BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

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

NOTICE OF FILING

TO: John Therriault, Assistant Clerk
Illinois Pollution Control Board
James R. Thompson Center
100 West Randolph Street, Suite 11-500
Chicago, IL 60601

Attached Service List

PLEASE TAKE NOTICE that I have today filed with the Illinois Pollution Control Board Midwest Generation's Questions for the District's Witness Scott Bell, a copy of which is herewith served upon you.

Dated: February 23, 2011

MIDWEST GENERATION, L.L.C.

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CERTIFICATE OF SERVICE

The undersigned, an attorney, certifies that a true copy of the foregoing Notice of Filing and Midwest Generation's Questions for the District's Witness Scott Bell were filed electronically on February 23, 2011 with the following:

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and that true copies were mailed by First Class Mail, postage prepaid, on February 23, 2011 to the parties listed on the foregoing Service List.

/s/ Susan M. Franzetti

ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF;	**)**	
	)	
WATER QUALITY STANDARDS AND	**)**	**R08-9 Subdocket C**
EFFLUENT LIMITATIONS FOR THE	**)**	**(Rulemaking-Water)**
CHICAGO AREA WATERWAY SYSTEM	**)**	
AND LOWER DES PLAINES RIVER	**)**	
PROPOSED AMENDMENTS TO 35 ILL.	**)**	
ADM. CODE 301, 302, 303, AND 304	**)**	

MIDWEST GENERATION'S QUESTIONS FOR
THE DISTRICT'S WITNESS SCOTT BELL

Midwest Generation, L.L.C. ("Midwest Generation" or "MWGen"), by and through its attorneys, Nijman Franzetti LLP, submits the following questions based upon the Pre-filed Testimony of Scott Bell, submitted on behalf of the Metropolitan Water Reclamation District of Greater Chicago (the "District"). Midwest Generation requests that the Hearing Officer allow follow-up questioning to be posed based on the answers provided.

QUESTIONS

1. What qualifications does one need to have to become a "Board-Certified Environmental Engineer by the American Academy of Environmental Engineers" as you state you are on page 1 of your pre-filed testimony?

2. Please explain the extent of effort involved in conducting the Limnotech Habitat Study of the CAWS in terms of the extent to which this study should be viewed as an extensive or rigorous evaluation of the habitat conditions in the areas of the CAWS you studied.

3. Describe generally what was the purpose and goal of conducting a comparison of habitat variables with fish data in the CAWS.

4. In the course of the CAWS Habitat Study Report, referring to the report submitted January 6, 2010 as part of Public Comment No. 284 in this proceeding, there is a review of the Major Large River Habitat Assessment Protocols (*see, e.g.,* Report at pps. 22-26). It is noted that using a habitat evaluation protocol that is developed and validated for aquatic biota was considered important because one of the Habitat Study objectives was to determine what modifications to physical

habitat in the CAWS would be required to improve aquatic habitat. (Report at Section 2.4.1, p. 25). The Report goes on to state that "only the Ohio EPA Qualitative Habitat Evaluation Index (Rankin, 2004) was found to explicitly reference fish in its development documentation (Rankin, 1989)." (Report at pps. 25-6) Please explain the meaning of this statement.

5. Is it correct that the CAWS Habitat Index was developed because due to the man-made nature of the CAWS, it was determined that none of the existing habitat indices adequately addressed these unusual features of the CAWS?

6. In the CAWS Habitat Study Report, at p. 106, Section 6.2.1a Representation of Fish Data in the Analysis of Habitat Data, at the end of the first paragraph, it states: "A fish index of biological integrity (IBI) was not available that incorporated the selected metrics, although the process used to select the fish metrics was exactly the same process used in many fish IBI studies." Please explain the meaning of this statement.

   a. Under item 2, p 8, of your pre-filed testimony, you stated that "a combined fish metric was developed as part of the CAWS Habitat Study which served as a CAWS-specific index of biological integrity for fish." Based on the phrase "CAWS-specific index of biological integrity," isn't it correct that your combined fish metric is an IBI that you developed for the CAWS? If this is not correct, please explain how your combined fish metric differs from an IBI.

7. On page 8 and in Attachment 3 of your pre-filed testimony, you discuss the applicability of existing habitat indices to the CAWS. In Figure 1 of Attachment 3, you compared QHEI scores with what is termed the CAWS Habitat Index, which includes a "combined fish metric" consisting of eleven physical habitat variables, is that correct?

   a. In your pre-filed testimony at page 8, you refer to the following six of these eleven habitat variable as "key" variables: maximum channel depth, number of off-channel bays, percent of vertical walled banks, percent of riprap banks, manmade structures and macrophyte cover. Why are these six physical habitat variables considered to be the key ones as compared to the other five included in your CAWS Habitat Index?

   b. If these six variables explain 48% of the variability in the fish data, does the use of the eleven variables CAWS Habitat Index likely explain more of the variability?

   c. Please explain the scoring system for the "combined fish metric" used in the CAWS Habitat Index.

   d. Do you agree that most IBI-type indices produce only positive values?

e. Please explain how or why does the CAWS combined fish metric produce negative values?

f. One of the CAWS fish metrics is the "number of Illinois native sunfish species." Does this metric include all members of the sunfish family? If not, which does it exclude and why?

g. With respect to the counting of native sunfish or of native minnows for purposes of the CAWS fish Index, are hybrid fish included in these counts? If so, please explain the rationale for including hybrid fish?

8. On page 3 of Attachment 3 to your pre-filed testimony, you state that: "Linear regression of these two sets of variables results in an r-squared value of 0.02. This indicates that the QHEI explains about 2% of the variability in fish data from the CAWS, for this data set." Given that the QHEI was developed and calibrated against fish metrics developed and calibrated in Ohio, would you agree that it is not surprising that the QHEI explains very little of the variation in the CAWS Index which has different metrics that were developed for a system with a very limited fish community?

9. On page 3 of Attachment 3 to your pre-filed testimony, you state that: "It is also worth noting that the QHEI results in a relatively narrow range of scores (34 to 56) for the CAWS stations, indicating that the QHEI may be limited in its ability to discern variability in physical habitat within the CAWS." Although you conclude that this indicates a potential limitation of the QHEI to discern physical habitat variability, is this narrow range of QHEI scores from 34 to 56 also an indication that habitat throughout the CAWS is limiting and poor practically everywhere?

10. On page 11 of your pre-filed testimony, you indicate that the r-squared value of 0.48 for your CAWS Habitat Index is very good compared to other habitat indices, specifically with regard to the r-squared of 0.45 for the QHEI. Do you agree that the developer of the QHEI, Mr. Ed Rankin, used data only from reference sites as a means to minimize the influence of factors other than habitat on the biological scores generated by the QHEI?

a. Because of the highly disturbed nature of the CAWS, is it true that such "reference sites" within the CAWS do not exist and hence Limnotech could not use them?

b. Do you think it is likely that the approximately 50% of variability not explained by the CAWS Habitat Index is also explained by the existence of other factors such as water quality, sediment contamination, barge traffic, water level fluctuations, urban runoff, etc. and not solely the inherent variability of biological data?

11. In Table 4-1 on p. 60 of the Habitat Evaluation Report (PC 284) it is stated that some of the QHEI metrics are not useful for the CAWS because these metrics

when applied result in the same score for most or all the stations. Are the QHEI scores you are referring to here accurately described as very low scores, including many zero scores?

a. Given the consistency of the very low or zero score results for the CAWS, is this additional, relevant evidence that several habitat features that are important to supporting a balanced fish community, such as riffles, bends in the river and shallow areas, are either absent from the CAWS or very close to being absent?

12. On page 27 of the CAWS Habitat Study Report, Table 2-4, Limnotech characterizes the QHEI as not being a "quantitative" protocol. Is it your opinion that the scoring system used in the QHEI cannot be considered a "quantitative" protocol? If so, please explain the basis for your opinion.

a. Do you agree that when the QHEI is applied and its scoring conducted by adequately trained biologists it is capable of yielding consistent scores among such biologists?

b. Do you agree that when the QHEI is applied by adequately trained biologists it is capable of yielding a reasonable estimate of habitat quality?

13. In the CAWS Habitat Study Report, Limnotech discusses the Illinois Index of Biological Integrity, also known as "IBI," for fish and notes that it has certain limitations, namely that it was developed for wadeable systems. Please explain why the fact that the Illinois IBI developed for wadeable streams makes it less suitable for use in the CAWS?

a. Is it correct that the Illinois IBI and the Ohio EPA's Boat IBI are different IBI indexes?

b. Do you agree that the Ohio Boat IBI was developed for rivers and not for wadeable systems?

14. Assuming that sediment chemistry was not included directly in the CAWS habitat regression equation, please explain whether and, if so, how it was used at all and also whether there is a difference between how the "sediment chemistry" factor was used in the CAWS study versus how sediments are used in the QHEI.

a. Is it correct that navigation and sediment chemistry were not among the anthropogenic factors included in the CAWS Habitat Index? If so, were these factors addressed or considered in any way in reaching the conclusions regarding the aquatic use potential of the segments of the CAWS you studied?

15. Please explain whether there is a difference between how the "sediment chemistry" factor was used in the CAWS habitat protocol versus how it is used in the QHEI.

16. With regard to the "manmade structures" anthropogenic factor, please provide some specific examples of the types of manmade structures that were determined to have a detrimental impact on aquatic life as part of the Habitat Study?

    a. Does the CAWS Habitat Index with respect to the "manmade structures" factor attempt to quantify the various manmade structures located within a given segment of the CAWS to which the Index was applied? If so, please explain further how the CAWS Habitat Index quantifies the manmade structures factor (*e.g.*, does it consider the differences in size of the various manmade structures).

17. At page 57 of the CAWS Habitat Study Report, there is the finding that fish metrics are positively correlated to dissolved oxygen, but dissolved oxygen is a poor predictor of fish metrics. Please explain further what this finding means, including what the phrase "positively correlated" means.

18. In Appendix C to the Habitat Evaluation Report (PC 284) and on pages 2-3 of your pre-filed testimony, you consider the relationships between fish and water quality, particularly dissolved oxygen. Is it correct that the Limnotech study determined that dissolved oxygen was a much poorer predictor of the quality of the fish community than was habitat?

    a. Do you agree that in the CAWS, habitat is a much more important factor to the quality of the fish community than is dissolved oxygen?

19. At p. 57 of the CAWS Habitat Evaluation Report, it is stated: "In terms of ability to explain fish data in the CAWS, compliance with new standards is similar to compliance with existing standards. Fish metrics from observations where standards were being attained were generally better than fish metrics where standards were not in attainment, but most differences were not statistically significant." Please explain in more detail the meaning of this finding and the fish data on which it is based.

20. At p. 57 of the report, 3rd bullet, it is stated: "Some fish metrics are positively correlated to temperature, but more poorly than with dissolved oxygen. Relatively few fish metrics showed statistically significant correlation to observed temperature data."

    a. Please explain in more detail the meaning of this finding and the data on which it is based.

    b. Which fish metrics are positively correlated with temperature?

    c. When you say that some fish metrics are positively correlated with temperature, does this mean that as temperature increases, the fish community as measured by that metric improves?

d. What is the significance of the finding that relatively few fish metrics showed statistically significant correlation to observed temperature data?

21. At page 57 of the CAWS Habitat Evaluation Report, the 3rd bullet goes on to state: "Applying the proposed water quality standards for temperature to the 2001-2007 CDOM data set does not suggest that attainment of these proposed standards is a good indicator of fish health." Please explain this finding in more detail.

a. With regard to temperature, is it correct that the Limnotech Study found that temperature in the CAWS rarely exceeded the current Secondary Contact water quality standards?

22. Regarding the data contained in Table 3-1 in Appendix C, did Limnotech compare the 12 fish metrics with the percent of the time the daily maximum temperature exceeded the maximum proposed water quality temperature standard in the twelve-month period preceding each fish sampling event and did it find that in none of the cases was the correlation significant (*i.e.*, $P<0.10$)?

a. Is it also correct that Limnotech found that there was not a significant relationship between the combined fish metric and temperature?

23. Regarding the data contained in Table 3-2 in Appendix C, does this information present Limnotech's comparison of the fish metrics and the percent of time the daily maximum temperature exceeded the maximum proposed water quality temperature standard by greater than 2^{o} C within a regulatory period?

a. Did Limnotech's comparison of this data also fail to find any statistically significant relationships?

24. In Tables 3-3 and 3-4 of Appendix C, do these two tables present Limnotech's comparison of the 12 fish metrics and the 24-hour and 48-hour average antecedent temperatures, respectively?

a. In these comparisons, is it correct that you found statistically significant relationships with three metrics and the combined fish metric?

b. For the three metrics where a statistically significant relationship was found, is it correct that the r-squared values were low, ranging from 0.04 - 0.21?

c. Is it also correct that based on these low r-squared values, Limnotech concluded that "low r-squared values suggest relatively weak relationships"? And is it true that the 24-hour and 48-hour average antecedent temperatures at most explained only about 20% of the variability in any of the fish metrics, and usually much less, and that for most fish metrics these temperatures did not even show a statistically significant relationship?

25. Based on the various analyses that Limnotech conducted, do you agree that temperature is not a strong indicator of fish health?

26. Based on the various regression analyses performed by Limnotech, did you find that attainment of the water quality standards proposed in this UAA rule-making is not a good indicator of fish health?

    a. Is it your expert opinion that the fish community in the CAWS will not improve measurably if the proposed water quality standards are adopted?

27. At page 57 of the CAWS Habitat Evaluation Report, Section 3.3.3 concludes with the statement: "While no definitive statement can be made about causation from regression analysis, the weak correlations between fish metrics and dissolved oxygen indicate that incremental improvements in water quality alone may have, at best, a small benefit to fish if all other conditions affecting fish in the system remain unchanged."

    a. Does this statement mean that because of the habitat conditions in the CAWS and other stressors besides water quality, improving just the water quality without addressing these other stressors is not going to result in a significant improvement in the aquatic community?

28. At pages 63-64 of the CAWS Habitat Evaluation Report, regarding the topic of sediment and substrate conditions, there is a discussion of a comparison of the available sediment chemical data to macroinvertebrate data collected from the CAWS. It is stated that "[t]his comparison showed that many chemicals were significantly correlated with macroinvertebrate metrics ($p<0.05$)…." Please explain further what is meant by this finding of a significant correlation between many chemicals and macroinvertebrate metrics.

    a. At page 64 of the Report, the term "anthropogenic chemicals" is used. Please explain the meaning of this term as used in the Report.

    b. At page 64 of the Report, it is stated that: "These observations suggest that anthropogenic chemicals in CAWS sediments are affecting macroinvertebrate populations directly and suggest an indirect effect on fish as well." Please explain further what effects on macroinvertebrate populations and fish populations are being referred to in this statement.

    c. At page 64 of the Report, it is stated that: "Based on these correlation analyses, three sediment chemical parameters were chosen for use in the habitat evaluation: cadmium concentration, total PCB concentration, and concentration of simultaneously extracted metals, which is a measure of the bioavailability of heavy metals in sediments." Why were these three sediment chemical parameters selected for use in the habitat evaluation?

29. At page 65 of the CAWS Habitat Evaluation Report, after Table 4-2, it is stated: "Where large substrate (gravel, cobbles, boulders) are present in the CAWS, they

30. At page 65, and in several other sections of the Report relating to habitat conditions, references are made to the "Orth and White, 1999" article. Please provide a copy of this article for introduction into the record of this rule-making.

31. At page 81 of the CAWS Habitat Evaluation Report, in Table 4-7 entitled "Habitat Limitations in the CAWS Related to Hydrology (after Bunn and Arthington, 2002)," the Bunn and Arthington, 2002 article is cited in support of several of the statements in Table 4-7 regarding the habitat limitations in the CAWS related to hydrology. Please provide a copy of this article for introduction into the record of this rule-making, and please explain the meaning of the parenthetical "(after Bunn and Arthington, 2002)" in the title of Table 4-7.

    a. In Table 4-7, regarding the section on "Flow," it states that: "Bunn and Arthington (2002) cite flow as the major determinant of physical habitat and biotic composition in river ecosystems." Please explain further what the Bunn and Arthington paper found with respect to the influence of flow on physical habitat and biotic composition.

    b. In Table 4-7, regarding the section on "Flow regime," it states that: "Bunn and Arthington (2002) state that species whose life history strategies have evolved with defined flow regimes may experience recruitment failure in managed systems. These altered systems promote the establishment, spread and persistence of exotic and introduced species." Please explain further the meaning and basis of these conclusions.

    c. Do you agree that the flow regime of a waterbody is important to the health and quality of the fish community?

    d. Does the CAWS Habitat Index take into account flow or flow regime in the waterway?

    e. Is it correct then that flow or flow regime is another adverse condition that is present in certain of the CAWS segments to which you applied the CAWS Habitat Index but which would not be accounted for in the scoring you generated?

32. At page 119 of the CAWS Habitat Evaluation Report, immediately below Figure 6.6 Comparison of the CAWS Habitat Regression Model with 2008 Fish Data, it states: "As shown in Figure 6-6, the six-variable habitat regression model (developed using 2001-2007 fish data) shows a relatively good fit with the 2008 fish data." Why is this important?

    a. This same paragraph goes on to state that: "The r-squared value of 0.29 ($p=0.014$) indicates that there is good and statistically significant

correlation (98.6% confidence) between the habitat regression model and the 2008 fish data." Why is this important?

b. In the next paragraph, last sentence, it states: "The regression fit the long-term averages with an r-squared of 0.51, indicating that the six habitat variables in the regression equation explain more than 50% of the variability in fish data over long periods." Please list the six habitat variables referenced in this sentence and address whether this statement means that these six habitat variables are the ones that have the greatest impact on the quality of the fish community in the CAWS.

33. At page 120 of the CAWS Habitat Evaluation Report, in Section 6.4 Relative Importance of Physical Habitat in the CAWS, it is stated: "As previously discussed, the regression analysis shows that physical habitat can explain 48% of the fish data collected from 2001-2007." You state in your pre-filed testimony at page 2 that: "Multiple linear regression shows that the dominant habitat variables identified in this study had an r-squared of 0.48 with fish, indicating that these habitat variables explain as much as 48%, or about half, of the variability in the fish data." Please clarify what you mean by these statements with regard to why they clearly support your finding that physical habitat is more important to fish than dissolved oxygen.

34. At page 121 of the CAWS Habitat Evaluation Report, regarding Figure 6-8 Comparison of Regression Residuals with Variation in Metrics Calculated Using Fish Data from 2001-2007 and 2008, it is stated that the comparison "suggests that as much as 70% of the variability in the CAWS fish data that is not explained by the six habitat variables in the regression equation (35% of total variability in fish data) can be explained by variability in the fish samples themselves, as opposed to some other external condition, such as a missing habitat variable." You also discuss fish variability at page 10 of your pre-filed testimony, where you state that "fish samples exhibit large temporal variability at any given location in the CAWS" and you conclude that fish variability explains most of the other 50% not explained by physical habitat alone. Please explain further what you mean by variability in the CAWS fish samples themselves.

35. As you also discuss on page 3 of your pre-filed testimony, at page 123 of the CAWS Habitat Evaluation Report, regarding Figure 6-9 Comparison of Regression Residuals with Percent of Time Dissolved Oxygen Less than 5 mg/L, it is stated that "DO alone can explain 27% of the variability in the same seven years of fish data. This indicates that physical habitat is relatively more important in understanding fisheries in the CAWS than water quality." Is this conclusion based on the finding that "physical habitat can explain 48% of the fish data" as compared with dissolved oxygen explaining only 27%?

a. Can it be inferred from these results that if one improves the dissolved oxygen levels in these waters from what they are today, there is not going

to be a significant change in the fish community because the physical habitat remains unchanged?

b. You state on page 3 of your pre-filed testimony that Limnotech tested various measures of dissolved oxygen and found that the strongest relationship between any of them and the combined fish metric had an r-squared value of 0.27 with the other measures of dissolved oxygen having r-squared values ranging from 0.02 to 0.08. So does that mean that the strongest correlation between DO and the fish data was 27% and the other DO measures tested were substantially less significant at 2% to 8%?

c. Which measure of dissolved oxygen resulted in explaining 27% of the variability in the seven years of fish data?

36. At page 124 of the CAWS Habitat Study Report, at the end of Section 6.4.2, it is stated: "This result indicates that including DO with the habitat variables improved the amount of fish data variability explained by the regression by about 4% over physical habitat alone." What is the significance of this finding?

a. Does this also support the conclusion that based on the findings of the Limnotech Habitat Evaluation Study, physical habitat has a far greater effect on the quality of the fish community in the CAWS than does the existing levels of dissolved oxygen in the CAWS?

37. With regard to trying to explain the causes of the fish data variability, it appears from the content of Appendix C to the Report that temperature was another metric that was studied to see to what extent it explained the fish data variability in the CAWS, correct?

a. Did you conclude that temperature played even less of a role in explaining the variability of the fish data than did dissolved oxygen?

38. In Section 8.1 on page 141 of the CAWS Habitat Evaluation Report, there is the finding that based on statistical comparison of key physical habitat variables and DO metrics, "habitat is much more important to fish than dissolved oxygen." Based on the statistical comparison of key physical habitat variables and temperature, is it also correct that the results showed that habitat is much more important to fish than temperature?

a. Is it correct that the statistical comparison results would rank temperature in the CAWS as relatively less important to the quality of the fish community than either habitat or dissolved oxygen?

39. On page 10 of your pre-filed testimony, you state that "two habitat variables (maximum channel depth and percent overhanging vegetation) were the most important factors in describing fish data from the CAWS." Also, in the CAWS Habitat Study Report, the first finding at the bottom of page 124 states: "The two most important physical habitat variables in the CAWS that are positively

correlated with fish are the amount of macrophyte cover and the quantity of areas that act as off-channel bays to provide refuge from the main channel." Do these statements mean that these two habitat characteristics, maximum channel depth and percent overhanging vegetation, have the greatest positive effect on the quality of the fish community in the CAWS?

a. Describe what "macrophyte cover" means as referenced at page 124 of the Report.

b. How did you define off-channel bays for purposes of your study?

c. What is meant by the "quantity of areas" that act as off-channel bays? For example, does this mean the areal extent of the areas and/or the number of such areas?

40. The second finding at page 125 of the CAWS Habitat Evaluation Report states: "The four most important physical habitat variables in the CAWS that are negatively correlated with fish are the maximum depth of the channel, the amount of vertical walled banks, the amount of riprap banks and the number of manmade structures." Please explain further what is meant by the phrase "habitat variables in the CAWS that are negatively correlated with fish," and use one or more of the cited physical habitat variables to explain the meaning of "negatively correlated."

41. Is Table 7-7 on page 139 of the CAWS Habitat Evaluation Report accurately described as a summary of the CAWS Habitat Index Scores for the Major Reaches in the CAWS?

a. If so, does Table 7-7 provide a summary view of the relative differences in physical habitat in the CAWS?

b. Is it correct to conclude that based on the Habitat Index Scores presented in Table 7-7, the Chicago Sanitary and Ship Canal and the South Branch Chicago River have the lowest quality of habitat for fish among the major reaches in the CAWS?

42. With respect to the Chicago Sanitary and Ship Canal and the South Branch of the Chicago River, please describe in more detail the basis for the statement in the first finding in Section 8.1 on page 141 of the CAWS Habitat Evaluation Report and also on page 2 of your pre-filed testimony that "[t]he form and uses of the CAWS impose severe limitations on physical habitat in the system."

43. Regarding page 5 of your pre-filed testimony and your discussion of the channelization of the CAWS, why is the creation of shipping channels so detrimental to the fish life?

44. On page 6 of your pre-filed testimony, you stated: "In rivers and streams, connection to the floodplain is not only important for the system's hydrology but it is important for aquatic biota. For fish, floodplains can provide seasonal habitat

diversity, as well as a source of organic and inorganic materials required by various organisms in various life stages."

a. What do you mean by "connection to the floodplain"?

b. On pages 6-7 of your testimony, you state that: "Floodplains never existed for the 75% of the CAWS that were excavated where channels did not previously exist, such as in the Cal-Sag Channel and the Chicago Sanitary and Ship Canal." Why didn't floodplains exist?

c. On page 7 of your pre-filed testimony, you state that: "In the CAWS reaches that were once natural waterways, or partially so, channelization has eliminated floodplain connectivity almost entirely." Please explain how channelization eliminates floodplain connectivity.

d. On page 7 of your pre-filed testimony, you state that: "The absence of floodplains and floodplain connectivity in the CAWS is, for the most part an irrevocable condition." Please explain why.

45. On page 7 of your pre-filed testimony, you state that: "The CAWS Habitat Study found that channel depth, lack of off-channel areas and bank refuge for fish, vertical-walled or riprapped banks, and manmade structures in the channels were all strongly, negatively correlated with fish condition." Please explain what you mean by "strongly, negatively correlated with fish condition."

46. On page 7 of your pre-filed testimony, you state that the CAWS Habitat Evaluation Report "found that sediment contamination was statistically correlated to poor invertebrate condition." Please explain what you mean by this statement?

47. On page 7 of your pre-filed testimony, you state that: "CAWS reaches with high commercial navigation were found to have a statistically significant poorer fisheries condition than those reaches without high commercial navigation." Is the CSSC one of the reaches with high commercial navigation? What was your basis for determining if commercial navigation usage was "high"?

48. On page 3 of you pre-filed testimony, you discuss the finding that there is a limited potential for physical habitat improvement in the CAWS. You discuss the effect that "reach-wide improvement of the primary habitat impairments that can be improved would result in habitat index score increases between 0 and 13 points." What do you mean by "reach-wide improvement of the primary habitat impairments"?

49. On page 13 of your pre-filed testimony, regarding the Habitat Improvement Report, you discuss the fact that some of the Limnotech assumptions regarding habitat improvement potential may not be realistic, and you give the example of the estimate that proposed improvements would increase the habitat index score from 34 to 47 (38% increase) for the South Branch Chicago River and that this is

largely predicated on the assumption that half of the vertical side walls can be removed and improved, which may not be feasible.

a. Please explain further what the assumption regarding removal and improvement of the vertical side wall of the South Branch Chicago River entailed.

b. Are you aware of any similar projects in scope and size being done?

50. Referring to page 14 of your pre-filed testimony, is it correct that the CAWS Habitat Index Limnotech developed does not account for all of the stressors to the fish community that exist in the CAWS?

a. Is it correct that the fish community stressors that are not accounted for in the CAWS Habitat Index include effects of navigation, sediment contamination and flow variability?

b. Do you agree that all three of these stressors exist in the South Branch of the Chicago River?

c. Do all of them exist in the CSSC?

51. At page 15 of your pre-filed testimony, you state: "First, a cluster analysis of the fish data used in this study (Attachment 4) indicates that a dominant fish community occurs throughout the CAWS, suggesting a degree of stability in the fish community. In light of this, it is unlikely that the small increases in habitat score discussed here would likely result in significant change in fish community (i.e. new species or significant change in relative proportion of existing species)." Please explain what you mean by the phrases "dominant fish community" and "stability in the fish community"?

52. Referring to page 5 of Attachment 4 to your pre-filed testimony, it states: "One cluster comprised the majority of the most abundant fish species, including largemouth bass, bluegill, common carp, and a number of minnow and sunfish species. This group was observed at every station in the CAWS. For this evaluation, that cluster will be referred to as the "dominant fish community." Is this the description of the fish species that make up the "dominant fish community" in the CAWS that you are referring to in your pre-filed testimony?

53. Referring to page 5 of Attachment 4 to your pre-filed testimony, specifically with respect to Table 1 on that page, you state: "An evaluation of the distribution of the trophic levels (food chain links) represented within the clusters indicates that the dominant community has the most complete representation from all trophic levels, while other clusters primarily consist of fewer components of the food web. This suggests that the dominant community represents a relatively complete fish community, in the sense that its members occupy most trophic levels. The other clusters lack the components (such as prey base) to exist as independent communities." Please explain the significance of the statement that "this suggests

that the dominant community represents a relatively complete fish community, in the sense that its members occupy most trophic levels"? In other words, why is it significant that the dominant fish community members occupy most trophic levels?

54. On page 6 of Attachment 4 to your pre-filed testimony, you state: "The distribution of substrate types among the different groups suggests that the differentiation of the clusters may be, at least in part, due to habitat preferences found within the habitat-limited environment of the CAWS. In particular, the rock bass/smallmouth bass group consists primarily of fish that are associated with large substrates (boulder, cobble, and gravel), while most of the other fish in the CAWS tend to be associated with mud, sand, and vegetated substrates." Does this data support the conclusion that substrate plays an important role in determining the nature of the fish community that can be expected to be present in a given waterbody?

55. On page 6 of Attachment 4 to your pre-filed testimony, you state: "The distribution of pollution tolerances among the clusters indicates that all but one of the clusters are dominated by tolerant species." For the clusters that were dominated by tolerant species, what does this say about the general quality of the fish community in the areas of the CAWS where these clusters were found? Were the clusters found in the South Branch of the Chicago River and the CSSC dominated by tolerant species?

Respectfully submitted,

MIDWEST GENERATION, L.L.C.

By: /s/ Susan M. Franzetti
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