

ILLINOIS POLLUTION CONTROL BOARD
August 29, 1972

METROPOLITAN SANITARY DISTRICT) R72-4
OF GREATER CHICAGO) In the Matter of a Petition
for Amendments of Certain
Water Quality Standards

OPINION OF THE BOARD (by Mr. Dumelle)

This opinion is in support of a motion by the Board adopted August 15, 1972 to partially allow and partially reject portions of the Metropolitan Sanitary District of Greater Chicago (MSDGC) petition that we authorize hearings on a proposal for amendments to the Water Quality Standards adopted March 7, 1972.

The petition was filed on May 3, 1972 by MSDGC and requested amendments to 24 sections and subsections of the Water Quality Standards. It was referred to both the Illinois and Federal Environmental Protection Agencies and to the Institute for Environmental Quality for comments. Joint meetings of these three agencies with MSDGC evolved and certain of the questions of interpretation of the regulations were answered by discussion. On August 7, 1972 a letter from MSDGC was filed with the Board deleting five of the proposals from the petition.

The Board in adopting the Water Quality Standards on March 7, 1972 held extensive hearings all over Illinois. Any evidence bearing upon the standards should have been presented at those hearings or in written submissions to the Board while the record was open. Unless new information is now available the Board cannot continue to reconsider matters it has just considered. To do so would leave it with no time for new matters.

Consequently, the Board has allowed new hearings only on the District proposal to amend Part IV, 404(e) Deoxygenating Wastes and has rejected all others. The reasons for the grant and denials are given in detail below.

Part II, 203(f). The District requests that the effluent standard for ammonia govern where stream dilution is limiting in lieu of the water quality standard of 1.5 mg/l. The District makes it clear that the request applies to the small plants of the District. Since there is no ammonia effluent standard applicable to the District small plants (see Section 406

of the standards) the request is incorrectly phrased. What is being requested is the establishment of an ammonia effluent standard (presumably at 2.5 mg/l) for the small plants. We think the proper course of action is to file variance requests for those small plants the District feels cannot meet the ammonia water quality standard outside the mixing zone and to justify each based upon the conditions of the individual stream into which each plant discharges. If the stream is so shallow that temperatures lethal to fish life are attained naturally then it would make little sense to insist upon a 1.5 mg/l ammonia water quality standard. See Part II, 302(k) for recognition of this principle in the designation of Restricted Use Waters. The Board also notes that the District is actively phasing out many of its small plants (Orland Park, East Chicago Heights and Barrington Woods) and the problem may soon become moot in some cases.

Part II, 205(c). The District asks that we insert a December 31, 1982 date for the effective date of the 3.0 mg/l (16 hours) and 2.0 mg/l (8 hour) dissolved oxygen standard on restricted use waters. The District supporting material makes it clear that the main concern is with the dissolved oxygen standards for the North Shore Channel which is discussed in Section 302(j) below.

Part III, 302(j). As mentioned above, the District also asks a December 31, 1982 date for the realization of the 5 mg/l (16 hour) and 4 mg/l (8 hour) dissolved oxygen standard on the North Shore Channel. The 1982 date request was undoubtedly chosen to correspond with the same requested date for combined sewer overflow control since the resulting bottom deposits would exert an oxygen demand in the North Shore Channel.

The District's statement mentions its Board of Trustees action of April 20, 1972 authorizing a \$1,500,000 instream aeration system for the North Shore Channel to be operative by April 1, 1974. This action is a new development since our March 7, 1972 enactment of the Water Quality Standards. Instream aeration has been shown to be perhaps three to five times cheaper than higher treatment in other places such as on the Ruhr River in Germany and can be installed quickly. See "Instream Aeration an Alternative to Advanced Waste Treatment?" by William Whipple, Jr., Civil Engineering, September, 1970. We commend the District for this pioneering initiative without passing judgment in advance on all the effects of the project. However, since the aeration system is to be operative April 1, 1974 and for the reasons given under Section 602(d)(2) it is premature to set a deadline date now ten years into the future. We urge the instream aeration system be completed as soon as possible.

The District's concern with effective dates stems from the natural feeling to protect itself from prosecution for water quality standards violation. In an early case (Springfield Sanitary District v. EPA, PCB 70-32, January 27, 1971) we held that the deadline dates set by the old Sanitary Water Board regulations for the construction of treatment works to adequately meet water quality standard are equivalent to variances. Thus, to be explicit as possible the District could not be prosecuted for a violation of water quality standards, whether oxygen levels or floating material or color, if a specific future date is given for the construction of works to meet those standards. Conversely, a required degree of treatment, such as secondary, on the same water course, if operated so as to cause a violation of water quality standards, is not so protected since proper operation is always required.

Part IV, 404(e). The District request, which we have granted, is for additional hearings to substitute an effluent standard of 10 mg/l BOD and 12 mg/l of suspended solids for the present requirements of 4 mg/l BOD and 5 mg/l suspended solids. The District asserts that tertiary treatment (to the 4-5 standards) would cost from \$200 to \$250 million while the 10-12 standards would only cost \$100 to \$125 million in capital costs. The savings, then, are somewhere between \$75 to \$150 million which are indeed substantial. The District further asserts that with a 10-12 standard, removal of combined sewer overflows, maintenance dredging and instream aeration, it will meet the Water Quality Standards for dissolved oxygen in the canal system.

We give the District its opportunity to show that the 10-12 standard is the better one. The new facts, such as the recent District commitment to in-stream aeration together with technical comments by the Institute and the District indicate that the proposal has merit. But we wish to point out that the waters of Illinois continue beyond Lockport where the Sanitary and Ship Canal terminates. We want to know the effect of the looser effluent standard upon the Des Plaines River below Lockport and upon the Illinois River, especially between its formation and the Dresden Dam. Portions of these waters are General Use Waters and are known to be now below existing standards. It is common knowledge that the oxygen demand caused by the District's ammonia releases exerts a deleterious effect upon the Illinois River even below Peoria. Similarly, we will look closely at the District proposal for downstream effects:

Dr. John T. Pfeffer, Environmental Scientist for the Institute for Environmental Quality, in his comments of June 21, 1972 on the District proposals states,

The downstream effect of the discharge from the waterways has not been adequately documented. The MSDGC developed

a hypothetical analysis based upon the extension of the channel 80 miles downstream. The analysis has no bearing on the actual stream flow conditions downstream from Lockport. The true impact can only be evaluated from an analysis of the stream in this area. However, increasing the effluent BOD₅ to 10 mg/l adds only approximately 110,000 pounds of ultimate BOD per day. This additional oxygen demand is offset by the addition of 160,000 pounds of oxygen per day by in-stream aeration. Therefore, the waterway will receive an additional 50,000 pounds per day of oxygen. Also, the MSDGC model shows that the BOD₅ will increase from 3.4 to 5.4 mg/l at Lockport for the 10 mg/l BOD₅ effluent condition. This additional 2 mg/l BOD₅ in conjunction with a proposed 7.0 mg/l of dissolved oxygen should not create significant oxygen problems downstream from Lockport.

One other benefit would be realized with the use of in-stream aeration. The planning, design, and construction time associated with installation of these modules is considerably shorter than the time required for completion of the program for water pollution control in the metropolitan Chicago area. Therefore, it is conceivable that the District could have these systems operating and eliminating excessively low dissolved oxygen levels in the waterways system at a much sooner program. This would be an advantage in showing a somewhat higher quality of water in the waterways prior to the completion of the construction of the entire pollution abatement system.

Part IV, 406. The District asks that we extend the date of the ammonia effluent standard of 2.5 mg/l (April through October) and 4.0 mg/l (November through March) from December 31, 1977 to December 31, 1982. The District supplied a great deal of technical material asserting the possible difficulties using two-stage nitrification. We feel that the testimony of two eminent authorities Dr. Edwin Barth (December 17, 1970 R70-8) and Dr. Clair Sawyer (October 1, 1971, R70-8, etc.) still holds which is that two-stage nitrification is entirely feasible. The fact that the District itself has the Salt Creek treatment plant now under construction at a cost of \$43,259,000 for completion December 31, 1974 shows that large scale plants (30 MGD) are capable of being designed to incorporate two-stage nitrification. The District raises the possibility of poisoning of the nitrifiers by industrial wastes but presents no data showing influent levels of these metals in comparison to reported toxic levels. Thus we do not know if the possible problem even exists. We note as an example that mercury toxicity for nitrifiers is given by the District as 2.0 mg/l. This level is far above our sewer discharge regulation of 0.0005 mg/l and should not be countenanced.

To grant another five years now onto the December 31, 1977 deadline is to delay that much longer the substandard conditions caused by the District in the Illinois River from its ammonia discharges. What the District needs to do is to accelerate its nitrification research at each major plant. If materials toxic to nitrifiers are found, then the District sewer discharge ordinance may have to be tightened. The ammonia has to be nitrified and that as soon as possible.

Part IV, 602(d)(2). The District has requested another 5-year extension from December 31, 1977 to December 31, 1982 for the solution to its combined sewer problem. The District in the table of costs puts the so-called "Deep Tunnel" project as having an ultimate cost of \$1.223 billion and states that the project is so massive in scope that it physically cannot be built by 1977. If the complete "Deep Tunnel" project is the only solution then the District may be correct. The "Deep Tunnel" project is both a pollution control and flood control measure. Water quality standards may be met at a degree of retention less than that required for optimum flood control. The Board's regulations do not necessarily require full retention of all storm flows. The regulation requires the "first flush" as determined by the Agency be treated to the effluent standards. Additional flows shall receive a minimum of primary treatment and disinfection. And everything over 10 times average dry weather flow shall receive the treatment necessary to comply with water quality standards [602(c)]. These regulations may permit something less than the complete "Deep Tunnel" project and this lesser portion might be conceivably constructed by 1977. The District should determine in consultation with the Agency as the regulation states, exactly what degree of treatment is necessary and proceed forthwith to meet the regulation.

The Federal storm water research program lists different processes by which treatment can be achieved. Some of these processes, such as dissolved air flotation or high rate filtration might be entirely suitable for installation now on streams designated General Use Waters such as the Des Plaines River, Salt Creek or the North Branch of the Chicago River upstream of Lawrence Avenue where only a small number of combined storm outlets exist.

The Board opinion of March 7, 1972 on the Water Quality Standards states this about the District's 1977 storm water treatment deadline

...we do not think it proper to extend the deadline beyond that originally set by the Sanitary Water Board. Four years have passed since the ten-year deadline was set, and the District is still in the planning stage. It is time something happened.

The Board is aware of the District and City of Chicago construction since 1967 of three "deep" tunnels but none have pumping stations which are yet operative. These projects ought to be finished and operated to make certain that ground water contamination can be avoided, that methane will not build

up and that solids will not accumulate. The "Deep Tunnel" concept has yet to be proven and the District needs to speed up its efforts. Due diligence in controlling combined storm flows should be shown and the instant request for five more years is thus premature.

Part XI. The District has requested changes in many of the sections of the regulations dealing with permits. The District cites its own need to issue permits, the costs of a duplicate system of permits, possible delay to developers and to the public as reasons for exempting District located projects from the necessity for obtaining State permits.

We agree that the District should continue to issue permits if it desires and that right still exists. But we also feel that a State overview is required under the Environmental Protection Act. We encourage any cooperative permit program that can be worked out between the District and the Agency. For the present we think it important to retain the present permit regulations and accumulate experience with them.

I, Christan L. Moffett, Clerk of the Illinois Pollution Control Board, hereby certify the above Opinion was adopted on the 29th day of August, 1972 by a vote of 5-0.


Christan L. Moffett, Clerk
Illinois Pollution Control Board