

**BEFORE THE ILLINOIS POLLUTION CONTROL BOARD**

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

**NOTICE OF FILING**

To: ALL COUNSEL OF RECORD  
(Service List Attached)

**PLEASE TAKE NOTICE** that on the 17<sup>th</sup> day of June, 2011, I electronically filed with the Office of the Clerk of the Illinois Pollution Control Board, the **Written Responses to Illinois EPA's Pre-Filed Questions for MWRDGC's Witness Adrienne D. Nemura.**

Dated: June 17, 2011.

**METROPOLITAN WATER RECLAMATION  
DISTRICT OF GREATER CHICAGO**

By: /s/ Fredric P. Andes  
One of Its Attorneys

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**PROOF OF SERVICE**

The undersigned attorney certifies, under penalties of perjury pursuant to 735 ILCS 5/1-109, that I caused a copy of the foregoing, **Notice of Filing** and the **Written Responses to Illinois EPA's Pre-Filed Questions for MWRDGC's Witness Adrienne D. Nemura** to be served via First Class Mail, postage prepaid, from One North Wacker Drive, Chicago, Illinois, on the 17<sup>th</sup> day of June, 2011, upon the attorneys of record on the attached Service List.

*/s/ David T. Ballard*

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**BEFORE THE ILLINOIS POLLUTION CONTROL BOARD**

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**WRITTEN RESPONSES TO ILLINOIS EPA'S PRE-FILED QUESTIONS  
FOR MWRDGC'S WITNESS ADRIENNE D. NEMURA**

Pursuant to the Board's Order of June 1, 2011, the following responses are provided to Illinois EPA's Pre-Filed Questions for Adrienne D. Nemura.

1. What was your role in "reviewing the habitat study"? (Page 2 of pre-filed testimony).

**RESPONSE:** I reviewed LimnoTech's draft report and provided comments to the District. I also reviewed the report to so that I could provide input to the District's development of their aquatic life use proposal.

2. What was your role in "reviewing cost estimates for addressing dissolved oxygen issues in the CAWS?" (Page 2 of pre-filed testimony).

**RESPONSE:** I reviewed AECOM's cost estimates as background information on the improvements that could be achieved with additional flow augmentation and supplemental aeration.

3. On pages 2-3 of your pre-filed testimony, you state, "Because it is not possible to eliminate or fully treat these wet weather sources in the foreseeable future, the impact of these events on dissolved oxygen levels in the CAWS needs to be considered when establishing the highest attainable designated uses for these waterways."

a. How long do you consider "foreseeable future"?

**RESPONSE:** At least until 2029 (18 years), when TARP is fully implemented, and probably longer. I believe a wet weather limited use (WWLU) will still be needed after TARP is fully implemented. This is because there will still be discharges from CSOs and municipal separate storm sewers, and overland runoff to the tributaries. I don't see how these discharges can be eliminated or fully treated. This is going to be a long-term issue.

- b. When will TARP be finalized for the Thornton Reservoir? For the McCook Reservoir?

**RESPONSE:** According to Item 11 in the District's response on January 3, 2011 to the Board's request, Thornton Reservoir should be online in 2015 and Stage 2 of the McCook Reservoir should be online in 2029.

- c. When TARP is finalized, will this provide "full treatment" of the CSOs?

**RESPONSE:** It is my understanding that when TARP is fully implemented, some CSOs will still discharge to the CAWS. I am not aware of whether TARP will provide "full treatment".

- d. Should MWRDGC's Long Term Control Plan be implemented prior to the designation of the Wet Weather Limited Use?

**RESPONSE:** No. A substantial amount of work been completed on studying both habitat and water quality. The WWLU will be needed for a long time. As CSOs are controlled more, I expect that the WWLU will be needed less- but it will still be needed as long as there are wet weather discharges. We have the information we need now to structure the WWLU. As conditions change, the WWLU can be adjusted if it is appropriate.

- e. Will the Wet Weather Limited Use still be necessary after MWRDGC's Long Term Control Plan is fully implemented?

**RESPONSE:** Yes. There will still be some CSO (even though it will be less) and other wet weather discharges to the CAWS after TARP is fully implemented and therefore the WWLU will still be needed.

4. On page 2 of your pre-filed testimony you state that “It is my professional opinion that a wet weather provision needs to be included in the water quality standards for protection of aquatic life uses in the CAWS.” How will a wet weather provision help to protect the aquatic life uses in the CAWS?

**RESPONSE:** Let me clarify. There are water quality standards for protection of aquatic life uses. This provision needs to be included in the standards, because if there is no provision, the standards cannot be attained and standards need to be attainable. The standards will still be protective even with this provision as discussed in Ms. Wasik’s testimony.

5. On page 3, you state, “...dissolved oxygen criteria for the CAWS cannot be met exclusively by advanced wastewater treatment at its three major (Calumet, North Side, and Stickney) regional water reclamation plants (WRPs) or by the capture and treatment of CSOs (MWRD 2009).” Is it your testimony that if all CSOs are captured by TARP, the proposed dissolved oxygen water quality standards cannot be met during wet weather? What about the existing standards? Explain.

**RESPONSE:** First, this statement is from the District’s report on the 2008 calendar year Continuous Dissolved Oxygen Monitoring (CDOM) data. Second, it’s my understanding that TARP will not capture all CSOs. So my testimony is not as stated in the question. As stated in my previous testimony, hypothetical model simulations showed that if all gravity CSOs were eliminated that the existing standards could not be met during and after wet weather. Existing standards cannot be met because of the wet weather events. With respect to the Agency’s proposed standards, they still could not be met.

6. You testify that “The existing biotic community appears to tolerate periodic low dissolved oxygen levels in the CAWS that are caused by wet weather events.” What do you base this conclusion on?



**RESPONSE:** I base this conclusion on the habitat study findings that there is a stable and tolerant resident fish population and that wet weather events, with episodic low dissolved oxygen levels, occur in the CAWS without significant fish kills. Dissolved oxygen conditions during wet weather events are different than dissolved oxygen conditions during dry weather. During wet weather, dissolved oxygen levels can drop in one segment and then the levels recover. These pockets of low dissolved oxygen travel through the system. Literature cited in Ms. Wasik's testimony supports the theory that the resident fish community can avoid the low dissolved oxygen pockets.

7. On page 4 of your testimony, you state, "Establishing a WWLU, which recognizes that there will be periods when the dissolved oxygen criteria cannot be met, will not result in degraded water quality."

a. What do you mean by degraded water quality?

**RESPONSE:** A common misconception is that if you make a water quality standard less restrictive, dischargers will rush to dump more pollution into the river- resulting in "degraded" water quality. The WWLU is simply acknowledging the current state of the waterways. So my statement is to dispel the notion that if you change the standards, somehow the water quality will get worse. This is not the case.

b. Do dissolved oxygen values of 0 mg/L constitute degraded water quality?

**RESPONSE:** If the resident fish are able to tolerate intermittent periods of zero dissolved oxygen then I don't see how providing a WWLU will degrade water quality. The WWLU is based on the current understanding of wet weather impacts and will not result in more hours of low dissolved oxygen.

8. Is it your testimony that wet weather conditions will still result in adverse dissolved oxygen conditions even if CSOs were eliminated?

**RESPONSE:** Modeling demonstrated that even if gravity CSOs were eliminated, wet weather sources would still result in episodic low dissolved oxygen conditions. So it is still my testimony that even if CSOs could somehow be “eliminated”, the WWLU would still be needed.

9. On page 5, you state, “The WWLU designation would apply to waterway segments receiving or otherwise affected by CSOs or other wet weather flows and would remain in effect during, and up to a predefined maximum amount of time after a wet weather event.”

a. What “other wet weather flows” are you referring to?

**RESPONSE:** Urban stormwater runoff and tributary discharges during wet weather.

b. When TARP is fully implemented, will the pump stations discharge on a regular basis or will they be reduced to 4 or less per year?

**RESPONSE:** I don’t know.

c. Are there any waterway segments that are not “receiving or otherwise affected by CSOs”?

**RESPONSE:** No, with the exception of Lake Calumet.

d. Should the CAWS be divided into smaller segments to minimize the impact of the wet weather limited use proposal?

**RESPONSE:** No. Since all of the segments except Lake Calumet are affected by CSOs, dividing the system into smaller pieces would not, in my opinion, “minimize the impact of the WWLU proposal”.

10. Explain what is meant on page 4 of your pre-filed testimony when you state that “The proposed WWLU can be re-evaluated periodically as new data becomes available or as additional CSO and other wet weather source controls are established for this system (Lanyon 2008).”

a. What mechanism will be used for this re-evaluation?

**RESPONSE:** As I stated in my testimony, I would propose that the WWLU be re-evaluated after major changes to the operation of the CAWS. This could be handled through a requirement

in the District's NPDES permits and coordinated with Illinois' triennial review of water quality standards.

b. What is the Lanyon 2008 citation in this sentence referring to?

**RESPONSE:** In Mr. Lanyon's testimony on Sep. 8, 2008, he indicated that TARP will continue to be implemented over the next 14 years. Since the purpose of TARP is to store and treat more CSO, I expect that CSO discharges will be reduced. The District will continue to report data on CSO discharges and dissolved oxygen, so the appropriateness of the WWLU could be re-evaluated by the District, IEPA, and others on a periodic basis.

11. Explain how "The appropriateness of the 'trigger' and the maximum duration for applying a WWLU designation could be re-examined periodically." (Page 6 of pre-filed testimony).

a. Would the re-examination be required?

**RESPONSE:** Not necessarily. The annual reports would contain the data needed to alert the District, Illinois EPA, or a member of the public that re-examination might be in order. Or, if major changes were made to the operation of the CAWS, the appropriateness of the WWLU could be re-examined

b. Who would conduct the re-examination?

**RESPONSE:** The District is in the best position to generate the data that would be used in a re-examination. I believe Illinois EPA and the Board are best suited to evaluate the data and decide whether a re-examination is needed. If this is the case, this could be done as part of the triennial review of Illinois' water quality standards. I should also mention that because wet weather is highly variable, you would need to evaluate changes over multiple years.

c. Should the WWLU designation have a sunset date?

**RESPONSE:** No. Even after TARP is completed, there will still be wet weather impacts and the WWLU will probably still be needed. Sunset dates are generally appropriate, in my judgment, only if there are data that show it is feasible to eliminate a pollutant at its source - say a certain chemical that you know needs to be (and can be) phased out. The CAWS is different. It is an engineered waterway where we know these wet weather events are going to occur and that the system has to be operated to prevent flooding.

12. You state on page 6 that “the designation could be re-evaluated after major changes to the operation of the CAWS (e.g., construction of additional supplemental aeration or flow augmentation facilities or full implementation of the Tunnel and Reservoir Plan [sic]).”

a. Would the re-evaluation be required?

**RESPONSE:** Again, not necessarily. People should evaluate the data in the annual reports or changes in the operation of the system and then make a decision about whether a re-evaluation is warranted.

b. Who would conduct the re-evaluation?

**RESPONSE:** Again, I think the District should generate the data and the Illinois EPA and the Board should re-evaluate the water quality standard (which will include the WWLU designation).

c. Under what circumstances do you believe the District will construct additional supplemental aeration or flow augmentation facilities if the WWLU is adopted?

**RESPONSE:** Dr. Zenz’s testimony describes the additional facilities needed to meet the District’s proposal. I believe the District would be willing to consider constructing additional facilities if the WWLU was adopted.

d. Should a re-evaluation wait for the full implementation of TARP?

**RESPONSE:** Not necessarily. It depends on what the data show or if there are major changes to the operation of the system.

- e. Won't the capture of CSOs significantly increase in the Calumet system when the Thornton Reservoir is completed in 2014?

**RESPONSE:** I believe the Thornton Reservoir is currently scheduled to be completed in 2015. However, I do not know how much CSO that reservoir will capture as I am not familiar with the design of TARP.

- f. Won't the capture of CSOs significantly increase in the rest of the system when the first phase of the McCook Reservoir is completed in 2015?

**RESPONSE:** I believe that Phase I of the McCook Reservoir is currently scheduled to be completed in 2017. But, again, I do not know how much CSO will be captured.

13. Will the Wet Weather Limited Use still work if the Board adopts the Agency's Aquatic Life Use designations rather than the Categories proposed by MWRDGC? Why or why not?

**RESPONSE:** Possibly. Additional study would probably be needed to evaluate what facilities would be needed during dry weather, but I believe a WWLU would still be needed.

- a. Explain why the WWLU is not needed for the "Category 3" waters in MWRDGC's proposal.

**RESPONSE:** There is no minimum dissolved oxygen criterion associated with the narrative criteria for Category 3 waters.

- b. Does the narrative criteria applicable to these waters allow the dissolved oxygen levels to fall to zero?

**RESPONSE:** At times these waters already have dissolved oxygen less than one mg/L and sometimes zero. So adopting narrative criteria would not somehow "allow" anything worse. However, the narrative criteria still protect against adverse impacts, such as fish kills.

14. Explain how MWRDGC's proposal to lower the dissolved oxygen requirements in the Category 2 waters (except the Cal-Sag Channel) is protective of the existing aquatic community?

**RESPONSE:** It's my understanding that the District's proposed dissolved oxygen criterion for Category 2 waters is the same as the minimum criterion that Illinois EPA proposed. Also, since the proposal does not lower existing water quality, which the community tolerates, it is protective of the existing aquatic community.

a. How does it protect the highest attainable aquatic community?

**RESPONSE:** The habitat evaluation and improvement studies, and the District's fish data, showed that current dissolved oxygen conditions support a stable and primarily tolerant resident fish community. The studies also showed that habitat was preventing the current fish population from improving and that the improvements that are feasible won't improve habitat significantly. Therefore the current fish population appears to be the highest attainable aquatic community.

b. How is this protective of early life stages of aquatic life when they are present?

**RESPONSE:** The resident fish community, which is made up of primarily pollution tolerant species, appears to be able to sustain itself under existing conditions. Since the District's proposal will maintain those existing conditions, I believe that the District's proposed dissolved oxygen criteria will be protective of the community, including early life stages.

15. Explain why the WWLU is a "use designation" rather than a "site specific criteria"?

**RESPONSE:** "Use designation" is more representative of what exists. During dry weather, the dissolved oxygen conditions across the CAWS are similar for periods of time and fish might have to swim a long way to find different conditions. During wet weather, not all of the segments

are affected at the same time. If the dissolved oxygen is depleted, the fish appear to move to the adjacent segment to avoid the low dissolved oxygen. The dissolved oxygen then recovers as the slug of low dissolved oxygen moves through the system. Therefore, the WWLU recognizes that the aquatic use is different during wet-weather conditions. In my opinion, you need to establish the appropriate aquatic life use first and then determine the dissolved oxygen criteria that support the uses.

16. Are the Wet Weather Limited Use triggers more complicated than necessary for the relatively small number of days per year it will be needed?

**RESPONSE:** I don't think so. Wet weather, and its effect on dissolved oxygen in the CAWS, is complicated. What we are proposing (the trigger approach) may seem complicated at first but once you apply the WWLU triggers with the data, it is actually quite simple. The regulations could spell out the WWLU trigger (that I described in my testimony in Table 1) and the step-wise procedures that are used so that everyone understands how the WWLU would be applied. Here are the steps (shown in Figure 1 of the Attachment) that I would suggest:

Step 1: the District would put the dissolved oxygen and rain data into a database.

Step 2: using the daily rain data, each hourly dissolved oxygen value would be flagged as either a dry value or wet value, based on the WWLU trigger and period.

Step 3: the dissolved oxygen values that are "dry" could be compared to the dissolved oxygen criteria. This would allow you to calculate the percent of time (hours) that the dry weather criteria were met or violated.

Step 4: for the "wet" dissolved oxygen values, you would need to look at the dry weather dissolved oxygen values immediately preceding each wet weather event. If the dry weather dissolved oxygen value preceding the trigger day was below the dry weather criteria, the hours during that event would become "WWLU-excluded" values; if not, they would be "WWLU-qualified" values.

Step 5: For the “WWLU-excluded” wet weather periods, the dissolved oxygen criteria would apply. Any dissolved oxygen value that is below the dissolved oxygen criteria would be considered a violation. The other “WWLU-excluded” values would be reported separately as hours meeting the water quality criteria.

Step 6: For the “WWLU-qualified” values, you would compare those values to the dissolved oxygen criteria. If they met the criteria, you would label those values as “Wet Hours above the WQC” and there would be no need for the WWLU as to those values. But for the hours during the WWLU-qualified periods, we know there would be dissolved oxygen values less than the criteria. This is when the WWLU is needed.

17. Did you consider simply proposing some number or percentage of excursion hours as part of the dissolved oxygen criteria for these waters?

**RESPONSE:** The District evaluated their data a number of different ways. Again, trying to pick “a number” that doesn’t reflect the magnitude of the storm events would be problematic. I suppose if you wanted you could simplify by saying anytime it rained more than a quarter of an inch, that the WWLU designation could remain up to 6 days (instead of limiting the designation for smaller rain events to 2 or 4 days). Also, if the standard allowed some number or percentage of hours to be below a minimum dissolved oxygen criterion that applied at all times, this would allow excursions during dry weather. Picking a number or percentage would be less protective than the District’s proposal.

18. Why are there no Continuous Dissolved Oxygen Monitors (“CDOMs”) listed for the South Fork of the South Branch Chicago River?

**RESPONSE:** Since the District is proposing narrative criteria for Bubbly Creek, there are no numeric dissolved oxygen criteria proposed. The WWLU designation therefore doesn’t make sense for Bubbly Creek and a CDOM is not needed for evaluating compliance.

19. Why are there no CDOMs listed for the Chicago River main stem?



**RESPONSE:** The District had operated a station at Clark Street from 1998 to 2009. The dissolved oxygen was above the general use criterion and the station was not impacted by the water reclamation plant effluents, so the District notified Illinois EPA that they would discontinue the station.

20. Is the CDOM network you describe in your testimony a mandatory component of the Wet Weather Limited Use proposal? Are there a mandatory number of monitoring locations?

**RESPONSE:** CDOM monitoring is mandatory to assess WWLU hours and I described the District's 2011 monitoring program in my testimony. Changes may need to be made to the program for a number of reasons, including technical reasons (biofouling, navigational disturbance, etc.), or safety reasons (if location is contributing to work-related injuries during deployment/retrieval). In the event the District were to propose a change to the program, Illinois EPA should be notified and given an opportunity to approve the change before it was implemented.

21. What procedures will be required for MWRDGC to move a CDOM? Will Agency or Board approval be required? If not, what factors will MWRDGC use to decide to make a change and to select the new location?

**RESPONSE:** I believe the District should continue to submit letters to the Illinois EPA about any intended changes to the CDOM program. The Agency could be given a period of time to respond (say 60 days). The letter could indicate that if the Agency did not object, the District would implement the changes after the 60-day period. The Board would not need to approve changes.

22. Is the rain gage network you describe in your testimony a mandatory component of the Wet Weather Limited Use proposal?

**RESPONSE:** The District would need to continue to operate a rain gage network, as they have been doing for other purposes.

I don't think it would be appropriate for someone to mandate where rain gages should be located. As long as they had gages that could be considered representative for interpreting the data at each CDOM station, I believe this is sufficient. The District could, however, notify the Agency about changes to its rainfall monitoring program.

a. Are there a mandatory number of monitoring locations?

**RESPONSE:** No.

b. How were the locations selected?

**RESPONSE:** There are 12 gages in the District's network that measure rainfall that impacts the CAWS- four in each of the three basins (North, Central, and South). There are 12 gages outside the basin where the District assesses whether storms that could affect the operation of the CAWS are approaching the area. I believe the District selected the gage locations to provide a wide net over the entire area using locations where the District had power and communications, such as treatment plants and pump stations. They also needed locations that were accessible for calibration and maintenance.

c. Was location of CSOs a factor?

**RESPONSE:** I don't know, but the locations appear to provide broad coverage, including for CSOs.

23. Why is the rainfall gage at the Main Office location on Erie street used for five of the eight stream segments? Where physically is that gage located at the Main Office?

**RESPONSE:** This rain gage is in the center of the system and therefore is in close proximity to the five CDOM stations that were analyzed. The gage at the Main Office Building is on the roof.

24. Why does the WWLU depend on MWRDGC's rain gages rather National Weather Service data?

**RESPONSE:** The District's gages provide more spatial resolution than the National Weather Service data.

25. What procedures will be required for MWRDGC to move a rain gage?

**RESPONSE:** It's my understanding they would need to issue a work order to move the gage. The new location would need power and a phone line and be accessible for gage maintenance and calibration.

a. Will Agency or Board approval be required?

**RESPONSE:** The District could notify the Agency of any proposed changes in the rain gage network. The Board would not need to approve the changes.

b. If not, what factors will MWRDGC use to decide to make a change and to select the new location?

**RESPONSE:** I don't know what factors MWRDGC would use to make a change and to select a new location. The District has moved gages in the past. The 95<sup>th</sup> St pump station gage was apparently moved because the Skyway was interfering with its operation.

26. Is snow or snow-melt a factor in the Wet Weather Limited Use designation?

**RESPONSE:** No. The rain gages do not measure snow or snow-melt so it is not a factor in the proposed WWLU. While the gage areas are heated, the District doesn't report snowfall. So

snow-melt from accumulated snow on the ground would not be a factor in their reports since there is a delay in those flows reaching the CAWS.

27. What percentage of time are the CDOM's not operational? What percentage of the data does not meet MWRDGC's quality assurance/quality control guidelines? How will the Agency determine that MWRDGC is not choosing to exclude data that demonstrates a D.O. violation?

**RESPONSE:** The data for calculating the period of time in 2006 that the CDOM monitors are not operational (or data were rejected) are in Table 7 of my testimony. In general the CDOM monitors provided valid data about 96% of the calendar year.

I did not evaluate what percentage of the data doesn't meet QA/QC guidelines. The District does that calculation and all the dissolved oxygen data I used met the QA/QC guidelines. The District has QA/QC guidelines that they follow. Because these instruments are subject to drift and fouling, it is not uncommon that some of the readings need to be excluded. This is done before comparing the data to water quality standards. I am sure the District could provide the excluded data if the Agency or others wanted to review it.

28. What is the terminus of the Chicago Sanitary and Ship Canal segment as it is used in the WWLU proposal?

**RESPONSE:** Confluence with Des Plaines River near River Mile 290.

- a. What use designations and water quality standards should the board adopt for the Lower Des Plaines River?

**RESPONSE:** I can't speak to what water quality standards the Board should adopt for the Lower Des Plaines since I have not studied that system.

29. On page 1 of Attachment 1 to your pre-filed testimony, you state that "dissolved oxygen data collected from 2001 to 2008 from eight monitoring locations" were used in your analysis. Why did you limit your analysis to eight stations? How did you select the eight stations?

**RESPONSE:** The District had done a lot of preliminary analysis and selected 8 stations, one per reach, as the representative stations for analysis. Typically the station that received the most negative impact on dissolved oxygen was selected if the reach had more than one station. These are the stations that were used in developing the proposed WWLU that is discussed in Attachment 1. In my testimony, I applied the WWLU to all of the 16 CDOM stations so I did not limit my analysis to just 8 stations.

30. What is meant in your testimony by the term “practical maximum flow”? (See, e.g. page 4 of Attachment 1).

**RESPONSE:** Practical maximum flow represents the maximum water reclamation plant (WRP) capacity “at the time of discharge” not the maximum rated WRP capacity. It’s my understanding that the District operates its pump stations taking into account the maximum flow they can send to the plants. For example, if tanks are out of service due to maintenance or other permitted modification (like rehabilitation), the maximum WRP capacity will be less than usual.

31. On page 5 of Attachment 1, you indicate that for rainfall events of between 0.25 and 0.49 inches, pump station CSO discharges occurred 21 percent of the time and gravity CSO discharges occurred 16 percent of the time. If CSO discharges did not occur during a large majority of the rainfall events of less than ½ inch, why is 0.25 inches an appropriate trigger for a Wet Weather Limited Use designation?

**RESPONSE:** CSOs are not the only source of dissolved oxygen impact during wet weather. There is also urban runoff, un-gaged CSO, storm sewer discharges, and highway runoff. All of these sources combine with the CSO discharges that occur with rain less than ½ inch to impact the dissolved oxygen. Therefore, a WWLU is needed for rainfall events less than ½ inch. The District evaluated triggers less than 0.25 inches and chose to use the upper value of the triggers that were considered (which were 0.05, 0.1 and 0.25 inches).

Other factors that need to be considered when thinking about frequency of these discharges are uneven rainfall distribution, ground conditions before precipitation, and impact from nonpoint sources in the tributaries. The District's analysis indicated that 0.25" of daily cumulative rainfall generally brings elevated flow to the WRPs, causes discharges from the combined sewer system, or causes urban runoff.

32. In Table 4 on page 10, the following Note is included at the bottom of the Table: "Note: If a CDOM monitor was not operational for a period of time, those hours would not be included in the wet weather limited use analysis."

a. Explain what "not included in the analysis" means in this context.

**RESPONSE:** If data were missing for a particular station for a few days, those days would not be included in the calculations. Calculations would still be performed based on the other days where the station was operational.

b. Explain what default conclusions are made when there CDOM data has been thrown out.

**RESPONSE:** The process the District uses to reject data is described on page 3 of the most recent (2009) CDOM data report. Valid data are not "thrown out" and there are no default conclusions. As part of the data analysis, the total number of hours that a CDOM station was operational with reliable data is reported (see Table 7 of my testimony).

33. What time of day are rain gage measurements taken?

**RESPONSE:** Cumulative rainfall is measured throughout the day at 15-minute increments. We therefore used the total rainfall that fell during a calendar day.

a. What happens if the trigger event occurs on two different calendar days?

**RESPONSE:** As explained on page 5 of my testimony, if a trigger event follows another trigger event, "the maximum duration would be extended by the maximum duration following

the last trigger day.” So for example, let’s say on day 10, there was 0.3 inches of rain. If there was no rain the next day the WWLU would apply for day 10 and days 11 and 12 (2 days following day 10). If there was, say, more than an inch of rain on day 11, the WWLU would apply on day 10 (the first trigger) and days 11 – 17 (the second trigger).

b. Are the WWLU days 24-hour rolling periods or calendar days?

**RESPONSE:** They are calendar days.

c. If a 0.25 inch rainfall begins at 11 p.m. and ends at 1 a.m., what day is used for the preceding day and when does the WWLU period end?

**RESPONSE:** It depends on the distribution of the 15-minute rainfall data. If 0.2 inches of rain fell between 11 pm and midnight and 0.05 inches of rain between midnight and 1 am, the trigger would not apply. If the 0.25 inches of rainfall began at midnight and lasted till 2:00am, the trigger would apply on that day. In evaluating the data and creating the regulatory language, it seemed simpler to use calendar days for the trigger. We could evaluate the data on an event basis that ignored calendar days if desired; however, this would be more complicated and raise issues when assessing compliance with the daily water quality criteria.

34. You testify on page 7 that “the District would submit annual documentation of water quality data, including rainfall and CDOM data, no later than March 31 of the following year.”

a. What other data would this report include?

**RESPONSE:** The District would continue to report all of the data that is in their annual water quality data reports (monitoring locations, materials and methods, and results) and add the rainfall data and additional calculations that I included in my testimony. The March 31 date is proposed because with winter ice coverage, it can take a while to retrieve the data. There’s also a lag time in data reporting when getting the rain and CSO data and assessing the QC data.

- b. If it rains on March 11, 2011, is it true that Illinois EPA will not be able to determine whether the dissolved oxygen standards were met on March 12<sup>th</sup> until March 31, 2012?

**RESPONSE:** On March 31, 2012, the District would submit an annual report that covers the relevant data from January 1, 2011 to December 31, 2011. So the data for the hypothetical rain event on March 11, 2011, would not be reported until the following year. Currently, Illinois EPA receives reports that evaluate compliance with water quality standards in the CAWS on an annual basis. This would continue. But other reporting periods could be considered as long as they were practical. Or the agency could request preliminary dissolved oxygen data at any time, although the District would need some time to first get out to the CDOM station to download the data, conduct the QA/QC, and get it into a format the agency could use. The Agency could also request data at any time, it might just be preliminary data.

- c. Shouldn't MWRDGC provide notice monthly to the Agency if the dissolved oxygen standards are violated?

**RESPONSE:** No. This is not practical. The District needs time to retrieve the monitors, which are switched in and out, and verify that the data are reliable. Plus rain events could span calendar months.

- d. Does it interfere with the compliance and enforcement process to only provide the Agency with annual reports?

**RESPONSE:** No. The agency can request data at any time.

- e. If dissolved oxygen falls below the water quality standard during dry weather, is that not reported until an annual report to be submitted in the following calendar year also?

**RESPONSE:** That's true, but this is how the District currently reports the CDOM data.



35. On pages 11-12 of your pre-filed testimony, you discuss various “bins” and sub-divided bins into which each day of the year would be placed for compliance and “accounting” purposes.

- a. What bin is a day placed in when there is no usable CDOM data on the day preceding the wet weather event?

**RESPONSE:** In our processing, we assumed that if the preceding dissolved oxygen was missing, it was assumed to be below the criterion prior to the wet weather event. Our analysis is therefore conservative as these hours ended up in the WWLU excluded bin (meaning the WWLU was not allowed to be applied). It’s important to note that the CDOM monitors are typically operating most of the time (96 percent or higher). The District could always identify any events like this and provide more detail in the annual report.

- b. What if only half of the hours that day have useable data?

**RESPONSE:** We still used the data.

- c. What if there is only 1 hour of usable data in a day?

**RESPONSE:** We still used the data.

- d. What happens to the hours with no CDOM data?

**RESPONSE:** Those hours are ignored.

36. What is the purpose of calculating percent compliance of each of the bins? What would that information be used for?

**RESPONSE:** If you are referring to the compliance statistics in Table 7, I may have used an inappropriate title. This is actually the percent of hours that fall within each bin. What is important from a compliance perspective are the last two columns. This shows the percent of time where the waterways were out of compliance during wet weather and during dry weather.

37. On page 13 of your pre-filed testimony you state “Under the District’s proposal, this location [Main Street on North Shore Channel] will receive additional treatment which could improve dissolved oxygen conditions during dry and wet weather.” What treatment is planned for North Shore Channel and why? Will installation of this treatment be a regulatory requirement?

**RESPONSE:** My statement is based on the model runs that were conducted by Marquette University. Dr. Zenz’s testimony (see Table 8) indicates that a 24 million gallons per day aerated flow augmentation station (using flow from the North Side WRP) would be needed to comply with the District’s proposed dissolved oxygen standard.

**ATTACHMENT**

Figure 1. Procedures for Calculating Compliance with Dissolved Oxygen Standards in the CAWS