do you refer to?

- a. Don't fish spend time outside depositional areas as well as in depositional zones?
- b. Don't most sediments, toxic or not, settle out in depositional zones?
- c. Do the fish species that spawn below the Brandon Dam target the shallow waters where the sediment samples were collected? Do any fish species spawn in the riffle areas below the Brandon Dam, that are outside the depositional zones where sediment samples were collected?
- d. Are you familiar with data collected by EA that found larval fish to be present within and below this riffle area?

57. On page 8 you discuss sediment contamination in the Des Plaines River. Is it your testimony that the sources of sediment contamination in the Lower Des Plaines River is upstream contamination from General Use waters? Do you believe these contamination sources make the Upper Dresden Island Pool incapable of attaining the Clean Water Act aquatic life use goals?

58. Please provide the documentation you are referring to on page 6 of your pre-filed testimony with respect to strong correlations between fish tissue consumption advisories and sediment contamination?

59. Please explain "photoinduced-toxicity"? Have you measured photoinduced toxicity in Upper Dresden Island or Brandon Pools? Is it your testimony that photoinduced PAH toxicity is occurring in the CAWS or Lower Des Plaines River? Where? Have you previously found photoinduced toxicity of polycyclic aromatic hydrocarbons is not a concern in the Upper Illinois Waterway?

60. Have any *in situ* toxicity studies been conducted to assess whether photoinduced PAH toxicity is actually occurring in the Lower Des Plaines River sediments?

61. Can the water column attenuate photoinduced toxicity? If so, how is attenuation affected by depth and intensity of UV light? How does turbidity affect photoinduced toxicity? Do you agree that your studies indicate photoinduced toxicity is not a key stressor in this system?

62. Is it correct that the Des Plaines River sampling stations DR 14 and below are downstream of the UAA study area and therefore are in General Use

waters? Are any of the other Des Plaines River sampling stations located upstream of the UAA study area on the Des Plaines River? Have you evaluated whether there are highly localized sources of sediment contaminants at the upstream or downstream Des Plaines River stations?

63. In Table 11, is it correct that the green boxes show samples that were higher in 2008 than in 1994 and 1995, no matter how small or great the increase? Are all white and beige boxes samples that were lower in 2008 than in 1994 and 1995? Is there a color for samples that were the same in 2008 and 1994 as in 1995?

- a. Why aren't all the sampling stations included?
- b. Were sediment samples taken from the same locations in all years?
- c. Doesn't your data show that many of the contaminants have declined in concentration?
- d. Does a chemical's decline or increase correlate to a decline or increase in the bioavailability of that chemical?
- e. Do increases in chemical concentrations necessarily mean increases in bioavailability? Is it possible for the sediment organic carbon content to bind up organic pollutants and reduce their bioavailability? Would this result in reduced toxicity and bioaccumulation potential in aquatic organisms?
- f. What other factors can affect the bioavailability of metals in sediment? Is the acid-volatile sulfide one of these factors?

Have you evaluated this factor in the CAWS or Lower Des Plaines River? If so, what did you conclude?

- g. Why was data within a factor of 2 lower than 1994-1995 concentrations used to suggest similar data? Why was this same approach not used for data above the 1994-1995 values?

64. You state on pages 12-13 of Appendix C that “Based on the results in Table 11, it is our opinion that the differences are not improvement of the sediment quality, but rather improvements in detection limits...” How many samples fall into this category? In your opinion, for which parameters does a change in methodology impact the results?

65. What are the multiple lines of evidence you are relying on to argue that Upper Dresden Island Pool will not meet Clean Water Act goals for aquatic life uses? Where does the weight of evidence lie in your experimental results?

66. Please explain your findings with respect to your study involving *Ceriodaphnia dubia*? Is this study included in the Record? Was it conducted to assess turbidity levels in the Upper Illinois Waterway?

67. What are the impacts to the zooplankton population as referenced on page 9 of your pre-filed testimony? Is turbidity affecting other aspects of the aquatic community such as macrophytes?

68. On page 15 of Attachment 1 please complete the last sentence in the fourth paragraph.

69. Are you familiar with the 1997 USEPA document entitled "The Incidence and Severity of Sediment Contamination In Surface Waters of The United States" ("ISSC")? Did you participate in the publication of this document?
- a. Can you summarize the precautions ISSC discusses in relying on only sediment chemistry data to make conclusions about whether sediments are toxic to aquatic life?
 - b. Does ISSC suggest that sediment chemistry data are appropriate for regulatory criteria, site-specific cleanup standards or remediation goals?
 - c. When should sediment chemistry data be used as anything more than a screening tool to aid in deciding whether more in-depth ecological assessments might be performed?
 - d. Discuss some of the general limitations of the sediment evaluation approach utilized in ISSC.
 - e. Are there any new peer-reviewed methodologies for evaluating sediment toxicity since the publication of ISSC? If so, describe how you applied such methodologies to your work on the Lower Des Plaines River?

Barge Traffic Questions

70. Can you contrast and compare the potential effects on aquatic life of barge traffic in the CSSC and with the potential barge traffic effects in the Brandon Pool and in the Upper Dresden Island Pool?

71. On page 2, paragraph 1 of your pre-filed testimony you state: “My work entails, among other things, an evaluation of sediment contamination and toxicity, review of the literature on temperature, turbidity and barge traffic effect, *in situ* toxicity evaluations around MWGen’s Joliet generating stations, and laboratory evaluations of temperature effects.”

- a. What studies did you find and review on barge traffic effects?
- b. What information or data demonstrates that barge traffic is preventing aquatic life in Brandon Pool and Upper Dresden Island Pool from achieving Clean Water Act aquatic life goals?
- c. What reduction in level or frequency of barge traffic do you believe would be necessary to allow the Clean Water Act goal aquatic life uses to be attainable in the Upper Dresden Island Pool?

72. What water quality is necessary to support barge traffic? How do the proposed water quality standards interfere with the barge traffic use?

73. Do other segments of the Illinois River and other rivers where barge traffic occurs have the ability to attain the interim Clean Water Act aquatic life goal?

Questions related to other chemical stressors: Ammonia, Nutrients, Emerging Contaminants

74. On page 3 of your pre-filed testimony you state “Pollutants such as ... Dissolved oxygen, are ubiquitous.” Do you consider dissolved oxygen a pollutant?

75. When you state on page 5 that “overlying water quality in some cases may be considered relatively good (and may even minimally meet water quality standards)” what do you mean by “minimally”? Did you conduct an evaluation of the water quality? If so, did the results of your evaluation differ from the CAWS or Lower Des Plaines River UAA studies?

76. On page 5 of Attachment 1, with regard to the Upper Dresden Island Pool you state “The dominant stressors include: contaminated sediments, metals, synthetic organic chemicals (including pesticides, PAHs and pharmaceuticals and personal care products (PPCPs), nutrients, flow regime alteration, and degraded habitats.”

- a. Are these listed in order of importance and dominance? If not, place them in order of dominance.
- b. With regard to metals, are you referring to water column or sediment metals? Which metals are you referring to? At what level would each of these metals no longer be a “dominant” stressor?
- c. With regard to synthetic organic chemicals, are you referring to water column or sediment levels? What data are you relying on for this conclusion?

77. On page 5 of Attachment 1, you go on to state “Unless the great majority of these stressors (and their sources) are removed, the CSSC and UDP will continue to be impaired. What do you mean by “great majority”? How many stressors must be removed to allow the South Branch Chicago River and Chicago Sanitary and Ship Canal and the Brandon Pool to attain the CAWS and Brandon Pool Aquatic Life Use B designation?

78. On page 9 of your pre-filed testimony you state “In fact, studies have found ammonia to be a primary sediment stressor in the UIW and Brandon Pool area, and it is significantly correlated with sediment acute toxicity, particle size and organic contaminants.” What studies are you referring to? What locations specifically are you referring to in the UAA study area?

79. You state on page 14 of Attachment 1 that “It is not until below Dresden Pool that levels drop significantly for nitrogen, ammonia, phosphorus and fecal coliforms.” Where precisely do these levels drop? What levels do they drop to?

- a. Do you have any evidence that the Upper Dresden Island Pool is not in compliance with the General Use water quality standard for ammonia? If so, what is that evidence?
- b. What evidence do you have that ammonia is present in toxic amounts to support that ammonia as a stressor to aquatic life in Brandon Pool and Upper Dresden Island Pool?
- c. Is it your testimony that Illinois’ ammonia water quality standard does not protect Clean Water Act aquatic life goal

uses? Do you believe it is protective of the designated uses proposed for the South Branch Chicago River, Chicago Sanitary and Ship Canal, Brandon Pool and Upper Dresden Island Pool?

80. Explain your statement on page 15 of Attachment 1 that “There are at least 3 lines of evidence (chemistry, TIE testing, laboratory toxicity tests) showing ammonia is a major stressor in the CAWS.”

- a. Does your statement refer to ammonia in sediment or the water column? What is the relationship between ammonia in sediment and in the water column with regards to toxicity? Has ammonia been detected in bulk sediment tests?
- b. What TIE testing are you referring to? Who performed this TIE testing? What methodologies were used and what components were tested? Is it part of the Record in this proceeding?
- c. Where were the samples subjected to TIE testing collected? How were the sampling locations selected? Were they intended to be representative samples or conservative, worst-case scenario samples?
- d. What were the conclusions of the TIE testing mentioned above?

81. What recent USGS phosphorus studies are you referring to on page 10 of your pre-filed testimony?

82. On page 14 of Attachment 1 you state “The waters of the UIW from above Chicago through the Dresden Pool have high levels of nitrogen and phosphorus.” What is the basis for this statement? High levels compared to what? How do these levels compare to other areas of the State?

- a. Do you believe nitrogen and phosphorus can be reduced using effluent limits and best management practices on point sources? Is it your testimony that these stressors are irreversible? Why or why not?
- b. Have you factored in any future phosphorus or nitrogen treatment at the wastewater treatment plants in your analysis?
- c. Why have you concluded that these stressors will not be remedied in the foreseeable future?

83. Where has the USGS “attributed the primary degradation of the UIW to elevated concentrations of ammonia and phosphorus, and the presence of organic wastewater contaminants such as disinfectants, pharmaceuticals and steroids, insecticides, and organochlorines.” What did they find not to be a primary source of degradation? Did they rank the factors listed?

84. On page 10 your testimony states, “Recent USGS studies have documented phosphorus concentration exceeding U.S. EPA desired goals to prevent excessive growth of algae and other nuisance plants in every water sample ...”

- a. Which USGS studies are you referring to here?

- b. Do you know how U.S. EPA developed their desired goals for phosphorus? Are the goals based on toxicity?
- c. Have you read the District's preliminary report on phosphorus reduction at the Egan facility?
- d. Is there excessive growth of algae in the Lower Des Plaines River?
- e. Is there excessive growth of other nuisance plants in the Lower Des Plaines River?
- f. Do you have evidence that dissolved oxygen levels in the Upper Dresden Island Pool are being affected by nutrient levels?

85. What studies are you referring to on page 10 of your pre-filed testimony with respect to "fish downstream of municipal wastewaters suffer from exposure to estrogenic chemicals with extreme reproduction disruption and feminization"? Have extreme reproduction disruption and feminization been show to occur in the CAWS or Lower Des Plaines River?

86. What recent U.S. EPA study are you referring to on page 10 of your pre-filed testimony with respect to pharmaceutical compounds in fish tissues?

87. On page 10-11 you state that "A recent lake study conducted in Canada found that fish exposed to levels commonly found in both untreated and treated municipal wastewaters (5-6 ng/L) resulted in feminization of males and ultimately a near extinction of the fathead minnow species from the lake." What

compound or compounds is this concentration referring to? Have these levels been shown to occur in the CAWS or Lower Des Plaines River?

88. Please provide any data you are relying on for pharmaceutical and personal care products levels in the Upper Dresden Island Pool?

89. Have you reviewed any data on endocrine disrupting compounds taken by the Metropolitan Water Reclamation District of Greater Chicago in collaboration with U.S. EPA? Do you know which of these compounds have been detected in the ambient water quality monitoring network in the CAWS?

90. Have you reviewed any data of actual endocrine disruption in the CAWS or Lower Des Plaines River?

91. Page 10 of your pre-filed testimony states, "The UIW and the UDP are also adversely impacted by organic compounds collectively referred to as "emerging contaminants," which include endocrine-disrupting compounds (EDCs) found in many pharmaceutical and personal care products (PPCPs) and veterinarian and livestock operations."

- a. Does USEPA currently have guidance or criteria on "emerging contaminants"?
- b. Are you an expert on these "emerging contaminants"?
- c. Do you believe that they should be regulated in the proposed water quality standards?
- d. Are veterinarian and livestock operations significant sources of endocrine-disrupting compounds in the CAWS and Lower Des Plaines River?

- e. What level of emerging contaminants would prevent spawning? Do you have any data to support this? Are fish surviving in the Lower Des Plaines River?

92. On page 4, paragraph 1 of your testimony you state: "Dominant stressors for the UDP include contaminated sediments, metals, nutrients, synthetic organics (e.g., pesticides, carcinogenic polycyclic aromatic hydrocarbons ("PAHs"), pharmaceuticals and personal care products ("PPCPs"))"

- a. Are you referring to metals, nutrients, synthetic organics pharmaceuticals and PPCPs in the sediments or the water column or both, and what is the basis for your statement?
- b. What data demonstrates levels of metals, nutrients, synthetic organics pharmaceuticals and PPCPs in the water column are detrimentally affecting the aquatic life in Lower Des Plaines River?
- c. What data that demonstrates levels of pharmaceuticals and PPCPs in the sediments are detrimentally affecting the aquatic life in Lower Des Plaines River?

93. What data is available that endocrine disrupters or PPCPs are present in Brandon Pool and Upper Dresden Island Pool at levels that are affecting aquatic life? Are most effluent dominated waterways incapable of attaining Clean Water Act aquatic life goal uses because of endocrine disrupters

or PPCPs? Are you aware of any U.S. EPA water quality or effluent standards for endocrine disrupters or PPCPs?

94. Is the discharge of EDCs and PPCPs unique to the CSSC and the Upper Dresden Island Pool? Do other rivers receive similar levels of these pollutants and maintain the ability to attain the Clean Water Act's interim aquatic life use goal?

95. Are you suggesting on pages 10-11 of your testimony that all waters that receive discharges of "emerging contaminants" can not attain the Clean Water Act aquatic life use goals? If not, what levels of emerging contaminants would prevent the ability to attain the Clean Water Act aquatic life use goal?

96. On page 6 you state "This widespread contamination in the UIW is reflected in the many fish consumption advisories posted throughout most of the Des Plains [sic] watershed due to the high levels of mercury and PCBs found in sediments." What is the basis for this statement? How do the fish consumption advisories in the CAWS and Lower Des Plaines River differ from the rest of the State of Illinois?

97. What conclusion is to be drawn from your statement on page 12 that "Nitrification is also inhibited by cold temperatures and ammonia is not always consumed in the upper sediment layers"?

98. Page 15 of your pre-filed testimony states, "Acute toxicity of water and sediments, unrelated to temperature, is and will remain a major limitation on the potential of this water body to achieve CWA aquatic life goals." Which

parameters in the water are acutely toxic? Do you have documentation that the water is acutely toxic?

99. On page 15 of your testimony you state the “development of new, modified standards, including thermal standards, will not address the key issue of excessive and pervasive pollution sources, excessive use impairments and limited habitats in this watershed.”

- a. What “excessive and pervasive pollution sources” are you are referring to here?
- b. Do the current Secondary Contract and Indigenous Aquatic Life Use water quality standards sufficiently protect the current and potential biological condition of this system?

Concluding Questions

100. Why is it your opinion that “the heavily human-dominated nature of this waterway and the attendant stressors that shape the aquatic ecosystem will not change”? Have any stressors been reduced over time? Is it possible for them to be reduced in the future? Are all waterbodies with the stressors you list in your testimony unable to attain the Clean Water Act aquatic life use goals?

101. Is it your opinion that over time this waterway has not been improving and will not improve?

102. Can you compare the feasibility of habitat restoration in the CSSC with feasibility of habitat restoration in the Upper Dresden Island Pool? Is restoration more feasible in one of these waters than in the other? Are you

aware of any plans to improve the habitat in the CAWS and Lower Des Plaines River?

103. In your opinion what should Illinois EPA have done to address the key issues of excessive and pervasive pollution sources, excessive use impairments and limited habitats in this watershed?

104. On page 15 of your testimony you state that the "Illinois EPA's presentation of the data, data interpretation, and supporting statements are often biased..." Identify which statements and data presentations are biased. What do these statements reflect a bias toward? Why would the Illinois EPA have such a bias in your opinion?

105. This quote on page 15 continues by stating that Illinois EPA's presentation of data, interpretation of data and supporting statements "fail to provide a scientifically-balanced representation of previous UIW studies." Please explain which statements and studies you refer to?

106. What level of aquatic life use is the minimal biological condition that can be supported in the Upper Dresden Island Pool? In the Brandon Pool? In the Chicago Sanitary and Ship Canal? In the South Branch Chicago River?

- a. How did you determine whether or not the present level of stress experienced in these waters is high enough to render unattainable a biological condition consistent with the Clean Water Act's interim aquatic life goal?
- b. What benthic community can be supported in these waters?

107. On page 17 of Attachment 1 you list 12 “lines-of-evidence” for a weight of evidence approach. You list the human risk from pathogens and fish consumption as one of these factors, but do not specifically list dissolved oxygen sags or thermal pollution. Do these fit into one of your lines of evidence or do you believe they are not a factor? Which of these “lines of evidence” are reversible? Which are irreversible?

108. Which existing impairments make the Clean Water Act uses unattainable? Which could be remedied?

109. You state on page 13 of your testimony that “The application of these three UAA Factors does not support the upgrading of use designations under the Proposed UAA Rules.”

- a. Are the waterways currently meeting their designated use of “Secondary Contact and Indigenous Aquatic Life?”
- b. Is it your understanding that if a water body cannot meet the Clean Water Act goals, they cannot be upgraded from their current use designation to an intermediate use designation?
- c. In your opinion, could Illinois upgrade the CAWS and Lower Des Plaines River from its current designation to something incrementally better, but still below the Clean Water Act aquatic life use goals?

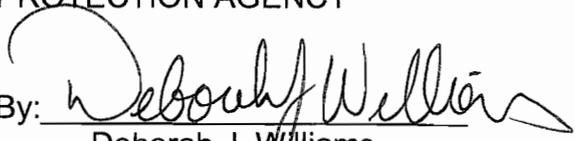
110. Your testimony states on page 13, "Moreover, under U.S. EPA's rules, a determination that any one of these Factors applies would support the downgrading of the use designations."

- a. Wouldn't the downgrading only apply to waters that are designated for the Clean Water Act aquatic life use goals?
- b. Are you suggesting that we downgrade the currently designated uses?

111. Do you believe any effluent dominated rivers are capable of attaining uses that are consistent with the Clean Water Act aquatic life goal uses?

Respectfully submitted,

ILLINOIS ENVIRONMENTAL
PROTECTION AGENCY

By: 

Deborah J. Williams

Dated: October 20, 2008

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PROOF OF SERVICE

I, the undersigned, on oath state that I have served the attached Illinois EPA's Pre-Filed Questions for Midwest Generation Witnesses upon the person to whom it is directed by placing it an envelope addressed to:

John Therriault, Clerk
Marie Tipsord, Hearing Officer
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James R. Thompson Center
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and mailing it by Overnight Mail from Springfield, Illinois on October 20, 2008, with sufficient postage affixed and by mailing it by First Class U.S. Mail from Springfield, Illinois on October 20, 2008 with sufficient postage affixed to the **ATTACHED SERVICE LIST**.



SUBSCRIBED AND SWORN TO BEFORE ME

This 20 day of October, 2008


Notary Public



THIS FILING IS SUBMITTED ON RECYCLED PAPER

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