ILLINOIS POLLUTION CONTROL BOARD
February 2, 1989

IN THE MATTER OF:	)	
	)	
PETITION FOR SITE-SPECIFIC	)	
EXCEPTION TO EFFLUENT STANDARDS	)	
FOR THE ILLINOIS-AMERICAN	)	R85-11
WATER COMPANY, EAST ST. LOUIS	)	
TREATMENT PLANT.	)	

ADOPTED RULE. FINAL ORDER.

OPINION AND ORDER OF THE BOARD (by J. Theodore Meyer):

This matter is before the Board on a petition for site-specific rulemaking filed by Illinois-American Water Company (Company), a subsidiary of American Water Works Company. In its original petition, filed April 23, 1985, the Company asked that its East St. Louis water treatment plant be totally exempted from the effluent limitations for total suspended solids (TSS) and total iron. The limitations for these contaminants, found at 35 Ill. Adm. Code 304.124, are 15 milligrams per liter (mg/l) and 2 mg/l, respectively. On September 25, 1986 the Board denied the Company's request for complete relief. On October 28, 1986 the Company filed a motion to reopen the record so that it could submit additional evidence regarding alternative treatment methods. The Board granted that motion on November 20, 1986.

The Company filed its revised treatment proposal on January 20, 1987. After several cancelled hearing dates, a public hearing was held on November 10, 1987 at the East St. Louis City Hall. On February 2, 1988, the Department of Energy and Natural Resources (DENR) informed the Board that it found that its prior negative declaration, issued March 4, 1986, is still appropriate.

On June 16, 1988 the Board proposed for First Notice a temporary rule exempting the Company from the TSS and total iron limitations of Section 304.124 for a period of three years, provided that the Company uses only biodegradable coagulants listed by the United States Environmental Protection Agency (USEPA) as acceptable drinking water additives. The proposed rule would expire on January 1, 1992. During the three years of the rule, the Company is to conduct a comprehensive study of the effects of the use of the coagulants on the receiving stream. The proposed rule was published in the Illinois Register on July 8, 1988, at 12 Ill. Reg. 11397.

Several comments were received after First Notice publication. The Department of Commerce and Community Affairs filed a comment which stated that the proposed rule will have no

effect on small businesses. (P.C. #77.) Comments were also filed by the Company (P.C. #75) and the Agency (P.C. #76). (The substance of these comments will be addressed later in this Opinion.)

On January 17, 1989 the Joint Committee on Administrative Rules (JCAR) filed its Certification of No Objection to the rule. To satisfy concerns raised by JCAR, the Board has agreed to make several non-substantive changes to the authority note and the table of contents. The Board has also agreed to add a sentence to the text of the rule, as follows:

> The Company, in consultation with the Agency, shall conduct a comprehensive study of the effects of the use of those polymers on the receiving stream, including but not limited to, information on the toxicity of the discharge, both to humans and to fish; the concentration of the polymers in the discharge as compared with the raw water application rate of the polymers; and the rate and chemical pathway for degradation of the polymers.

This addition adds the requirement that the Company conduct a study of the effects of the polymers on the receiving stream to the rule. That requirement was previously stated only in the Board's Opinion.

Background

The discharges at issue in this proceeding emanate from the Company's East St. Louis treatment plant, which is located on the Mississippi River. Raw water is withdrawn from the river, purified, and distributed to the homes and businesses of the approximately 50,000 customers in the Company's Interurban District. Of these customers, approximately 19,100 live in and around the City of East St. Louis. The products of the purification process are potable water and residual solids. The solids are made up essentially of total suspended solids, principally silt, which is present in the raw water drawn from the Mississippi. There are slight additions to the silt, generated by coagulants which are used in the treatment process. These solids are then discharged back into the Mississippi. (Company Ex. 7, pp. 5, 8.)

The East St. Louis treatment facility is actually made up of two separate plants. (Transcript of November 10, 1987 (Tr.) at 79.) Water is withdrawn from the Mississippi River at two intakes which are known as the low-service and Chouteau Island intakes. The low-service intake is located at the East St. Louis facility, which is about 15 miles below the confluence of the

Mississippi and Missouri Rivers. The Chouteau Island intake is somewhat north of Granite City, 5 miles below the confluence of the two rivers (Tr. 74). The Chouteau Island intake feeds water to a treatment facility known as the Aldrich Plant, which is a series of eight Peri-filters with clarifying equipment in their centers. The water filter itself is on the outside perimeter of each Peri-filter. (Tr. 75.) After filtering in the Aldrich plant, the Chouteau Island water goes to a clear well located next to the Peri-filters.

Water withdrawn from the low-service intake is routed directly to treatment units known as Lamella separators. At the Lamella separators, silt and other sediments are removed from the water. After treatment at the Lamellas, some of the water is piped to settling basins 1 and 2, and some to settling basins 4 and 5 (Tr. 76). The clean water on top of the sedimentation basins then overflows into a trap that is connected to the low-service intake filter building at the conventional (low service) plant (Tr. 88-89). After treatment at the conventional plant, the low-service intake water goes into its own clear well. The low-service clear well and the Chouteau Island clear well are piped in common into the treatment facility's customer distribution system. (Tr. 75-76, 88-89.)

Sediment discharges occur from the Aldrich plant, the Lamella separators, the sedimentation basis, and the filters in the conventional plant. (Tr. 80-81.) The Aldrich plant discharges sediment back to the river in a daily cycle system (Tr. 77). The Lamella separators discharge to the river on a continuous basis. Filter backwash removal is required every 48 to 72 hours at both the Aldrich Peri-filters and the conventional plant (Tr. 78-80). The sediment basins are currently cleaned twice a year, in the spring and fall. Flushing is not done during the winter because outside pressure may cause structural damage when all of the water is removed during freezing conditions. Similarly, the Company does not discharge the basins during the maximum load summer periods because a basin cannot be taken out of service at that time. (Tr. 204.) See generally Company Ex. 1, Figure 3, at 9.

Approximately 51,447 pounds of dry weight solids are drawn through the low-service intake everyday. This figure is based upon a mean water flow of 26.475 million gallons per day and 233 parts per million of total suspended solids in the raw water. About 29,148 pounds per day of dry weight solids are received from the Chouteau Islands intake. That figure is based upon a mean flow of 15 millions gallons per day and 233 parts per million of total suspended solids. Thus, the plant's average intake is 41.475 million gallons per day. (Tr. 66; see Company Ex. 6.) The daily solids discharge from the plant is

approximately 82,430 pounds. (Company Ex. 1 at 35.) On an annual basis, the plant discharges over 30,000,000 pounds (15,000 tons) of dry solids to the river.

Company Proposal

As previously noted, on September 25, 1986 this Board denied the Company's petition for complete relief from the TSS and iron limitations contained in Section 304.124. The Company subsequently moved to reopen the record so that it could submit additional evidence on treatment methods. The Company stated that the compliance method that it had intended to use (on-site treatment using mechanical centrifuges) had been found to be significantly less feasible, both economically and technologically than originally anticipated. The cost of that method had been originally estimated at a capital cost of $8.5 million and $150,000 annually in operating costs, but further study indicated a capital cost of roughly $12.4 million. The Company also stated that industry experience with centrifuges has been sufficiently discouraging to question whether the treatment would work properly. Thus, the Company proposed an alternative treatment method.

The Company initially suggested that it would lagoon all discharge from its Lamella separators. Sediments in the discharge would be dried by evaporation and by withdrawing settling water. The dried sediment would be transported off-site. In July 1987, the Company learned of the availability of new biodegradable polymers and began testing those polymers. Prior to that time, the Company used inorganic coagulants (alum and ferric chloride) to help remove sand and sediment from the raw water. Preliminary test results showed that the new coagulants increase the effectiveness of the Lamella separators, resulting in the removal of an average of 80% of the residual solids in the raw water drawn through the low service intake. Company Ex. 6.

The Company therefore revised its alternative treatment proposal to consist of two parts: (1) the elimination of the alum and ferric chloride coagulants in favor of the new biodegradable polymers; and (2) the construction of new lagoons to dewater the solids, with subsequent land disposal of the dry sediment. The total capital costs of this lagoon treatment method are estimated at approximately $7,494,000 in 1987 dollars. Annual operating costs would be approximately $232,852 during the five years that the dried solids can be disposed of on Company property. When the dried solids must be disposed of off-site, total annual operating costs are estimated at $1,224,240. (Company Ex. 6.) The annual cost of the biodegradable polymers is $27,000. (Tr. 56-57; Company Ex. 5.) The lagoon treatment method is expected to reduce discharges from the East St. Louis facility by approximately 51%. (Company Ex. 5, 6; Tr. 48.)

The implementation of the new coagulation system is a two-step process. First, the biodegradable polymers are injected into the inlet line at the low-service intake pump building, which feeds directly into the Lamella separators. The second stage polymer can be fed at either the inlet or the outlet of the Lamella units. Test results indicate that the second stage polymer is most effective when added at the Lamella outlet. Although the Lamella separators service only the low-service intake, the biodegradable polymers are used at both the low-service intake and the Chouteau Island intake. (Company Ex. 5.)

The second step of the Company's proposal involves the construction of new lagoons for the dewatering of the sediments which are now discharged from the Lamella separators to the Mississippi. All solids removed by the Lamellas would be placed in this series of settling lagoons, where they would be dried by natural evaporation and the withdrawal of the settling water through a pipe network beneath a sand and gravel filter media. The withdrawn water would be recycled to the head of the conventional treatment plant. (See Company Ex. 6, Revised Attachment 1.) The Company proposes to build six settling lagoons over 10.2 acres of land already owned by the Company. (Company Ex. 6.) After the solids are dried they would be removed from the lagoons and landfilled. The Company has approximately 18 acres of property available for this purpose. This space will be sufficient for about five years, after which the dried sediment would be disposed of off-site. (Company Ex. 6; Tr. 66-68.)

The Company contends that this proposal, although not capable of total compliance with the TSS and total iron effluent limitations, is the most economically reasonable, especially when balanced against its claim that the Mississippi River is not adversely affected by the discharges from the East St. Louis treatment facility. If its proposal is rejected and 100% compliance required, the Company states that it would probably utilize natural on-site dewatering. This would involve the construction of two very large settling lagoons totalling 58 acres. All residual solids at the treatment facility would be discharged to these lagoons, where the sediment would be dried solely through natural evaporation. The estimated capital cost of this alternative is $15,715,900. This estimate does not include the cost of obtaining the additional land necessary for this alternative, if such land is available. Additionally, when the lagoons eventually fill up, the dried solids would have to be transported off-site for disposal, resulting in annual operating costs of at least $2 million per year. (Company Ex. 6; Tr. 69, 73.)

Environmental Impact

In support of its original request for complete relief, the

Company submitted a study of the impact of the Company's discharges to the Mississippi River. (Company Ex. 1.) That study, done by the Illinois State Water Survey (SWS) and partially funded by the Company, concluded that:

> Except during 7-day 10-year low flow conditions, increases in suspended solids in the Mississippi River during occurrences of maximum waste discharges will not be perceptible. (Company Ex. 1 at 60.)

Mr. Ralph Evans, one of the authors of the study, testified that a change in the composition of the bottom sediments is only detectable at the time the basins are cleaned, twice a year. A week after the basin cleaning, the river bottom composition had returned to natural levels. (Company Ex. 1 at 58; Tr. 137.) Mr. Evans believes, based upon the results of the SWS study, that the Company's discharge does not degrade the environmental quality of the Mississippi River (Tr. 137-138). This belief was strengthened by the Company's use of biodegradable polymers. Mr. Evans particularly stated that these biodegradable coagulants would address the Board's previous concerns, stated in the September 1986 Opinion and Order, about the use of alum and ferric chloride as coagulants. (Company Ex. 8.)

In response to requests by the Board and the Illinois Environmental Protection Agency (Agency), the Company submitted information on the biochemical oxygen demand (BOD) of the biodegradable coagulants used at the East St. Louis plant. The results of the tests show that the BOD levels are well within the limits of 35 Ill. Adm. Code 304.120. (Company Brief, Exhibit A.) The Company also provided the results of the EP Toxicity tests run on the sludge produced after use of the biodegradable polymers. Those samples indicate that the sludges showed no toxicity under federal regulations or under 35 Ill. Adm. Code 721.124, nor were there any detectable levels of pesticides or herbicides in any of the samples. (Company Brief, Affidavit of Clarence A. Blanck, Exhibit B.) The company states that it is generally believed that because of the comparatively small quantities of polymers used and the neutralization effect resulting from the anionic properties of the solids discharged from the plant, the discharges containing the polymers will not be harmful. However, the Company notes that there is a lack of conclusive research on the subject, and suggests that tests be run on the discharge. Such tests would provide direct evidence of polymer behavior under actual treatment conditions. The Company agrees that its requested relief be conditioned upon such tests. (Company Reply Brief at 22.)

The Agency states that it has concerns about the use of the biodegradable polymers, given the uncertainties of these new products. The Agency states that it has reviewed the September 25, 1987 USEPA list of acceptable drinking water additives, and

that while AgeFloc B-50 is listed, no listing was found for FreFloc 25. (These are the polymers used by the Company.) Of particular concern to the Agency is the effect of the polymers, even if accepted for potable water use, on fish in the receiving stream. The Agency also raises a concern about the uncertainty of the rate and chemical pathway for degradation of the polymers.

Economic Impact

The Company admits that 100% compliance with the TSS and iron limitations is technically feasible, but argues that the cost of full compliance is economically unreasonable. Much of the Company's argument is based upon the depressed economic condition of the East St. Louis area. Mr. Thomas M. Connor, Vice President and Manager of the Company, testified that 58.6% of the households in East St. Louis have incomes placing them below the poverty line. (Company Ex. 7.) Mr. Connor stated that the costs of full compliance, if allowed by the Illinois Commerce Commission, would result in rate increases of about 17%, or approximately $60 per customer family. The cost of the Company's alternative proposal would "necessitate" an 8% increase in water rates, or about $28 per customer family. Mr. Connor testified that given the very poor economic conditions in the East St. Louis area, and keeping in mind that the SWS study concluded that the Company's discharges do not cause environmental harm, he believes that the costs of full compliance would unfairly burden the Company's customers. (Company Ex. 7.)

The Agency states that it sympathizes that the Company's customers will bear additional fees if full compliance is required, but contends that the cost of pollution abatement is historically the most readily accepted of all government impositions. The Agency notes that there are other water treatment plants in Illinois which are in compliance with the TSS and iron limitations (see DENR Ex. 1), and maintains that the Company has avoided the compliance costs which were paid long ago by the complying plants.

Response to First Notice Comments

In its First Notice comments, the Company stated that, based upon a careful review of the proposed rule, it supports the issuance of the rule. (P.C. #75.) The Company believes that the proposed rule shields its East St. Louis customers from economic hardship while promoting environmental goals. The Company feels that the on-site testing which will occur during the temporary rule will protect water quality and facilitate the Company's use of innovative treatment technology.

Furthermore, the Company stated that the proposed rule is consistent with federal and state approval requirements for drinking water polymers. The Company noted that the Safe

Drinking Water Act (42 U.S.C. 300f et seq.) provides that USEPA is the designated regulatory authority for drinking water additives. The proposed rule requires the Company to use only coagulants that have been approved by USEPA. The Company also points out that Section 653.202(b) of the Agency's Technical Policy Statements (35 Ill. Adm. Code 653.202(b)) provides that public water supply chemical treatment additives must be listed by USEPA and the American Water Works Association (AWWA). The Company states that AWWA guidelines do not generally recommend polymer additives which have not been approved by USEPA.

On the other hand, the Agency's First Notice comments (P.C. #76) reflected its continuing objection to the proposed rule. The Agency raises three claims: 1) that the proposed rule violates Section 39 of the Environmental Protection Act (Act) (Ill. Rev. Stat. 1987, ch. 111 ½, par. 1039), which provides for Agency issuance of permits; 2) that the Board's consideration of water quality and economic impact in proposing the rule violates federal law; and 3) that the proposed opinion and order does not define what testing is required during the period of the proposed rule.

The first two issues raised by the Agency (issuance of permit and consideration of water quality and economic impact) were also argued in the Agency's post-hearing briefs. The Board addressed both claims in its June 16, 1988 Opinion and Order (slip op. at 8), and reaffirms its belief in those holdings. As to the Agency's third claim (that the proposed opinion does not define what testing is to be done), the Board points out that the June 16 Opinion does contain general guidelines on what the study shall contain. (Slip op. at 7.) However, the Board agrees that the Agency's expertise should be used to more specifically define what testing should be done by the Company. Therefore, the Company is directed to consult with the Agency when designing the comprehensive study, and to periodically consult with the Agency during the course of the study.

Finally, the Board notes that the Company's comments indicate that it will consider acting upon the Board's suggestion that it might join other water treatment plants in a general rulemaking. In order to avoid any possible confusion, the Board wishes to state that its suggestion of a general rulemaking was directed only to other water treatment plants which are similarly situated to the Company's East St. Louis treatment facility (i.e. plants which intake from and discharge to the Mississippi).

After consideration of the comments received during the First Notice period, the Board sees no need to alter the substance of the rule.

Conclusion

When promulgating regulations under the Illinois Environmental Protection Act (Act), the Board is required to consider:

> the existing physical conditions, the character of the area involved, including the character of surrounding land uses, zoning classifications, the nature of the existing air quality, or receiving body of water, as the case may be, and the technical feasibility and economic reasonableness of measuring or reducing the particular type of pollution. (Ill. Rev. Stat. 1987, ch. 111½, par. 1027(a).)

After considering the circumstances of this case in light of all these factors, the Board finds that some relief is warranted. Therefore, the Board will adopt a temporary regulation exempting the Company from the TSS and total iron limitations of Section 304.124 for a period of three years. During these three years, the Company shall continue to treat its water exclusively with the biodegradable polymers. The Company shall conduct a comprehensive study of the effects of the use of those polymers on the receiving stream, including information on: (1) the toxicity of the discharge, both to humans and to fish; (2) the concentration of the polymers in the discharge as compared with the raw water application rate of the polymers, and (3) the rate and chemical pathway for degradation of the polymers. The Company need not proceed with the construction of the new settling lagoons at this time. This three-year exemption is intended to provide a period of experimentation with these new biodegradable coagulants, and the Board believes that it would be premature to order the construction of the lagoons before there are conclusive results on the effects of the polymers. While the Board finds that the preliminary evidence shows that these coagulants are both safe and effective, the possibility that the final results of the study may not be as positive precludes the Board from ordering a $7.5 million expenditure on the lagoons at this time.

The Board believes that this temporary exemption is justified when all of the circumstances of this case are balanced together. It is true that total treatment is technically feasible: it is also true that the costs of such treatment are high, and would most likely be passed on to customers who live in a severely economically depressed area. The Board does not believe that the Mississippi River will be adversely affected by the temporary exemption. The Mississippi is a rapidly moving river which naturally contains a high percentage of silt. (Company Ex. 1.) The use of the biodegradable polymers by themselves will not reduce the amount of solids discharged by the

Company, but it will improve the nature of those discharges. The Company will no longer use alum and ferric chloride as coagulants, thereby virtually eliminating the aluminum in the discharge and greatly reducing the amount of iron. (Company Ex. 1, 8.) The aluminum and the concentrated iron in the discharge were specific concerns noted by the Board in its September 25, 1986 Opinion. Additionally, the use of the biodegradable polymers will result in a dramatic reduction in the volume of additives necessary. According to the Company, the use of the polymers will allow the use of less than 1/12 of previous quantities at the low-service plant and less than 1/3 of the former usage at Chouteau Island. (Company Reply Brief at 16.)

The Agency argues that Section 304 of the Clean Water Act (33 U.S.C. 1314) precludes the Board from relying on the environmental impact or the economic impact on the discharger. However, the Board believes that its prior assessment of this issue, included in the September 1986 Opinion (72 PCB 429, 437-438), remains correct. USEPA has not yet promulgated regulations establishing effluent limitations on water treatment plant waste. In the absence of such regulations, effluent limitations are to be established on a case-by-case basis under Section 402(a)(1) of the Clean Water Act. (33 U.S.C. 1342(a)(1).) The Board continues to believe that directives from USEPA give the Board and the Agency broad discretion in determining the appropriate standard of control to apply to discharges from water treatment plants. Additionally, as noted above, the Board is statutorily required to consider the the factors set out in Section 27(a) of the Act. The Board has done so, and finds that under the state statute, the Company has shown that it is entitled to temporary relief.

There remain several issues upon which the Board wishes to comment. First, the Agency suggested the possibility that an NPDES permit could not be issued to the Company which did not contain numerical limitations on TSS and iron. Although the Company argues in its reply brief that numerical limitations should not be set, one of its attorneys stated at the hearing that the Company would be willing to work with the Agency for as long as necessary to work out NPDES limitations. (Tr. 178-179; 209-210.) The Board trusts that the Agency and Company will work together on the issuance of a permit. Second, there was previously some concern over the amount of mercury, manganese, and copper in the Company's discharge. The Company has specifically stated that it is willing to accept the limits on these substances set forth in Section 304.124 and 304.126 (Company Ex. 5; Tr. 61-63.) Third, there was some discussion about reducing the environmental impact of the Company's discharges still further by flushing the sediment basins more often than twice a year. (Tr. 189; 203.204.) Because the biodegradable polymers remove more of the residual solids, the sediment basins will apparently need to be back-flushed more

often because there will be more accumulation. The Company should avoid discharging when the Mississippi is low, to further reduce the environmental impact. (Tr. 204-205.)

The Board wishes to emphasize that the proposed temporary relief is a result of unique circumstances. The Board sees a need for further testing of these new biodegradable coagulants, and wishes to encourage the development and use of new treatment technologies. However, the regulated community is cautioned that the Board will rarely grant such temporary relief from general regulations, and this proceeding should not be viewed as setting a general precedent. Finally, the Board notes that there was discussion at the hearing about the possibility of a general rulemaking for similarly - situated water treatment plants. (Tr. 165; 194-197.) Since the proposed site-specific relief will expire in three years, the Company may wish to consider the possibility of joining others in such a general rulemaking.

ORDER

The Board hereby adopts, as final, the following amendment to be filed with the Secretary of State:

TITLE 35: ENVIRONMENTAL PROTECTION
SUBTITLE C: WATER POLLUTION
CHAPTER I: POLLUTION CONTROL BOARD

PART 304
EFFLUENT STANDARDS

SUBPART B: SITE SPECIFIC RULES AND EXCEPTIONS NOT OF GENERAL APPLICABILITY

Section 304.220 East St. Louis Treatment Facility, Illinois-American Water Company

This Section applies to the potable drinking water treatment plant owned by Illinois-American Water Company (Company) which is located at East St. Louis, and which discharges into the Mississippi River. The discharges of the plant shall not be subject to the effluent standards for total suspended solids and total iron of Section 304.124, provided that the Company uses only biodegradable coagulants approved by the United States Environmental Protection Agency pursuant to Section 1442(a) and (b)(1) of the Safe Drinking Water Act (42 U.S.C. 300j-1(a) and (b)(1)) as acceptable drinking water additives. The Company, in consultation with the Illinois Environmental Protection Agency, shall conduct a comprehensive study of the effects of the use of those coagulants on the receiving stream, including but not limited to information on the toxicity of the discharge, both to humans and to fish; the concentration of the coagulants in the discharge as compared with the raw water application rate of the

coagulants; and the rate and chemical pathway for degradation of the coagulants. This Section will expire on January 1, 1992.

IT IS SO ORDERED.

I, Dorothy M. Gunn, Clerk of the Illinois Pollution Control Board, hereby certify that the above Order was adopted on the 2nd day of February, 1989, by a vote of 7-0.

Dorothy M. Gunn

Dorothy M. Gunn, Clerk
Illinois Pollution Control Board