



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 5

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DEC 27 2010

STATE OF ILLINOIS
Pollution Control Board

DEC 27 2010

REPLY TO THE ATTENTION OF:

WQ-16J

Illinois Pollution Control Board, Clerk's Office
James R. Thompson Center, Suite 11-500
100 West Randolph Street
Chicago, Illinois 60601

PC# 561

Re: R2008-009 (B): In The Matter of: Water Quality Standards and Effluent
Limitations for the Chicago Area Waterway System and the Lower Des Plaines
River: Proposed Amendments to 35 Ill. Adm. Code 301, 302, 303 and 304

Dear Illinois Pollution Control Board:

U.S. Environmental Protection Agency has reviewed the Chicago Health Environmental Exposure and Recreation Study (CHEERS) Final Report (Public Comment 478) that was filed with the Illinois Pollution Control Board (Board) on August 31, 2010, as amended by Public Comment 484. EPA is providing our initial comments on this report in order to meet the December 31, 2010, public comment deadline on Subdocket B. Our comments do not include a review of the December 6, 2010, supplement; if necessary, we may submit comments on the supplement at a future date.

EPA has concluded that the following CHEERS results are noteworthy: (1) the estimated gastrointestinal illness rate in the water recreation group (approximately 13 illnesses reported per 1000 recreators) is greater than EPA's recommendation of 8 to 10 illnesses per 1000 recreators in fresh waters; and (2) increasing self-reported water exposure resulted in higher gastrointestinal illness rates in the water recreation groups.

We hope that this information is useful to the Board in its deliberations with regard to the above referenced matter. Please contact Linda Holst of my staff if you have any questions. She can be reached at (312) 886-6758 or holst.linda@epa.gov.

Sincerely,

Tinka G. Hyde
Director, Water Division

Enclosure

cc: Marcia Willhite, Illinois Environmental Protection Agency

**EPA Comments to Illinois Pollution Control Board Docket R2008-009
(Subdocket B) Regarding Chicago Health Environmental Exposure,
and Recreation Study (CHEERS), Final Report**

1. Unaddressed Peer Review Comments: The comments of peer reviewers are summarized in Appendix D of the August 31, 2010, CHEERS report. EPA's view is that the peer review comments including, but not limited to, the following issues were not adequately addressed in the study report: a) how somewhat similar fecal contamination in General Use Waters (GUW) affects the study's ability to draw comparisons between the Chicago Area Waterway System (CAWS) and GUW illness rates; and b) how design and implementation of the stool sample analyses affect the interpretation of these results.

It is important to note that the gastrointestinal illness rate in the water recreation group, approximately 13 illnesses reported per 1000 recreators, is greater than EPA's recommendation of 8 to 10 illnesses per 1000 recreators in fresh waters. EPA notes that the illness rates reported in CHEERS for the CAWS represent conditions from 2007-2009, when state and local authorities worked on several fronts (including the installation of detailed warning signs at access sites) to inform CAWS users to avoid contact with water. While the 2007-2009 timeframe represents a greater number of recreation users as compared to previous years, there is no information to suggest that the number of users, the intensiveness of the use, and/or the level of water exposure (either intentionally or unintentionally leading to greater contact with the water or less fastidiousness in activities that minimize exposure) will not increase in the future. Because increased levels of exposure were positively correlated with gastrointestinal illness risk, higher gastrointestinal illness rates in CAWS recreators are plausible over time. Furthermore, CHEERS did not include activities that have been documented within some areas of the CAWS such as swimming, wading, jet skiing, tubing, or waterskiing, where higher levels of water exposure and higher gastrointestinal illness rates are likely. CHEERS did not evaluate gastrointestinal illness rates for these latter activities, nor did CHEERS consider that such uses may increase over time. For these reasons, it does not appear that the observed risk levels in CHEERS represent the full or future level of health risk to recreators in the CAWS.

2. CAWS vs. GUW Comparison: Comparing the illness rates between CAWS and GUW is ill-advised. First, from a water quality perspective, the water in the GUW classification were not meeting applicable microbial water quality standards and microbial indicator concentrations, which suggest that the GUW waters are impacted by fecal contamination. As a result, the illness rate in the GUW waters should not be used as a reference population (unexposed to non-disinfected wastewater) upon which to compare CAWS waters. Second, there appears to be minimal reporting of what the relative fecal source attributions were for each day of the epidemiological study. It is unclear how any comparison between illness rates in the CAWS vs. GUW sites is relevant to this rulemaking since the indicator data are not informative as to the level of human-infectious pathogen differences between the CAWS and GUW sites. Third, the study was designed to have a 1 in 5 chance of not detecting a difference between study groups when in fact there may have been a difference. Since there was a 20% chance of making such a false-negative error, and both CAWS and GUW sites appeared to be polluted with sewage, it is not surprising that the study did not detect a different level of health effect between the CAWS

and GUW groups. Fourth, there are many differences in the populations of users, the types of activities occurring within the study groups, the duration of activities, the precautions taken by the users, the self-reported exposures and potential ingestion of the two groups that limit the usefulness of the comparison between the CAWS and GUW groups.

3. **Stool Sample Analyses and Interpretation:** While EPA is aware that etiological agents have been identified in other studies, such as for the Australian work following a sewer leak in Sydney Harbour by Ferson et al. (1993), and *E. coli* O157:H7 on the Great Lakes by Voelker (1996)), the stool sample design chosen for CHEERS was very likely not to identify an etiological agent (i.e., normal background community viral infection rate is expected to exceed 10% - a value reported by the study). EPA notes that the summary of stool sample analyses in the Executive Summary (at ES-17) states: *“The detection of pathogens in stool samples of participants with gastrointestinal symptoms was just as common for all three study groups. Pathogen presence was not associated with self-reported water ingestion. These two observations are not consistent with the assumption that CAWS use would be associated with the presence of waterborne pathogens in stool samples of study participants with gastrointestinal symptoms, and there was no suggestion that water recreation, CAWS use, or water ingestion was associated with gastrointestinal illness.”* EPA believes that this is an overstatement of the stool sample results due to concerns about this portion of the study’s design and methods.

4. **Additional Clarity Recommended:** Discussion of differences among the subgroups was unclear. For example, it was not always clear whether the reported differences among subgroups discussed in the report were corrected for differences among the users that may have affected illness rates. It was also unclear how well any such calculations were able to control differences among the groups that could contribute to potential differences in illness rates. Additionally, EPA is uncertain as to why there is apparently the highest gastrointestinal illness rate for fishers/boaters, given that water exposure (of which they would be assumed to be the lowest) seems to link clearly to illness. It is unclear how both these patterns can exist in this data set. Therefore, a more detailed and clear discussion of the analyses, and how the strengths and weaknesses of the analyses affect the interpretation of the results is recommended. Such an increase in transparency of underlying data and subsequent calculations would allow for results and their interpretation to be more easily evaluated. Lastly, several additional analyses that were provided to the Board were not included in the report. Additional details as to how these analyses were undertaken, their results, and conclusions should be provided, possibly in the form of a supplemental report.

References

- Ferson, M.J., Williamson, M. and Cowie, C. (1993) Gastroenteritis related to food and/or beach bathing. NSW Public Health Bulletin 4(7), 76-78.
- Voelker, R. (1996) Lake-associated outbreak of *Escherichia coli* O157:H7 Illinois, 1995. Journal of the American Medical Association 275(24), 1872-1873.