

ILLINOIS POLLUTION CONTROL BOARD
May 20, 1993

IN THE MATTER OF:)
)
PETITION OF ILLINOIS AMERICAN) AS 91-11
WATER COMPANY FOR AN ADJUSTED) (Adjusted Standard)
STANDARD FROM 35 ILL. ADM. CODE)
304.124 (TSS AND IRON ONLY) FOR)
THE WATER COMPANY'S EAST ST. LOUIS)
PUBLIC WATER SUPPLY FACILITY)

NANCY J. RICH, BELL BOYD & LLOYD, APPEARED ON BEHALF OF ILLINOIS AMERICAN WATER COMPANY;

BRUCE L. CARLSON, APPEARED ON BEHALF OF ILLINOIS ENVIRONMENTAL PROTECTION AGENCY.

OPINION AND ORDER OF THE BOARD (by R.C. Flemal):

This matter comes before the Board upon the petition by Illinois American Water Company (Water Company) for an adjusted standard from the effluent limitations for total suspended solid (TSS) and total iron set forth at 35 Ill. Adm. Code 304.124. The adjusted standard would apply to clarifier sludge and filter backwash discharges to the Mississippi River at the Water Company's public water supply facility located in East St. Louis, Madison County, Illinois.

The Water Company's petition was originally filed on December 31, 1991¹. Following the production of various reports and data, and discussions and negotiations with the Illinois Environmental Protection Agency (Agency), the Water Company filed an amended petition (Petition) on April 12, 1993.

The Agency filed a response (Response) to the Water Company's amended petition on April 19, 1993. The Agency recommends that the Water Company be granted the adjusted standard as requested. (Response at ¶1.)

Hearing was held April 21, 1993 in Belleville, Illinois. Representatives of both the Water Company and the Agency participated in the hearing; no members of the public were in attendance.

¹ The statutory provision under which this action is brought, 415 ILCS 5/28.3 (see below), requires that a petitioner have declared its intention to pursue an adjusted standard no later than January 1, 1991, and to have filed its adjusted standard petition with the Board no later than January 1, 1992. The Water Company has met both of these deadlines.

Based upon the record before it and upon review of the factors involved in the consideration of adjusted standards, the Board finds that the Water Company has demonstrated the grant of an adjusted standard in the instant matter is warranted. The adjusted standard accordingly will be granted as requested.

ADJUSTED STANDARD PROCEDURE

The Illinois Environmental Protection Act (Act) at Section 28.1 (415 ILCS 5/28.1)² provides that a petitioner may request, and the Board may impose, an environmental standard that is: (a) applicable solely to the petitioner, and (b) different from the standard that would otherwise apply to the petitioner as the consequence of the operation of a rule of general applicability. Such a standard is called an adjusted standard. The general procedures that govern an adjusted standard proceeding are found at Section 28.1 of the Act and within the Board's procedural rules at 35 Ill. Adm. Code Part 106.

For the matter at hand, there are additional pertinent provisions found at Section 28.3 of the Act. Section 28.3 provides explicit authority for consideration by the Board of adjusted standards applicable to clarifier sludge and filter backwash discharges (hereinafter collectively as "discharge") to the Mississippi River or Ohio River from a public water supply facility. Additional qualifications are that the public water supply facility (a) receive its raw water supply from those rivers, and (b) does not use lime softening in the its raw water purification process. The Water Company meets each of these qualifications.

In pertinent part, Section 28.3 specifies:

- a. Utilizing the provisions of Section 28.1 and this Section, alternative requirements may be established by the Board in an adjusted standards proceeding for the direct discharge of waste solids to the Mississippi or Ohio Rivers from clarifier sludge and filter backwash generated in the water purification process. Any public water supply utilizing the Mississippi or Ohio Rivers as its raw water source may initiate such a proceeding provided that its waste solids are generated as described herein and it does not utilize lime softening in the purification process. An adjusted standard granted by the Board in an adjusted standards proceeding shall be based upon water quality effects, actual and

² Formerly Ill. Rev. Stat., ch. 111½, par. 28.1.

potential stream uses, and economic considerations, including those of the discharger and those affected by the discharge.

- b. No later than January 1, 1991, the public water supply shall make a declaration regarding the intent to pursue an adjusted standard and assemble and submit to the Agency any background information in its possession relevant to current discharge practices. The Agency, after a review of its files and the submittal, shall request such further information as it deems necessary for its initial determination.

* * * * *

- c. . . . justifications shall be included in the petition. Justification based upon discharge impact shall include, as a minimum, an evaluation of receiving stream ratios, known stream uses, accessibility to stream and side land use activities (residential, commercial, agricultural, industrial, recreational), frequency and extent of discharges, inspections of unnatural bottom deposits, odors, unnatural stream chemical analyses. Where minimal impact cannot be established, justification shall also include valuation of stream sediment analyses, biological surveys (including habitat assessment), and thorough stream chemical analyses that may include but are not limited to analysis of parameters regulated in 35 Ill. Adm. Code 302. Except as otherwise provided in this Section, the petitioner shall adhere to the general procedural rules for adjusted standards petitions as adopted by the Board. If the petitioner files singly, justification shall include all components identified as applicable to instances where minimal impact cannot be established.

* * * * *

PRIOR PROCEDURAL HISTORY

The matter of discharges of waste solids by public water supply facilities has been before the Board in a number of prior actions, including a request for site-specific rulemaking relating to the Water Company's East St. Louis facility addressed by the Board in proceeding Petition for Site-Specific Exception tot Effluent Standards for the Illinois-American Water Company, East St. Louis Treatment Plant (February 2, 1989), R85-11, 96 PCB 69. By order of September 25, 1986 (at 72 PCB 429) the Board

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initially denied that request. The Water Company then successfully petitioned the Board to reopen the record. After supplementation of the record, including an additional hearing, the Board proposed a temporary rule that exempted the Water Company from the TSS and total iron limit effective to January 1, 1992. That rule was finalized by Board order of February 2, 1989.

In light of the circumstances of the Water Company, as well as several similarly situated facilities, the legislature adopted and the Governor signed into law P.A. 86-1363, effective September 7, 1990, that established Section 28.3 of the Act.

NATURE OF THE FACILITY

The discharges at issue in this proceeding emanate from the Water Company's East St. Louis³ treatment facility. Raw water is withdrawn from the Mississippi River and purified by removal of the river solids in a clarification and settling process. (Petition at ¶2.) The purified water is distributed to over 57,300 individual service connections in the Metro-East area, representing a population of approximately 300,000 people. (Tr. at 17.)

The Water Company's East St. Louis facility has been in operation since 1885. (Tr. at 18.) There are two actual water intakes for the facility, one located at East St. Louis, and the other upstream on Chouteau Island. (Id.)

Sedimentation basins are used to remove heavy, solid materials from the raw water; the water is also filtered before distribution. (Tr. at 18.) In both actions there are accumulations of solids, which are mostly sand and silt that were present in the naturally turbid raw water; some of the solids also result from chemical addition made to the raw water to assist the coagulation of the natural solids.

The Water Company's object in the instant action is to obtain allowance for discharge of these solids into the Mississippi River.

DISCHARGE SETTING

The Water Company's discharge occurs directly to the Mississippi River through an outfall located at River Mile 180.0

³ The Water Company has other facilities within Illinois, as well as other states, that are not the subject of the instant proceeding.

and at thirteen feet below normal river stage. The river has a 7-day 10-year low flow (7Q10) of 29,716 MGD (45,970 cfs), compared to mean and maximum Water Company discharges of 4.65 and 6.5 MGD, respectively. (Petition, Attachment 2b at 5.)

The Agency observes that commercial traffic is the principal and controlling use of the river in the vicinity of the outfall. (Response at ¶12.) The Agency further observes that the area is regularly dredged by the Department of Army, Corps of Engineers, and by licensed dredges who often remove sand from the area of the river for resale; the result is a river bottom that "does not support a substantial amount of bottom dwelling organisms". (Id.) The Illinois Department of Conservation also reports that to the best of its knowledge there are no freshwater mussel beds in the vicinity of the outfall. (Response, Attachment #1.)

The Illinois State Water Survey has surveyed the aquatic community of the Mississippi River in the vicinity of the East St. Louis facility. It has found a low population density and low diversity of benthic organisms attributable to the unstable sand substrate and high stream velocities. (Petition at ¶26.) Density of macroinvertebrates showed no significant difference in the near shore sampling stations upstream and downstream of the Water Company's outfall. (Id.)

The Water Company explains river-side land use in the vicinity of the outfall as follows:

. . . the area near the East St. Louis operations are commercial and industrial. . . . The close proximity of the East St. Louis plant to petroleum docks, downstream sewage treatment plants and other industrial activities, plus the heavy volume of commercial river traffic, discourage any recreational use of the area. (Petition at ¶19.)

The Mississippi River is leveed within the area of the Water Company's outfall. (Petition at ¶23.)

NATURE OF THE SOLIDS AT ISSUE

Over time, the technology and processing employed by the Water Company has been modified to effect changes in the composition and concentration of the solids as discharged. (Tr. at 66.) In particular, the Water Company has in recent years undertaken a number of actions to improve the overall quality of its discharge, including installation of Lamella separators and equipment that allows for continuous discharge of solids from the sedimentation basins (Tr. at 20), staggering the backwash sequences from the 20 filter units, and modification of coagulant

process to minimize the amount and quality of treatment residues in the discharge⁴ (Tr. at 21-22).

Prior to the installation of the continuous-discharge equipment, solids from the sedimentation basins were discharged to the Mississippi River as "batch discharges" at the time of semi-annual cleanings of each sediment basin. (Tr. at 31.) These discharges were typically of high volume and concentration over a short time. Since early 1992 the batch discharges have been totally eliminated. (Id.) In combination with spreading the filter backwash activity over a twenty-four hour period, the continuous discharge now causes return of the "raw water solids and minimal treatment additives to the river at a rate much more similar to that at which the solids are withdrawn from the river" (Tr. at 32). The Agency also notes that "discharges have been more uniform in magnitude and makeup" which "also greatly reduces the possibility of violations" of the color and turbidity standards applicable to the Mississippi River. (Response at ¶6.)

The Water Company has also modified its coagulant treatment by using a polymer technology in replacement of the prior industry-standard alum and ferric salts technology. The goal of polymer technology is to replace metal-based coagulants with biodegradable polymers, and thereby to greatly reduce metal-based precipitates in the discharge. (Tr. at 32-22.) The Water Company observes that, after some experimentation, it was able by 1991 to reduce metal-based coagulant precipitates to less than one-third of 1% of the total discharge (Tr. at 33, 42); this represents an approximate 99% reduction in discharge of metal-based precipitates. (Tr. at 33.)

The Agency observes that the Water Company's discharge is quite unusual with respect to its low percent of coagulant-produced solids: in the typical treatment plant 25% to 50% of the discharged solids do not originate from the raw river water source, as opposed to the Water Company's approximate 0.3%. (Response at ¶3; Tr. at 81.) The Agency also observes that in the case of the total iron content, the Water Company's discharge is entirely from the raw water. (Tr. at 81.)

The Water Company intends to continue to search for a new, better polymer technology (Petition at ¶52); the currently-used coagulant needed under high-turbidity conditions still involves approximately a 4% metal-based component (Tr. at 37).

⁴ A principal factor in the Board's granting of the temporary site-specific relief in R85-11 was the request of the Water Company for opportunity to investigate and implement alternate coagulation technology. See 96 PCB 69 et seq.

The Water Company has employed ENSR Consulting and Engineering (ENSR) to conduct, among other matters, studies of the toxicity and impact of the discharge (see Attachment 2a to Petition). Toxicity testing was conducted on both the settleable solids and supernatant of the effluent; in both cases test organism survival was 100% (Tr. at 46). ENSR concludes that neither the suspended solids nor the discharge water "pose a potential for adverse impacts on the Mississippi River". (Tr. at 46-47.) Similarly, based on the "negligible effect of the discharge on the physical environment and a local biota which is ecologically adapted to naturally elevated levels of TSS, it was concluded [by ENSR] that the discharge has no significant impact on the river biota". (Tr. at 47.) The Agency also notes that a priority pollutant scan also indicated that the Water Company's effluent did not exhibit any toxicity. (Response at ¶14.)

Review of historical data and current conditions indicated the absence of any visible bottom deposits, unnatural materials, odors, or color due to the Water Company's discharge. (Petition at ¶22.)

Nevertheless, because of the important nexus between the nature of the coagulant process and the resultant quality of the discharges, both the Water Company and the Agency endorse the imposition of a series of proscriptions on the nature of the coagulant process as a necessary condition of grant of the any adjusted standard. These include⁵:

- 1) Use of no non-metal based coagulants other than those that are federally-approved for such use;
- 2) Use of metal-based coagulants only as necessary to produce potable water under high turbidity raw water conditions; and
- 3) Review and approval of any coagulant change by the Agency.

EXISTING AND PROPOSED ADJUSTED TSS AND IRON STANDARDS

The rule of general applicability at issue is found at 35 Ill. Adm. Code 304.124, within the Board's rules governing general water effluent discharges. Section 304.124 establishes numeric standards for a variety of effluent contaminants. These standards apply to all discharges to the waters of the State, unless specific provision has been made otherwise by this Board.

⁵ The full text and provisions of the coagulant condition as proposed by the Water Company and the Agency, and accepted by the Board, occurs as item (b) in the order accompanying this opinion.

In the instant matter the standards at issue are the standard for TSS at 15 mg/L and for total iron at 2.0 mg/L; each of these numeric limits is subject to the "averaging rule" of Section 304.104(a)⁶.

Analysis of the Water Company's effluent demonstrates that the only general effluent standards which are not being met at the facility are those for TSS and total iron. (Petition at ¶28.)

The Agency concludes that the Water Company's discharge is in violation of the total iron standard entirely due to the makeup of the solids of the Mississippi River⁷, which on any given day may have a concentration that causes discharges from the Water Company to exceed the standard. (Tr. at 85.) The Agency further observes that the Water Company therefore cannot control the total iron discharge concentrations. (*Id.*) Measurements of the dissolved iron concentration of the Water Company's effluent are below the 0.04 mg/L limit of detection (Petition, Attachment 2a at 2-9), confirming the strong association of the total iron concentration with particulate solids.

After consideration of alternative numeric caps for TSS and total iron, both the Water Company and the Agency propose that the existing TSS and total iron standards simply not apply at all to the Water Company's discharges. The Agency observes that "it would be too difficult to develop a numeric limit which would be representative of the concentration . . . contained in the Water Company's discharge". (Tr. at 86.) The Agency adds that an adjusted standard without numeric limits can be adequately enforced through certain monitoring requirements contained in the Water Company's NPDES permit. (*Id.*)

As specifically regards the TSS standard, the Agency observes that the natural in-river concentrations range from seven tens to several hundreds mg/L. Thus, if a TSS concentration cap were to be imposed, the Agency opines that it would have to be "high enough to account for the times of high TSS concentrations in the river, thus rendering the limit rhetorical". (Tr. at 86.) Moreover, under various scenarios of

⁶ Section 304.104(a) provides that (1) no monthly average shall exceed the prescribed numerical standard, (2) no daily composite shall exceed two times the prescribed numerical standard, and (3) no grab sample shall exceed five times the prescribed numerical standard.

⁷ ENSR reports an average ambient total iron concentration in the river of 1.9 m/L. (Petition, Attachment 2a at 2-9 and Table 2-2.)

river flow and effluent discharges, ENSR concludes that typically the Water Company's discharge would increase mixed in-stream TSS concentrations by less than 1 mg/L. (Petition, Attachment 2a at 2-7.) This is small with respect to ambient TSS concentrations; it is also small with respect to the precision involved in normal TSS measurement procedures.

ALTERNATE CONTROL STRATEGIES

The Water Company, its consultants, and the Agency have explored a range of control strategies⁸. The Water Company concludes that the alternatives are either infeasible or cost-ineffective. (Tr. at 77.) The Agency also concludes, based its independent review, that compliance alternatives available to the Water Company are economically unreasonable and technically infeasible. (Response at ¶8; Tr. at 83.)

CONCLUSION

The Agency concludes, in view of the various special aspects of the Water Company's discharge and the environmental setting of the discharge, that "granting of the adjusted standard will not adversely impact the environment any more severely than compliance with the regulations of general applicability, i.e., the general effluent limitation". (Tr. at 83.) The Board similarly finds.

Based upon its consideration of the record presented in this action, the Board finds that the Water Company has provided justification necessary for an adjusted standard to be granted with conditions.

The Board has made one change in the conditions, and that is to make it clear that the Agency shall approve or disapprove any demonstration by the Water Company for proposal for change or for changes to the coagulants. Such Agency determination shall be in writing and is appealable (See Section 5(d) of the Act).

This opinion constitutes the Board's findings of fact and conclusions of law in this matter.

⁸ Substantial portions of the instant record are addressed to presentation of various compliance alternatives. The Board will not attempt to do an alternative-by-alternative review of this portion of the record here; the interested person is directed to the summary presented at ¶¶34-47 of the Petition and the Board's discussion of compliance alternatives in the earlier R85-11 (96 PCB 69, et seq.) proceeding.

ORDER

The Illinois-American Water Company (Water Company) is hereby granted an adjusted standard applicable to its potable drinking water treatment plant located in East St. Louis, Illinois, subject to the following conditions:

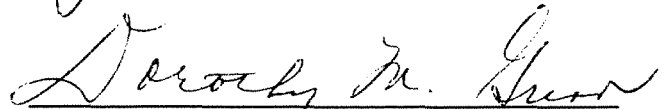
- a) Discharges of clarifier sludge and filter backwash effluent shall not be subject to the effluent standards for total suspended solids and total iron of 35 Ill. Adm. Code 304.124.
- b) The Water Company shall use only non-metal based coagulants approved pursuant to Sections 1442(a) and (b)(1) of the federal Safe Drinking Water Act (42 U.S.C. Sections 300j-1(a) and (b)(1), or identical chemical equivalents of such approved non-metal based coagulants at all times during which the raw water turbidity level is such that the exclusive use of the non-metal based coagulants allows the Water Company to produce potable drinking water which meets the requirements of the Safe Drinking Water Act. At times during which raw water turbidity levels exceed those under which potable water can be produced with the exclusive use of the non-metal based coagulants, the Water Company may use the metal based coagulants with the non-metal based coagulants to the extent required to produce potable drinking water. For the purposes of this adjusted standard, non-metal based coagulants shall mean coagulants containing no more than 5% aluminum by weight and no other metals which would cause violations of applicable water quality or effluent standards. Additionally, if the Water Company proposes or is required to change coagulants, the Water Company shall demonstrate to the Agency the effect of the change and the percentage of solids in the discharge that are attributable to treatment additives. The Agency shall review and approve or disapprove any such demonstration. The Agency's determination shall be issued in writing.
- c) The granting of this adjusted standard is not to be construed as affecting the enforceability of any other Board regulations, the Act, the Clean Water Act, or any federal regulation. Nothing in this order shall preclude the Agency from exercising its statutory authority to require as a permit condition a monitoring program sufficient to assess compliance with this adjusted standard and any other Board regulation, the Act, the Clean Water Act, or any federal regulation and other controls, if needed for compliance including compliance with water quality standards.

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IT IS SO ORDERED.

Section 41 of the Environmental Protection Act, 415 ILCS 5/41 (1992), provides for appeal of final orders of the Board within 35 days. The Rules of the Supreme Court of Illinois establish filing requirements. (See also 35 Ill. Adm. Code 101.246, Motions for Reconsideration.)

I, Dorothy M. Gunn, Clerk of the Illinois Pollution Control Board, hereby certify that the above opinion and order was adopted on the 20th day of May, 1993 by a vote of 6-0.


Dorothy M. Gunn, Clerk
Illinois Pollution Control Board