

ILLINOIS POLLUTION CONTROL BOARD

In the Matter of: )  
 )  
 ) #R70-3  
MISSISSIPPI RIVER TREATMENT DATES )

Opinion of the Board (by Mr. Kissel)

On August 12, 1970, the Environmental Protection Agency filed two regulation proposals with the Illinois Pollution Control Board. One proposal requested that the Pollution Control Board amend Sanitary Water Board Regulation, SWB-12, to specify that secondary treatment be provided by the persons named in SWB-12 by December 31, 1973, instead of the dates prescribed in said regulation. The other proposal requested that the Pollution Control Board amend Sanitary Water Board Regulation, SWB-13, to specify that secondary treatment be provided by the persons named in SWB-13 by December 31, 1975, instead of the dates prescribed in said regulation.

SWB-12 is a set of regulations promulgated by the Sanitary Water Board covering the interstate waters of the Mississippi River which forms a common boundary between Illinois and Iowa. The original water quality criteria which eventually became SWB-12 were adopted by the Sanitary Water Board on March 7, 1967. The implementation plan was submitted to the Department of the Interior on September 1, 1967. The Sanitary Water Board re-approved the modified water quality standards on March 6, 1968, and placed them on file with the Secretary of State of the State of Illinois.

The original 1977 and 1979 dates for the upper Mississippi were established after consultation with the Federal Water Quality Administration Regional Office, Chicago, and in accord with the Department of the Interior guidelines that all municipalities provide a minimum of secondary treatment within a specified time limit. The time schedule was incorporated in SWB-12 as Rule 1.07, Item 7.

Subsequently, the State of Iowa indicated to the Federal Government that it would not require secondary treatment on the Mississippi River. On April 8 and 9, 1969, the U.S. Department of the Interior Federal Water Pollution Control Administration called a hearing to consider the establishment of water quality standards for the Iowa portion of the Mississippi River. This resulted in the promulgation of a Federal standard against Iowa requiring its municipalities and industries to provide secondary treatment of their sewage by December 31, 1973. Iowa is presently seeking a hearing on the Federal standard by a special panel.

The Illinois Sanitary Water Board had indicated its intent to amend the existing Illinois standard to conform to the earlier Iowa date and in deference to the request of the Department of the Interior. On May 2, 1970, such a motion and resolution was proposed to the Sanitary Water Board, but action was deferred pending confirmation by the Department of the Interior.

SWB-13 covers the Mississippi River which forms a common boundary between Illinois and Missouri and was originally adopted by the Sanitary Water Board on February 8, 1967. The Implementation plan and the criteria were submitted to the Department of the Interior on September 1, 1967. The Sanitary Water Board re-approved a modified plan on August 8, 1968, and filed that with the Secretary of State.

Both SWB-12 and SWB-13 imposed the condition on municipalities and industries to provide secondary treatment of wastes. SWB-12 required that level of treatment when existing primary facilities approach design capacity or obsolescence, or by the end of 1977 for those facilities of a Population Equivalent (P.E.) of 10,000 or more and by the end of 1979 where the P.E. was less than 10,000. SWB-13 imposed a secondary treatment requirement when the existing primary treatment facilities approached design capacity or obsolescence or by the end of 1982. The specific types of secondary treatment were covered in those regulations and said regulations also stated that industries were required to provide a degree of treatment or control that is equivalent to that required of municipalities.

Based on the provision of the Federal Water Quality Act of 1965 requiring that municipalities provide a minimum of secondary treatment within a specific time limit, the Washington office of the Federal Water Quality Administration reached an agreement that Missouri municipalities would provide secondary treatment by December 31, 1982. The 1982 completion date was subsequently written into the Illinois standard since Illinois had been working in concert with Missouri to obtain compatible standards. In early 1969, the Department of the Interior requested Missouri to amend its secondary treatment deadline to an earlier date. To comply with the federal directive, the Missouri Water Pollution Control Board set a date of December 31, 1975. On July 30, 1970, the Secretary of the Interior announced his acceptance of the Missouri timetable.

The Illinois Sanitary Water Board had earlier indicated its intent to amend SWB-13 to include the 1975 date. Though a motion and resolution to this effect was submitted May 2, 1970, to the Sanitary Water Board, action was deferred pending confirmation of the 1975 date by the Department of the Interior.

On July 1, 1970, the Environmental Protection Act became effective and established the Pollution Control Board and its sister agencies. The Board authority to adopt secondary treatment deadlines derives from sections 12(a), (b), (c), 13(b), (c), 27, and 49(c) of the Act, which gives the Board power to amend the regulation of the old Sanitary Water Board. Section 13(b) in particular authorizes the Board to prescribe effluent standards specifying maximum amounts or concentrations of contaminants that may be discharged into the waters of Illinois.

The Board published notice of the scheduled hearings and sent a copy of the amendments proposed by the Agency to all those municipalities situated on or near the Mississippi River. The Hearing Officer held three days of public hearings, two in Rock Island, one in Edwardsville\* and received either oral or written testimony from over thirty municipalities. These hearings, we believe, establish the necessity, the technical feasibility and economic reasonableness for establishing December 31, 1973, as the deadline for requiring secondary treatment to all wastes discharged to the Mississippi River, which discharge sources are presently covered in SWB-12 and SWB-13.

The necessity for requiring secondary treatment by the December 31, 1973, date was established most graphically by Dr. Rosen, Chief of the Water Quality Section, Federal Water Quality Administration. Dr. Rosen, whose qualifications are second to none in the field of the effect of waste treatment, testified at a hearing in Edwardsville, Illinois, on October 28, 1970. He stated that conventional secondary treatment of municipal waste accomplishes one or more of the following purposes:

- "(1) Reduce disease-producing and other enteric bacteria and viruses;
  - (2) Reduce depletion of oxygen in the receiving water by oxidizing nearly completely the substances that consume oxygen;
  - (3) Reduce visible and otherwise aesthetically disagreeable sewage materials;
  - (4) Reduce specific substances in municipal wastes, by physical and chemical change, that otherwise will be dangerous to humans, animals or fish exposed to the contaminated water."
- (R. B 91-92)

While Dr. Rosen admitted that not all of the above reasons were applicable to the Mississippi River, he felt that there were still reasons for requiring secondary treatment of wastes which were discharged into that River. As an example, secondary treatment aids in the disinfection of effluent, even though primary treatment with chlorination is adequate to destroy some bacteria and viruses. With primary treatment, the effluent is so heavy in oxidizable organic material that large amounts of chlorine must be consumed to obtain

\*The page references from the transcript from the Oct. 9 hearing will be prefixed by an A; those from the last two days, by a B.

a similar degree of reduction in bacteria and viruses. Further, primary effluent contains a greater amount of fine waste particles which can shelter bacteria and viruses, making disinfection more difficult. (R. B 92)

Efficient secondary treatment can readily remove approximately 90% of five-day biochemical-oxygen demand (BOD<sub>5</sub>) in several hours. But, without secondary treatment, the same purification must be sought in the receiving stream. By removal of the BOD at the sewage treatment plant, therefore, the entire stream can be saved that degree of degradation that necessarily results from the presence of raw or only partially-reduced sewage substances. (R. B 93) As the Environmental Protection Agency pointed out, secondary treatment is the first step toward the removal of nitrogenous materials, a major contributor to stream eutrophication. Further, the development of acclimated bacteria capable of reducing bacteria and viruses is accomplished more consistently and effectively in the sewage treatment plant than in the receiving stream. (R. B 94) The discharge of primary effluent not only contributes to the degradation of the stream, but, due to its greater odor potential, increases the likelihood of downstream odor problems and may, through absorption, impair the taste of fish. (R. B 94)

Secondary treatment is necessary not only to minimize stream degradation, but also to obtain any substantial reduction in the commercial and industrial wastes which our contemporary technology dictates be discharged by individuals and corporations alike. Grease, fatty acids, proteins, amino acids, detergents, natural and synthetic hormones, hydrogen sulfide, and mercaptans, though not removed by primary treatment, are readily oxidized in secondary treatment, usually in amounts proportionate to the BOD removal. Secondary treatment also aids in the removal of color-producing particles. (R. B 96) Such substances as phenols, chlorophenols, alcohols, acids and ketones survive primary treatment, but are effectively oxidized in secondary treatment (R. B 97) The same reduction is true for petroleum, oils, pesticides and synthetic chemicals. (R. B 98)

The need for secondary treatment of wastes discharged to the Mississippi was demonstrated in the Conference to consider the "Establishment of Water Quality Standards for the Mississippi River Basin Interstate Waters State of Iowa" which was called by the Federal Water Quality Administration and held on April 8-9, 1969, in Davenport, Iowa. The record of that Conference was made an exhibit in this proceeding by the hearing officer on October 9, 1970. To quote from a rather extensive record is sometimes dangerous, but there is one sentence in the above conference report which is worthy of serious concern. On Page 25 of the conference report the following appears:

". . . Figure 1 shows that there has been a definite deterioration in dissolved oxygen content at Dubuque with measurements falling below the 8-hour minimum approved Iowa standard of 4 mg/l on many occasions from 1964 through 1967. . . . Low oxygen levels are an indication of the presence of amounts of oxygen-demanding organic wastes."

Since oxygen-demanding wastes are contained in the influent of all municipal and industrial plants, and since secondary treatment of those wastes reduce significantly the amount of such oxygen-demanding wastes, it is logical to assume that if all wastes, including those from our sister state, Iowa, discharged into the Mississippi River were given secondary treatment, the problem alluded to by the Federal report cited above would be greatly reduced if not eliminated.

Perhaps the most interesting connection between the present condition of the River and the need for secondary treatment and chlorination is the "slime problem." On the second day of the Rock Island hearing, October 23, 1970, a local newspaper carried a story which detailed the problems that local fishermen were having with a slime which had developed on the River. This story was alluded to in the record by Mr. Waller. (R. B23, Oct. 23, 1970) Interestingly enough, in the hearing in Edwardsville, Dr. Rosen postulated that this would occur as a result of the lack of secondary treatment. For example, in this exchange with Mr. Dumelle:

"MR. DUMELLE: . . . Did you talk anything about sugars or corn wastes, as such, and what secondary treatment does to them? I am thinking of the regrowth that happens.

DR. ROSEN: I didn't deal on that subject, but, yes, the point-- and it has been documented--that if we disinfect waste, whether it is an industrial--that is whether the nutrient organic material comes from a food waste or from domestic sewage--but if we do not destroy the nutrient, the organic food for bacteria-- but let's assume we kill the bacteria by coronation (sic). It has been demonstrated and been stated quite clearly that if this waste is discharged, and if there are any other sources of the same organism reaching the stream alive, that the organisms will, then, multiply because of the nutrient supplied by the disinfected, but not oxidized waste. . . .

MR. DUMELLE: This leads to the slime growths which foul nets and things.

DR. ROSEN: This plus the growth of even coliforms. . . ." (R. B 100-101)

Phil Smith of the Illinois Natural History Survey indicated he was sure the fishery business on the Mississippi had deteriorated and had heard that fishermen working the River below Metropolitan St. Louis complained bitterly about the odor of their catch. (R. B149) To protect the Mississippi's still abundant fish fauna and preserve their environment he recommended that we do the utmost to cease

dumping pollutants into the River. (R. B146) Dr. Rosen, in speaking to the question of human encounter with the River waters, stated that it would be "unsafe" to use for body contact sports those waters downstream from a primary discharge, even though the effluent had been chlorinated or otherwise disinfected. (R. B99) Without secondary treatment, potential pathogenic organisms are not sufficiently destroyed as to render the river water safe for swimming or boating. (R. B100) As Dr. Rosen concluded, "The obvious degradation that occurs from discharging primary effluent and the large number of specific deleterious substances removed or reduced by secondary treatment make it clear that no treatment less than secondary can be acceptable in preventing pollution. On large streams efficient secondary treatment may remain an adequate measure into the foreseeable future." (R. B98,99)

Perhaps the most interesting testimony concerning the present state of the River came from local citizens. Although these people did not come to deplore the sorry state of the River (in fact most came to say that municipalities they represented needed financial aid to meet the proposed date for secondary treatment), their testimony graphically outlined what the River must look like today. It was not pleasant testimony because many of those testifying would not use the River for recreation, even though such a use is designated by SWB-12 and 13. One witness, Don Waller of Milan, remembered that "it isn't the river that I recall as a boy...the banks are covered with debris...the slime is a great problem." (R. B22-3)

Homer Sherrill, Mayor of Hamilton, recollected that "when I was a little fellow, I used to go down swimming, but I wouldn't attempt it now...it is more muddy-looking, (more) roiled up than it used to be." (R. B82)

One long time resident of the area testified this way:

"ACTING CHAIRMAN KISSEL: How long have you lived in this area?  
A long time?

MR. SCHROEDER: I have lived in this area for 22 years and I've been in Andalusia for just a little over seven years.

ACTING CHAIRMAN KISSEL: And in your 22 years in this area, have you seen a difference in the use of the Mississippi, any difference in the river, itself?

MR. SCHROEDER: Even in the last five or six years, I have seen a great difference in it. Ten or fifteen years ago, you wouldn't mind swimming in it.

Seven years ago, when I moved to Andalusia, I bought a nice boat and I kept it just a year and a half and I sold it.

ACTING CHAIRMAN KISSEL: How come?

MR. SCHROEDER: You could not imagine the pollution in the water. In fact, if I did go fishing, I would be afraid to eat the fish. It is terrible.

ACTING CHAIRMAN KISSEL: Where do you think this comes from?

MR. SCHROEDER: I would say just disposal plants of every description. It seems like there is more solid waste on the top of the water and it actually is turbid.

Well, we noticed this more possibly in Andalusia because we have an island about ten miles long that breaks the Mississippi channel proper from Andalusia. And we have a nice boat harbor there. But just walk down to that harbor where the water is not moving too rapidly, actually it is sickening.

ACTING CHAIRMAN KISSEL: The odor?

MR. SCHROEDER: Yes.

ACTING CHAIRMAN KISSEL: Any algae, any green algae?

MR. SCHROEDER: Lots of it, lots of it.

ACTING CHAIRMAN KISSEL: I take it it has increased over the years?

MR. SCHROEDER: Very much so. I could see this coming. And my wife, she wouldn't even get in the boat any more.

She says, "If that's what we have to ride in, forget it."

ACTING CHAIRMAN KISSEL: Don't you think one of the ways to cure this is to have municipalities do something about their wastes?

MR. SCHROEDER: I certainly do. I agree with you.

ACTING CHAIRMAN KISSEL: Thank you very much.

MR. SCHROEDER: Thank you." (R. B34-6)

What more can be said as justification for requiring secondary treatment of wastes discharged into the River. Perhaps, Mr. Schroeder can, in his lifetime, use the River as he used it years ago.

As to the question of technical feasibility, there is no question as to the ready commercial availability of sewage treatment units capable of attaining the 85 and 90% removal which the new regulation

insists upon. Rather, the only technical question is whether complete installation of the necessary facilities can be completed by December 31, 1973.

William Busch, of the State of Illinois Environmental Protection Agency, testified that the municipalities were physically capable of meeting the 1973 date. This testimony was corroborated by several representatives of the municipalities. Rock Island's consulting engineer stated that if the standard were passed in early 1971 this would be sufficient time within which to complete installation by December 31, 1973. (R. A23-4) Moline indicated that its schedule would meet the 1973 date. (R. B15) The Sanitary Engineer from the City of Savanna spoke of a three-year period from inception to completion on the more complex municipal waste treatment situation; on this basis, he stated that Savanna could be in compliance by the proposed deadline. (R. B44) Similarly testifying were the municipalities of Cordova, Andalusia, Hamilton, and Albany. (R. B78, B64) Though opposition to the advancement of the deadline was expressed by several municipalities on the Lower Mississippi the evidence was overwhelming that the 1973 date was eminently technically feasible.

Much of the testimony in the hearings centered around the ability of the municipalities and sanitary districts to pay for the added facilities, which testimony raises the question of whether the advancement of the date for secondary treatment is "economically reasonable," as provided in Section 27 of the Environmental Protection Act. In determining whether such an advancement is "economically reasonable," we must take into consideration the actual costs to be expended by the persons in complying with the proposed regulation, versus the benefit to be obtained by the people of the State of Illinois if such costs are expended. The testimony proves rather conclusively that secondary treatment of the wastes discharged into the River is needed, all that is at issue is whether the date by which that degree of treatment is required should be advanced. Therefore, in determining "economic reasonableness" we need not balance the total cost of secondary treatment against the benefits to be obtained by the people of the State of Illinois, but rather whether the additional cost, if any, which may be incurred as a result of the advancement of the date by which said treatment is required is reasonable as compared against the benefits to be derived in having secondarily treated waste discharged into the River at the earlier date. When the question is so phrased, there is no difficulty in determining that the "sooner the better" as far as the public is concerned. In fact, delaying the time when secondary treatment is required may increase the cost since construction costs are generally on the rise. Thus, on balance there would be little, if any, increase in the cost to those who will be required to pay for the secondary treatment, yet, if the regulation is complied with the people of the State of Illinois will have a cleaner River at a much earlier date. Simply put, the cost is worth it to the people of the State. In addition, the funds from the



recently passed bond issue will be available to alleviate the burden of the local citizens of the affected municipality or sanitary district in paying the total cost of any facilities needed for meeting the requirement of secondary treatment.

The Regulation which was adopted by the Pollution Control Board on January 6, 1971, and which this opinion supports provides essentially as follows:

- (1) all oxygen-demanding wastes and wastes containing suspended solids shall receive secondary treatment, at a minimum, by December 31, 1973;
- (2) for sewage works with a Population Equivalent (P.E.) of 10,000 or more, secondary treatment shall mean 90% removal of BOD<sub>5</sub> and suspended solids, and no more than 20 mg/l of BOD<sub>5</sub> and 25 mg/l of suspended solids;
- (3) for sewage works with a P.E. of less than 10,000, secondary treatment shall mean 85% removal of BOD<sub>5</sub> and suspended solids and no more than 30 mg/l of BOD<sub>5</sub> and 37 mg/l of suspended solids; and
- (4) disinfection shall be provided for effluents to reduce fecal coliforms as follows:
  - (a) 400 per 100 ml in primary contact waters, and
  - (b) 2000 per 100 ml in all other waters.

The regulation is different than what requirements existed in SWB-12 and SWB-13. The obvious difference is, of course, the advancement of the date by which secondary treatment facilities are required. The regulation makes uniform throughout the Mississippi River the date by which such treatment is required. It does not, as did SWB-12 as compared to SWB-13, discriminate between that section of the River which forms a common boundary between Illinois and Iowa and that section which forms a common boundary between Illinois and Missouri. All those who intend to use that River as the outlet for their discharges shall be bound by the same requirement. We can only hope that the states of Iowa and Missouri will adopt consistent standards so that discrimination does not exist between those on one side of the River and those on the other.

The new regulation refers to all waste discharges, thereby not giving specific reference to municipal discharges as did paragraphs 7 of Rule 1.07 of SWB-12 and of Rule 3.01 of SWB-13. Paragraph 8 of both SWB-12 and SWB-13 insisted that industry furnish that degree of treatment "equivalent" to that furnished by the municipalities. Further, the Agency has informed us that the intent of the proposed regulation was that it apply to industry and municipality alike. To

avoid any ambiguity in this regard we have therefore phrased the new regulation in terms of "all waste discharges." We have included under that term of "discharges," both oxygen-demanding discharges and those containing suspended solids. The regulation therefore covers those industries which may discharge waste non-organic in nature.

We have also incorporated a minimum-size exclusion into the new regulation. Those sewage works receiving a waste discharge equal to or greater than 10,000 population equivalents (P.E.) must attain a 90% reduction in BOD<sub>5</sub>; those less than 10,000 P.E. need only reach an 85% reduction. The basis for such a differentiation lies in the type of secondary treatment facilities employed. With the activated-sludge process, a 90% reduction rate is attainable; with the trickling filter method, however, only 85% is generally possible. The trickling filter, though, is a more suitable method of treatment for smaller plants since it does not demand the extensive testing, the constant overseeing, or the highly-trained personnel that an activated sludge plant would require. In addition, the activated sludge process is more expensive to install. The federal government has suggested a 90% reduction rate all along the River; we do not believe that the 5% difference in efficiency for waste water discharge from the smaller plants along the Mississippi will cause an appreciable difference in the water quality of the River.

We have also repealed paragraphs 11(a) and (b) of Rule 1.07 and of SWB-12 and of Rule 3.01 of SWB-13. The effluent standard for fecal coliform reduction to 400 per 100 ml or less before discharge to any waters designated for primary contact and the requirement for bypass flows in excess of sewage works capacity have been retained in the amended regulation. We have added the requirement that disinfection reduce fecal coliforms to 2000 per 100 ml before discharge to any waters other than those designated for primary contact. Further, the wording in the new regulation removes any doubt as to whether the bacteria standard is in fact an effluent standard. In all other aspects, the numbers have been transposed to the new regulation and a constant proportion has been maintained in the numerical value of the reduction demanded.

A special note should be given that both the effluent standard and the reduction percentage must be met by all waste dischargers. This is especially applicable to industrial wastes. Thus, an industry with greater than 10,000 P.E. must attain a 90% reduction in suspended solids and BOD and an effluent which contains no more than 25 mg/l of suspended solids and no more than 20 mg/l of BOD.

In summary, ample basis has been established with the criteria established by the Environmental Protection Act for the promulgation of the following regulation. Adequate notice was served and the necessity of such a deadline was firmly proved. The regulation forms a vital portion of the Board's dedication to the principle of non-degradation of the waters of Illinois. The State legislature has directed the Board to act as expediently as possible in the area of water pollution and this regulation imposing a December 31, 1973 deadline is drawn in that spirit.

I concur:

*Robert J. Hunt*  
*David P. Carr*  
*Frank J. ...*  
*Samuel R. Eldredge*  
*James D. Dunne*

I dissent:

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February 3, 1971

I, Regina E. Ryan, do certify that the Board has adopted the above opinion this 3rd day of February, 1971.

*Regina E. Ryan*  
Regina E. Ryan  
Clerk of the Board