

IN THE MATTER OF:)
)
PROPOSED AMENDMENTS TO)
DISSOLVED OXYGEN STANDARD)
35 ILL. ADM. CODE 302.206)

R04-25
(Rulemaking - Water)

DEC 19 2006

STATE OF ILLINOIS
Pollution Control Board

PC498

NOTICE OF FILING

TO: SEE ATTACHED SERVICE LIST.

PLEASE TAKE NOTICE that on **December 19, 2006**, we filed the attached *Public Comments of the Metropolitan Water Reclamation District of Greater Chicago* with the Pollution Control Board, Dorothy Gunn, Clerk, JRTC, 100 W. Randolph Street, Suite 11-500, Chicago, Illinois 60601, a copy of which is herewith served upon you.

METROPOLITAN WATER RECLAMATION
DISTRICT OF GREATER CHICAGO

By: *Frederick M. Feldman*
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CERTIFICATE OF SERVICE

I, Judith Pappalardo, being duly sworn on oath, certify that I caused a copy of the above *Notice* and attached *Public Comments of the Metropolitan Water Reclamation District of Greater Chicago* to be sent via first-class U.S. Mail to the individuals identified on the attached service list, at their address as shown, with proper postage prepaid, from 100 East Erie Street, Chicago, Illinois, at or near the hour of 4:30 p.m. this 19th day of December, 2006.

Judith Pappalardo

Subscribed and Sworn to
Before me this 19th day of
December, 2006,
Rosalie Bottari
Notary Public



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DEC 19 2006

STATE OF ILLINOIS
Pollution Control Board

ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF)
)
PROPOSED AMENDMENTS TO R04-25) R04-25
DISSOLVED OXYGEN STANDARD) (Rulemaking – Water)
35 ILL. ADM. CODE 302.206)

**PUBLIC COMMENTS OF THE METROPOLITAN WATER
RECLAMATION DISTRICT OF GREATER CHICAGO IN
THE MATTER OF PROPOSED AMENDMENTS TO
DISSOLVED OXYGEN STANDARD, 35 ILL.ADM. CODE 302.206**

The proposed amendment to the dissolved oxygen standard serves to establish a scientifically sound and practical dissolved oxygen standard for aquatic life in Illinois. The District is concerned that the testimony of Dr. Thomas Murphy is clouding our attempt to achieve a useful water quality standard. Because of this concern, the District has the following comments on the testimony of Dr. Thomas Murphy concerning the subject proceedings.

Page 46, lines 8-24 and page 47, lines 1-2, Concentration of dissolved oxygen has been expressed as mg/L in water quality standards since before the Clean Water Act of 1972 and are used for this purpose throughout the United States. The IPCB does not need to “re-invent the wheel,” so to speak, on this topic. It is simply more convenient to express the concentration of dissolved oxygen in mg/L than as the percentage saturation, temperature, and oxygen tension. The classic work “Fish and River Pollution” by J. R. Erichsen Jones (1964), stresses this point. In this work, Jones asserts that in stating concentrations of oxygen in water, values in parts per million are usually given in mg/L and that sometimes the concentration is given in percentage of saturation but in this case the temperature must be stated. Ultimately, Jones agrees with Fry (1957) that it is always preferable to express the concentration in mg/L. This convention has been upheld for the past forty years.

Dr. Murphy has referred to himself as a chemist. He has approached the determination of dissolved oxygen standards for fish based on his understanding of water chemistry alone. While I appreciate his input in these proceedings, it is necessary to point out that his insistence on re-vamping the useful, ubiquitous, and time-tested method of expressing dissolved oxygen on a concentration basis, with expression as percent saturation and temperature is becoming an unnecessary distraction, rather than a meaningful solution for establishing a dissolved oxygen standard. This is especially problematic when Dr. Murphy finally recommends in his testimony (page 51, lines 12-17) that the dissolved standard be 6 mg/L or 6.5 mg/L, which are, of course, concentrations in mg/L, not percent saturation.


Dr. Murphy's concern that basing the standard on dissolved oxygen concentration is not protective appears to be due to the fact that during the colder months, when oxygen solubility is greatest, the proposed dissolved oxygen concentration limit is lowest, resulting in lower required dissolved oxygen saturation than during warm months. Dr. Murphy has indicated in his testimony that a dissolved oxygen saturation level of 47 percent or greater is protective. Dr. Murphy presents no valid evidence for Illinois that dissolved oxygen saturation during the August-February period is limiting or harmful to fish. The needs of fish change during this time of year.

Dr. Murphy does not present any specific data for Illinois that below 47 percent, saturation conditions become bad for fish species in Illinois. Why go to the trouble of calculating dissolved oxygen saturation when it is just as easy to use dissolved oxygen concentration in mg/L? Drs. Garvey and Whiles have already spent considerable time investigating the dissolved oxygen needs of fish in Illinois and have expressed these needs in terms of dissolved oxygen concentration. If Dr. Murphy used these same data, except as dissolved oxygen saturation, at specific water temperatures, would he not have come to the same conclusion as did Drs. Garvey and Whiles?

There is no sound theoretical reason for assuming that the availability of dissolved oxygen to fish is better represented by its tension, or by the percentage of saturation, than by its concentration in the aqueous medium (Doudoroff and Shumway, 1970). Since concentration and percent saturation are proportional, once a rational standard is set, based on either concentration or saturation, the measurement of compliance as concentration-based or saturation-based is largely a matter of logistics.

Respectfully Submitted,

Metropolitan Water Reclamation District of
Greater Chicago



BY: Louis Kollias, Director of Research &
Development

References

Doudoroff, P. and D. L. Shumway, "Dissolved Oxygen Requirements of Freshwater Fishes," Food and Agriculture Organization of the United Nations, FAO Technical Paper No. 86, 291 pp., 1970.

Fry, F. E. J., "The Aquatic Respiration of Fish," M.E. Brown, ed., *The Physiology of Fishes, Volume I - Metabolism*, New York, Academic Press, 1957.

Jones, J. R. E., *Fish and River Pollution*, Butterworths, London, 1964.