

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: PROPOSED AMENDMENTS TO)
35 Ill. Adm. Code Parts 301, 302, 303 and)
304)

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO'S PRE-FILED QUESTIONS TO MARC GORELICK

1. Page 1 - Paragraph 2, lines 7-9 state: "Disinfection is nearly universal in major cities in the United States and prevalent in most smaller communities, for the simple reason that it is widely recognized as necessary to protect public health." Do you believe that the historical practice of wastewater disinfection in the United States is justified when:
 - A. More current published research (Blatchley et.al., 2007)¹, strongly suggests that conventional wastewater treatment disinfection processes are not effective for control of risks of disease transmission?
 - B. A paper published in Australia (Razzell, WE. *The Realities of Disinfection in Water and Wastewater Treatment*, 1990)² also concluded that treatment of discharges of effluent from sewage treatment plants having secondary treatment is a waste of resources and a threat to the environment apart from being ineffective as practiced conventionally?
2. Are you aware of any reports of disease outbreaks associated with secondary treated wastewater effluents?
3. Do you have any data similar to that for drinking water that suggests wastewater disinfection as currently practiced in the United States is necessary to protect public health?
4. Page 1 - Paragraph 2, lines 11-13 states: "...a single study of this nature is simply not a sound basis for bucking that vast consensus and allowing a heavy pathogen load in recreational waters." It is important not to confuse the discharge of fecal indicators with the discharge of a "heavy pathogen load". For example, isn't it true that the actual measured concentrations of pathogenic microorganisms ranged from no-detect (<0.1) to very low numbers? (Dry and Wet Weather Risk Assessment of Human Health Impacts of

¹ Blatchley, et al. (2007). *Effects of Wastewater Disinfection on Waterborne Bacteria and Viruses*. Water Environment Research, Volume 79, Number 1, pp 89-91.

² Razzell, WE, *The Realities of Disinfection in Water and Wastewater Treatment*. Institute of Engineers, Australia, 1989. National conference publication.

Electronic Filing - Received, Clerk's Office, August 25, 2008

Disinfection Vs. No Disinfection of the Chicago Area Waterways System, Geosyntec Consultants, 2008; Tables 3-5a, 3-5b, 3-5c, 3-6 and 3-7).

5. A paper you co-authored and referenced in your testimony entitled, *Pediatric Emergency Department Visits for Diarrheal Illness Increased After Release of Undertreated Sewage* states, "Contamination of local waterways by untreated or partially treated sewage may affect public health through dissemination of waterborne pathogens. In the process known as secondary bypass, or blending, sewage proceeds to primary treatment where solids, hydrophobic compounds, and sediment are removed. From there up to 20% of the sewage stream bypasses the usual secondary treatment with biological agents (where most pathogens are removed) and is directly diverted to the final step in the process...and then disinfecting agents such as chlorine are added, and the partially treated or "blended" sewage is discharged into local watershed areas."
 - A. In this paper, you acknowledge that secondary treatment processes remove most of the pathogens from the raw sewage prior to disinfection and discharge into the receiving stream. Given that the District WRPs are all secondary treatment facilities, what data do you have to indicate that the District is discharging a heavy pathogen load into the CAWS?
6. Page 1-Paragraph 2, line13 states: "*Simply put, we do not need further study to know that germs in the water can make people sick.*" Can you provide references for any past epidemiological studies of risks of illness due to fishing, boating, rowing, canoeing and kayaking, which are the types of incidental contact activities taking place on the CAWS?
7. Page 1, Last paragraph states: "I urge the Board to be very cautious in its approach to the epidemiological study, because placing excessive and undeserved weight on it could set a dangerous precedent for other communities around the nation."
 - A. Since epidemiological studies provide relevant scientific information for evaluating risk from water recreation and for making decisions concerning protection of recreators exposed to water, why would consideration of this epidemiological study in formulating a basis for these decisions as they pertain to the CAWS be "setting a dangerous precedent for other communities around the nation"?
 - B. Further, you state that the epidemiological study would, "potentially encourage communities to discontinue a basic health precaution that they have, appropriately been taking for decades." What is the basis for this statement?
8. Page 3, last 3 sentences states: "Some of the worst plagues in history have been caused by untreated sewage being discharged into water sources used by humans..." While the risks associated with untreated sewage are well known, do you have data or know of any reports of plagues being associated with treated secondary effluent?
9. Page 4, lines 1-2 states: "Although modern primary and secondary sewage treatment remove many pollutants and solids from sewage, the pathogens will remain in the final discharged effluent unless the sewage is disinfected."

Electronic Filing - Received, Clerk's Office, August 25, 2008

- A. Was your statement meant to imply that secondary sewage treatment does not remove pathogens?
 - B. Are you aware that the statement contradicts your report referenced above in which you state that most pathogens are removed during secondary treatment prior to disinfection?
 - C. Are you familiar with the report entitled, Public Health Risks Associated with Wastewater Blending (Katonak and Rose-November 17, 2003)³, which states that activated sludge is a common form of secondary treatment in the United States?
 - D. Do you agree with the report's findings that activated sludge consisting of bacteria, protozoa, and metazoan is vital for the removal of viruses and for a significant reduction in E. coli 0:157-phage and that during aerobic wastewater treatment, Cryptosporidium and Giardia can be reduced by approximately 99.9% and Clostridium perfringens total counts can be reduced by approximately 99.97% all without disinfection?
 - E. In several places throughout your testimony you use the term "sewage-contaminated water." While you have indicated in your testimony the risks of serious illness from contact with sewage-contaminated water, how have you compared the difference in risks between sewage-contaminated water and treated effluent dominated waterways like the CAWS?
 - F. Are you aware that the Cryptosporidium outbreak in Milwaukee was a drinking water outbreak, not a recreational water outbreak?
 - G. The Wisconsin Division of Health and the Wisconsin Department of Natural Resources reports that this outbreak was not associated with the treated effluent from the Milwaukee Metropolitan Sewage District, but was a result of uncommonly heavy rains on frozen and ice-covered ground (particularly where manure had been spread), barnyard runoff, raw sewage overflows, slaughterhouse effluent, removal of a Milwaukee River dam and/or changes in filtration practices at the drinking water plants.⁴ Do you have any data which associates any such outbreak with treated wastewater effluent?
10. Page 4-Last paragraph, Lines 1-2 states: "In preparation for my testimony, I have reviewed a summary of indicator pathogen sampling data collected by MWRD and posted to its website <http://www.mwrddgc.dst.il.us/>."
- A. What do you mean by the term "indicator pathogen"?
 - B. Did you review the pathogen data or the indicator data or both?

³ Katonak, R. and Rose, J.B., *Public Health Risks Associated with Wastewater Blending*, Final Report, Michigan State University, November 17, 2003.

⁴ Archer, J.R. et al. *Cryptosporidium spp. Oocyst and Giardia spp. Cyst Occurrence, Concentrations and Distribution in Wisconsin Water*, Publication WR 420-95, Wisconsin Department of Natural Resources 1995.

Electronic Filing - Received, Clerk's Office, August 25, 2008

11. In your review of the data on the District's website, were you able to associate high levels of fecal indicators with high levels of pathogens?
12. How have the levels of indicator organisms in this data indicated the likely levels of these pathogens?
13. Do you have data which correlates the levels of indicators to the levels of pathogens in any secondary treated wastewater effluent?
14. Page 5, Paragraph 2, lines 8-10 states: "Several of the water samples in the CAWS have levels of E. coli that, if found in a urine sample of an infant, would be considered a sign of a urinary tract infection requiring antibiotic treatment."
 - A. Would these same levels of E. coli found in a fecal sample of an infant be of concern?
 - B. Please explain how levels of E. coli in urine are relevant to concerns about levels of E. coli in the waterways.
 - C. Do you know that each of us are excreting vast numbers of non-pathogenic E. coli every day?
 - D. Do you agree that the human health hazards associated with E. coli strains present in environmental water are not well known and that the relationship between pathogenic and non-pathogenic E. coli highly depends on the nature of the watershed and the source of pollution?
15. Page 5, Last paragraph, lines 2-4 states: "*It is unlikely on the other hand, that one would find high levels of indicator bacteria correlated with low levels of viruses because the latter tend to persist in the environment for longer periods of time.*"
 - A. Do you have data which correlates the levels of indicator bacteria with the levels of viruses in treated wastewater effluents?
 - B. Do you have data which suggests that high levels of indicator bacteria equals high levels of viruses?
16. Page 5 - Last paragraph, lines 8-11 to Page 6, lines 1-2 states: "Finally, as a general matter, even low levels of any human pathogen can be dangerous for sensitive populations – children, the elderly, and persons with compromised immune systems (such as people in chemotherapy). Thus, an overall low level of indicator organisms cannot be interpreted to mean that the level of waterborne pathogens is safe for sensitive populations." Given that current research suggests that disinfection is only effective in lowering the levels of indicator bacteria and may not be effective against pathogens that may be in the effluent, and given that monitoring results indicate that at times levels of pathogens are higher upstream suggesting other sources of these pathogens:

Electronic Filing - Received, Clerk's Office, August 25, 2008

- A. What level of waterborne pathogens in incidental or secondary contact water is safe for the sensitive population?
 - B. Do you have data to show that disinfection of the wastewater effluents will reduce the level of pathogens in the CAWS to that level?
 - C. Did you know that although their symptoms may be more severe, it does not take a lower dose of pathogens to infect children, the elderly, and persons with compromised immune systems?
17. Do you believe the proposed fecal coliform limit for the wastewater reclamation plants will sufficiently protect the general public?
18. Do you think the proposed effluent limits would make the waterways safe for sensitive populations, even with a very high level of treatment at the plants?
19. If the proposed effluent limits won't make the waterways safe for the public, including sensitive populations, wouldn't it be better to let the public know that the waterways should not be used for primary contact recreation?
20. Wouldn't it be best to warn sensitive populations that the waterways would not be safe even if very low levels of indicator organisms were present?
21. Page 6, Paragraph 3, Lines 4-6 states: "Since epidemiological study populations are not isolated from the general population or otherwise tightly controlled in their behavior and exposures, it can be extremely difficult to isolate the factor that is causing any observed effect calling into question the strength of the evidence."
- A. In your testimony you reference your "peer-reviewed study of diarrheal illness rates in children following a release of undertreated sewage (which found a positive correlation, i.e. more children in the exposed group of children were sickened by a statistically significant margin)". Who were the peer-reviewers of the study and what were their credentials?
 - B. How did you account for these same epidemiological study limitations in your study on children in such a way that you can confidently state that you found a positive correlation by a statistically significant margin?
 - C. The UIC School of Public Health's epidemiological study design was developed by a multi-disciplinary team of experienced researchers, with backgrounds in infectious disease medicine, environmental medicine, epidemiology, biostatistics, industrial hygiene and environmental science, and has been evaluated by a panel of recognized leaders in the field of water microbiology and health (including US Centers for Disease Control and Prevention, US EPA and other universities). What elements does your study contain that contribute to its validity that the UIC School of Public Health's epidemiological study does not have?

Electronic Filing - Received, Clerk's Office, August 25, 2008

- D. Some of the events in your study achieved statistical significance for “Lake Michigan,” none for “Non-Lake Michigan.” However the sample size was 4 times larger for Lake Michigan. What was the power of the study for Non-Lake vs. Lake Michigan?
- E. The September 1, 2003 and May 14, 2004 events had similar amounts of sewage diverted. The September 1, 2003 event had 4.2 times more Giardia cysts measured in the effluent, however, the correlated effect is quite different. Can you explain this?
- F. For the May 30 and September 1, 2003 events, did you have any data about whether those children visiting the ER could have been exposed to the blended effluent by recreating in Lake Michigan in areas affected by the effluent?
- G. In Table 2, did you define “winter” as the two events in December 10, 2003 and March 26-28, 2004? For the winter grouping, are the illness rates for both the Lake Michigan and the non-Lake Michigan drinking water zip codes statistically significant?
- H. How does that support your overall conclusion that there is a relation between blending events, Lake Michigan drinking water sources, and increased incidences of diarrhea?
- I. In terms of the zip codes that were not within the Lake Michigan drinking water source, do you know what treatment was provided to the source water?
- J. Do you have any evidence that the drinking water treatment provided to the source water for those living in the Lake Michigan supply area was inadequate to protect against waterborne pathogens?
- K. How do you support your conclusion “[w]e have observed an association between the release of partially treated sewage into a drinking-water source in a metropolitan area and subsequent child ER visits for diarrheal illness”?
- L. In the conclusion, the article states “Although these results are preliminary and cannot themselves demonstrate a causal relationship, they suggest a need for additional study in this area to inform ongoing policy debate.” What is meant by preliminary? Isn't it possible that the results don't support a causal relationship?
- M. In reference to your study, a letter from the Milwaukee Health Department (MHD) to the Milwaukee Journal Sentinel dated on April 28, 2006 states, “There currently is no evidence of drinking water quality degradation at MWW [drinking water] treatment plants as a result of secondary sewage bypasses at the wastewater treatment plant. Furthermore, MHD's surveillance data reveals no evidence that secondary sewage bypasses are directly related to increases in disease occurrence with the community.” What evidence do you have that the diarrheal illnesses you reported in children were directly related to drinking water contaminated with sewage bypasses?

Electronic Filing - Received, Clerk's Office, August 25, 2008

22. Page 7, Paragraph 2, lines 7-10 states: "Simply put, we already know that germs are bad for people, and MWRD WWTPs are putting those germs in the water. That, standing alone, is sufficient information on which to base a requirement that WWTPs disinfect their effluent..."
- A. Have you read the testimony of Ernest Blatchley?
 - B. On page 4 of his testimony, Dr. Blatchley states "A common impression among the lay public is that a wastewater effluent that has been "disinfected" (i.e., is in compliance with an effluent discharge limitation for coliform bacteria) is "safe", in terms of potential exposure to waterborne microbial pathogens. However, systems that are in compliance with coliform limitations similar to those that have been proposed for the District's facilities may still contain viable and/or infective microbial pathogens." Do you agree or disagree with these statements, and why?
 - C. On page 6 of his testimony, Dr. Blatchley states "For example, in most countries of western Europe, wastewater disinfection is practiced only at facilities where effluent discharge is to a public swimming area, or where other opportunities for direct human contact are likely (e.g., shellfish breeding grounds). Despite the fact that effluent disinfection is uncommon in Europe, the incidence of diseases associated with waterborne pathogens among the residents of these countries does not appear to be substantially different than in the U.S." Have you compared this information to what you found in your study of increases in emergency department visits due to the supposed effect of blending events on Lake Michigan drinking water?
23. Page 8-Paragraph 4, lines 1-2 states: "*All these issues with sample size appear to be present in the CHEERS epidemiological study ...*"
- A. Are you aware that survey research – such as surveys of how the public feels about the economy or the presidential race – generally samples less than 1/100 of 1% of the population?
 - B. If the CHEERS research study enrolls 5 or 10% of CAWS users, wouldn't you expect that to be representative of the population of interest?
 - C. If the percent of users enrolled in the research is very high compared to most research studies, wouldn't that make the results to be an unusually good reflection of the risks of the actual population of CAWS recreators?
24. Page 8-Last paragraph, lines 2-6 states: "The study is enrolling those engaged in all manner of secondary contact use – including kayaking, canoeing, rowing, fishing, and other activities that do not involve full-body contact. These activities differ greatly in the likelihood that a participant will end up swallowing a mouthful of contaminated water, which is the primary exposure pathway for waterborne pathogens."

Electronic Filing - Received, Clerk's Office, August 25, 2008

- A. The presence of pathogens would increase the risk of gastrointestinal disease if people swallow the water. Do you know of any study published in the peer-reviewed literature that estimated how much water people swallow when recreating?
- B. If no such study has been done, why should we think that sufficient quantities of water are swallowed by fisherman, boaters and rowers to produce illness?
25. Page 11, Paragraph 2 states: "It is important to note that when the risk under study can be changed by the individual, and it is known or suspected to be hazardous, the magnitude of that risk is likely to be underestimated in an epidemiological study because people may conduct themselves more cautiously in hazardous conditions and self-limit their risk..."
- A. Is the implication of this statement that disinfection will yield a substantial reduction in the risks associated with waterborne microbial pathogens?
- B. Are you implying that users of the CAWS have modified their behavior because of the perception of risk associated with the CAWS, in their current condition?
- C. What is the basis for these implications that the behavior patterns of users of the CAWS will change (i.e., these people will be less conservative in their behavior) if disinfection is implemented?
- D. How can you demonstrate that the cautious behavior you assume is exhibited now may change if disinfection is implemented?
- E. If users become less cautious as a result of implementation of disinfection, isn't it conceivable that the risk of disease transmission could increase?
26. Page 12, lines 4-7 states: "Rather, the problem of waterborne pathogens in the CAWS needs to be understood as a situation that we know is inherently dangerous, and that is bound over time to result in severe injury to someone even if that injury cannot be captured in the narrow window of a scientific study."
- A. Are you aware that in many of the waterborne disease outbreaks in the United States, most of the outbreaks are associated with "treated water" (swimming pools, spas, wading pools, interactive fountains, etc.) (CDC, 2006, p. 6)⁵. Do you think that swimming in treated water "is bound over time to result in severe injury to someone"?
- B. Should people stop swimming in treated water venues because it is inherently dangerous?
27. Page 12, Last 2 lines states: "*I believe that sound science and public health policy call for promptly disinfecting WWTP effluent as IEPA proposed...*"

⁵ Centers for Disease Control and Prevention (CDC) (2006). Surveillance for Waterborne Diseases and Outbreaks Associated with Recreational Water – United States.

Electronic Filing - Received, Clerk's Office, August 25, 2008

- A. Are you aware that research by Blatchley et.al. (2007) strongly suggests that wastewater disinfection processes cause a decrease in water quality and may not be effective for control of risks of disease transmission as once thought?
- B. Are you aware that research published in Australia by Razzell, WE (1990) concluded that treatment of discharges of effluent from sewage treatment plants having secondary treatment is a waste of resources and a threat to the environment?
- C. Are you aware that research presented to the Illinois Pollution Control Board by MWRD demonstrated that water quality in the receiving waters downstream of the Districts WRPs was the same or better when disinfection was terminated than it was when disinfection was practiced?⁶
- D. If the MWRD were to disinfect, it would take years before the disinfection processes would be built. If the risk is such as you describe, would you recommend banning all recreation on the CAWS until that time?
- E. Even if the wastewater treatment plant effluent was disinfected, would you still be concerned about recreational exposure to the CAWS due to pathogen contributions from stormwater runoff and combined sewer overflows?

Dated: August 25, 2008

Respectfully submitted,

**METROPOLITAN WATER RECLAMATION
DISTRICT OF GREATER CHICAGO**

By:



Fredric P. Andes

Fredric P. Andes
David T. Ballard
BARNES & THORNBURG LLP
Suite 4400
One North Wacker Drive
Chicago, Illinois 60606
(312) 357-1313
482438v1

⁶ Haas, C. et al., *Effects of discontinuing disinfection on a receiving water*. Journal Water Pollution Control Federation, Washington, D.C. 20037 (1988).