

ILLINOIS POLLUTION CONTROL BOARD
March 8, 1984

IN THE MATTER OF:)
)
PETITION FOR SITE SPECIFIC) R82-3
EXCEPTION TO EFFLUENT STANDARDS)
FOR ALTON WATER TREATMENT PLANT)

Adopted Rule. Final Order

FINAL OPINION AND ORDER OF THE BOARD (by J. Anderson):

This matter comes before the Board on the petition for site specific "exception" filed by the Alton Water Company (Company) February 9, 1982 as amended July 21, 1982. The Company seeks exception from 15 mg/l total suspended solids (TSS) and 2 mg/l total iron effluent standards of 35 Ill. Adm. Code 304.124(a), as they relate to the wastewater discharged by the Company's potable water treatment facility. [Identical variance relief was granted in PCB 82-13, August 18, 1982 until September 1, 1985 or the earlier completion of this rulemaking (See Company Gr. Ex. 1).]

A consolidated merit and economic hearing was held in Alton on February 15, 1983. In addition to the testimony and exhibits in support of the petition advanced by employees of the company, the Mayor of the City of Alton, a member of the City Council, and the President of the Greater Alton Chamber of Commerce also made presentations in support (R. 8-16, City Ex. 1, Timmermiere Ex. 1-2, Utterback Ex. 1). On behalf of the Department of Energy and Natural Resources (DENR), Linda Huff presented testimony concerning her "Economic Impact Assessment Regarding R82-3: A Site Specific Exemption for the Alton Water Company" (DENR Ex. 1) (also see PC 1). The Illinois Environmental Protection Agency (Agency) appeared at hearing to examine the Company's witnesses, but presented no testimony or witnesses. The Agency did, however submit written comments (PC 2).

The Board adopted a First Notice Order in this matter on October 8, 1983, and a Second Notice Order on January 12, 1984. On February 23, 1984, the Joint Committee on Administrative Rules determined that it had no objection to the rules as proposed.

*The Board appreciates the efforts of administrative assistant Kathleen Crowley, who acted as Hearing Officer and provided assistance in drafting this rule and Opinion.

PLANT DISCHARGES AND ENVIRONMENTAL EFFECTS

The Alton Water Company, Madison County, is a public utility which provides drinking water to approximately 16,900 residential, commercial, industrial, and municipal customers in the City of Alton and the surrounding area. The Company owns and operates a water purification plant which withdraws raw water from the Mississippi River and purifies and distributes finished water to its customers. Wastewater resulting from the purification process is discharged into the Mississippi downstream from the intake. An average of 12.5 millions of gallons per day (mgd) of raw water is treated prior to distribution by means of coagulation, settling, filtration, chlorination and fluoridation.

As of 1980, the rate filtered capacity of the Company's plant was 10.4 mgd. On account of lack of reserve treatment capacity, the plant was placed on the Agency's Division of Public Water Supplies' Critical Review list on July 1, 1981. As a result of various modifications to the Company's system, the rate filtered capacity was subsequently increased to 13.3 mgd, and the plant was removed from the Critical Review list.

The Company has recently completed construction of a new additional treatment system to increase the plant capacity by 5 mgd to 18.3 mgd. The Company alleges that the addition is necessary to enable the Company to meet existing system peaks and normal summer season demands on the system. Construction of this addition proceeded pursuant to a "construct-only" permit issued by the Agency. The Agency issued a short-term operation permit after grant of variance in PCB 82-13, but absent site-specific relief facilities to remove excess TSS and iron from the Company's effluent will need to be constructed.

Operation of this plant addition would not change the treatment process or discharge configuration of the existing plant, although the quantity of discharge would increase as production of finished water increases. The treatment process here involved begins with the pumping of raw river water at an intake structure, where alum and polymer are added to the water. It is then conveyed to two circular mixers and then to a clarifier where addition of a small quantity of lime for pH adjustment, pre-chlorination, and occasionally a coagulant aid, occurs. Water then flows through two sedimentation basins, and finally through sand and gravel filters, a filter aid having been added when required. Post-chlorination and fluoride additions are made after filtration. Finished drinking water flows to a clear well before distribution.

The high TSS concentration in the Company's wastewater was the subject of an earlier Board proceeding, East St. Louis and Interurban Water Co. v. IEPA and Alton Water Co. v. IEPA

(consolidated), PCB 76-297 and 298, 24 PCB 801, February 17, 1977. In that case, average TSS concentration of Alton's discharge was reported as being 11,060 mg/l, 24 PCB at 803. The Company unsuccessfully argued that since the high TSS concentration was largely attributable to high TSS levels in its raw water source (e.g. 68 mg/l), that it qualified for a Rule 401(a) exemption to the Rule 408 effluent limitations. The Board affirmed the Agency's denial of an operating permit. Following this Board decision, the Company began investigating methods of treating its discharge, as well as the possibility of obtaining site specific regulatory relief.

In pursuing the latter option, the Company contacted the State Water Survey (Survey) concerning the possibility of the Survey doing a study of the environmental impact of the discharge on the Mississippi. Due to the Survey's workload, its commitment to undertake the study was not made until May, 1979. The recently completed study, "Waste from the Water Treatment Plant at Alton and its Impact on the Mississippi River", Ralph Evans et al. (1982) (Evans Report) (Evans Ex. 1), and the supporting testimony of Mr. Evans, is the source of much of the information relied on by the Company.

The Evans Report estimates the volume of wastewater produced at the plant to be 603,000 gpd, or roughly 48,000 gallons of wastewater per million gallons of raw water treated. Wastes are produced in the mixers, clarifier, sedimentation basins and filters. The significant contributors to the waste loads in the discharge were viewed to be the TSS content of the raw water and the alum added for coagulant purposes. Average daily production of dry solids in the treatment system was estimated to be 12,500 pounds, of which only 150 pounds were attributed to alum usage.

During normal daily plant operations, in addition to TSS, the discharge exceeds only one other effluent standard:* the 2.0 mg/l iron limitation, the average concentration in the discharge being 14.6 mg/l. Again, however, the raw water contains iron in excess of the limit. During the twice yearly cleaning of sedimentation basins, the 2.0 mg/l barium standard and the 1.0 mg/l manganese standard are also violated, as the average

*At the hearing, the Agency inquired whether the discharge had been examined for levels of BOD and fecal coliform (R. 76-81). As Mr. Blanck noted, the NPDES Permit does not establish limitations for these parameters. Although the Company could not, at that juncture, submit contemporary information, it did supply available data. Based on this data, the Company asserts that the discharge does not pose any threat of violating water quality standards, or even effluent standards, for these parameters. (Evans Ex. No. 1 at 20-21; R. 76-81; Co. Ex. No. 2 at cover letter, 5, 10, 25, 30, 134-138.) The Agency has not challenged this assertion.

concentrations in the discharge at those times are estimated to be, respectively, 6.0 mg/l and 3.92 mg/l. [The Company believes that such excursions could be eliminated by more frequent basin cleaning, which it has undertaken to do (R. 27).]

In assessing the environmental impact of these discharges, the Survey believed it necessary to perform a study of in-stream water quality, based upon its earlier studies of water treatment plant discharges. Calculations were made concerning the impact of the TSS discharge under worst case conditions. Using the daily load of suspended solids in the discharge (12,500 lbs.) and the 7-day, 10-year low flow for the River (21,700 cfs) with a 10% mixing zone and a river TSS concentration of 10 mg/l, Evans included that the in-stream TSS concentration would be 34 mg/l.

Except during such conditions, the Company's discharge was estimated to represent only 0.018% of the average daily solids load conveyed by the stream.

Calculations were also made as to the effect of the barium, manganese and iron discharges during the twice-yearly (April, November) basin cleaning episodes during the worse November (average stream flow) conditions. Again assuming a 10% mixing zone, the concentration in the Mississippi without the waste, and then with it, were estimated to be: for barium 0.10 mg/l vs. 0.11 mg/l, for manganese 0.25 mg/l vs. 0.27 mg/l, and for iron 8.60 mg/l vs. 9.40 mg/l.

The Survey did do sampling of river bottom sediments, to determine their content as well as the types of densities of macroinvertebrates located in these sediments. The Survey determined that while the Company's waste flows were detectable in the River's bottom segments, that the areal extent of their influence was limited to 200 feet offshore and within 2,000 feet downstream of the waste outfall.*

Mr. Evans testified that examination of the sediments did not reveal a measurable "blanket" of sludge deposits foreign to the sediments of the river, but that the Company's discharges had changed the character of the sediments. Usual Mississippi River Bottom sediments are mainly sand (i.e. 94% sand, 4% silt, and 2% clay), while the bottom sediments in the impacted area consists mainly of silt and clay (i.e. 33% sand, 49% silt and 18% clay).

Examination of the sediments for bottom dwelling organisms did not reveal an adverse impact on them due to the Company's discharges. Mr. Evans noted that a mixture of sand, silt and

*At hearing, Mr. Evans clarified that this mixing zone would be well within that allowable by Section 302.102, that is, the area of a circle with a radius of 600 feet (R. 48-49).

clay is a more stable environment than sand for these organisms, and that while "the impact of the waste may not be solely beneficial in enhancing the habitat, it nevertheless does not have an adverse impact" (R. 53-54).

In response to a concern expressed in a Concurring Opinion in PCB 82-13, Mr. Evans performed a literature search concerning the toxicity of aluminum to aquatic life. (As aforementioned, the Company's discharge introduces about 150 pounds of alum into the river daily). Mr. Evans observed that in the USEPA publications he consulted, chlorides, nitrates, oxides, and sulfates of aluminum were suspected of adversely affecting various shellfish. However, hydroxides of aluminum, those contained in the Company's waste, were not mentioned. Based on this information, as well as on his observation that the number, type, and diversity of macroinvertebrae did not differ between sediments upstream of the discharge and sediments in the area impacted by the discharge, Mr. Evans concluded that the aluminum content in the discharges were not a "limiting factor" in the aquatic habitat (R. 56).

In the EcIS, Linda Huff provided information concerning stream uses immediately downstream of the Company's discharge and Ms. Huff noted that next to the Alton Water Company are two commercial/industrial facilities, and that a grain dock, a petroleum dock, and a sand operation are located immediately downstream and adjacent to the shoreline, all within 3000 feet of the Company's discharge (DENR Ex. 1, p. 11). (As aforementioned, the areal extent of the Company's discharge is limited to 200 feet offshore and within 2,000 feet downstream of the waste outfall.)

Ms. Huff also notes that there is no water quality monitoring point located immediately downstream of the Company's discharge, located at river mile 204.2, located 1.32 miles upstream of Lock and Dam No. 26. The closest downstream station is that at the East St. Louis water intake (river mile 180); any effects of the Alton discharge would be dissipated before that point (DENR Ex. 1, p. 9-10).

TREATMENT OPTIONS AND COSTS

The Company has, since 1973, considered various options for disposal of the sediments contained in its wastewater. Because of the small size of the plant site, only off-site disposal is feasible (R. 27). The possibility of discharging into the City's sewer system was discussed but rejected by the City on the basis of its engineers' findings that the treatment system could not accept the entire plant discharge (R. 28; Company Ex. No. 1, Amended Petition for Variance at Ex. 8; Company Ex. No. 2 at 141-142). The Company also considered discharge of a portion of the

wastewater to the city system. This alternative would, however, require construction of holding facilities which could not be accommodated on the plant site (R. 129-130). Negotiations to acquire nearby property for such holding facilities were unsuccessful (R. 96-97). Nor did this course present a more economical alternative for disposal. Construction costs were estimated (in 1977-78) at some \$2 million for the holding facilities (R. 28-29). In addition to these capital expenditures, annual user fees of \$147,000 to \$196,000 for disposal to the city system would be imposed (R. 28-29).

Various alternatives for treatment and disposal of the total discharge off-site were considered, including lagoon disposal, barging and mechanical dewatering (filter press and centrifuge) (R. 34). The Company's summary (Herman Ex. 3) of these options and costs is summarized below in table form:

SUSPENDED SOLIDS DISPOSAL

ALTON WATER COMPANY

	<u>Pump to Lagoon Disposal Site</u>	<u>Mechanically Dewater and Truck to Disposal Site</u>		<u>Barge to Disposal Site</u>	
		<u>Filter Press</u>	<u>Centrifuge</u>	<u>Illinois</u>	<u>Missouri</u>
		<u>Capital Cost</u>	\$3,000,000	\$3,300,000	\$3,120,000
<u>Operating Labor and Energy Costs</u>	\$ 11,850	\$ 33,100	\$ 76,700	\$ 9,400	\$ 6,700
<u>Maintenance</u>	\$ 5,000	\$ 16,250	\$ 17,500	\$ 11,250	\$ 11,250
<u>Hauling/Cost</u>	\$ <u> </u>	\$ <u>67,600</u>	\$ <u>78,000</u>	\$ <u>5,200</u>	\$ <u>5,200</u>
	\$ 16,850	\$ 116,950	\$ 172,200	\$ 25,850	\$ 23,150

The Company's engineers concluded that the lagoon disposal method was the only feasible alternative (R. 34-36).

The chosen compliance option, if ultimately required, would involve pumping of wastewater to an off-site lagoon disposal system. A site 3½ miles upstream of the plant has been purchased at a cost of \$243,000. Capital costs of construction of a collection system at the plant, installation of piping and lift stations, and construction of two drying lagoons, are estimated to be \$3,000,000 with annual operation and maintenance costs of \$16,850. Such a system would take approximately 20 months to construct.

Mr. Herman testified that the \$3,000,000 estimate (updated to 1982 dollars) included costs for 1) equipment and construction, 2) engineering, 3) interest and contingencies, and 4) land (R. 37;

Herman Ex. 1). Annual operating expenses were estimated (in 1982 dollars) to be \$19,000 (Herman Ex. 2).

To support the capital investment, the Company would have to request annual increased revenues in excess of \$710,000. Additional revenues, in the amount of \$19,000, the estimated annual operating expenses, would also be required. Finally, revenues to cover depreciation, in the approximate amount of \$60,000 (reflecting \$3 million in capital costs), would be needed. Thus, the total estimated additional revenues per year would total some \$789,000 (R. 30).

To generate these revenues, the Company would be required to seek an increase in its rates of an average 16 percent for all customer classes. Based upon the rate approved by the Illinois Commerce Commission in its Order of October 27, 1982, a typical residential customer now pays an average of \$163.00 per year. If the additional increase to reflect the cost of waste treatment and disposal facilities were included, the average residential customer would pay an additional \$26.00 per year, for a total bill of \$189.00* (R. 31; 126-127).

At hearing, Mrs. Huff generally did not disagree with the compliance costs estimated by the Company.** In the EcIS, a lengthy comparison of the costs and benefits of full compliance was made, which were summarized in Table 5-1 (DENR Ex. 1, p. 55). This Table is reproduced below:

Table 5-1. Comparison of Environmental Costs and Benefits of the Alton Water Company Complying with the Illinois Effluent Limitations

Impact Category	Annual Costs		Annual Benefits	
	Description	\$/yr	Description	\$/yr
Alton Water Company	Pollution Control Expenditures	\$517,000	Not Quantifiable	
Aesthetics			Not Quantifiable	
Environmental Impacts			Not Quantifiable	
• Fish			No impact	0
• Benthic Community			No measurable improvement	0
• Bacterial Contamination			Not known	?
• Aesthetics			No shoreline access for public	0
Public Water Supplies			Reduced solids Loading on downstream users	0-\$1,200
Navigation			Reduced dredging costs	0-\$4,000
Totals		\$517,000		0-\$5,200

*Mrs. Huff compared Alton to three suppliers on the Mississippi River (DENR Ex. 1 at 66), finding the existing Alton (footnote continued on next page)

The EcIS also considered treatment of part of the discharge through mechanical dewatering and disposal (DENR Ex. 1, p. 22-28) Mr. Herman calculated the expenses of such efforts to be substantially higher than suggested by the consultant (R. 88-91). Mr. Herman also testified that the construction costs would be the same as for disposal of all of the discharge because of the necessity for disposing off-site (R. 131-134).

AGENCY COMMENTS

In its comments, the Agency does not dispute the economic testimony presented, and agrees that "the continued discharge will have no significant impact on the Mississippi River." However, it declined to make a recommendation either that the Board grant or deny the requested relief.

The reasons for the Agency's maintenance of this posture will be best conveyed by quotation rather than by paraphrase:

"The Agency is concerned that a grant of relief here may cast doubt on the validity of suspended solids standards contained in the Board's regulation and continued ability to enforce them against facilities which discharge contaminants that originates in raw river water. In East St. Louis and Alton Water Company v. IEPA, PCB 76-297 and 298, February 17, 1977 the Board held that these contaminants must be controlled. Many facilities along both the Mississippi and Illinois Rivers, including other public water supplies and gravel and sand dredging operations, have less concentrated waste and perhaps as little impact. Yet these facilities must still control their discharges to meet the effluent standards.

(footnote continued from preceding page)

rates lower than those of the City of Quincy but substantially higher than those of Rock Island and East St. Louis.

**The EcIS (Ex. 1, p. 20-22) had noted that the capital costs of treatment options originally submitted by the Company were substantially higher than Huff and Huff estimates based on "New Concepts in Water Pollution" by Culp and Culp (DENR Ex. 4). At hearing (R. 87-93), it was explained in detail that the discrepancy had in large part resulted from differences between the Alton facility and the facility serving as the basis for the Culp and Culp figures, and in use of different indices in bringing 1970's dollars up to 1982 dollars.

The Board adopted effluent standards on the basis of the ability of the individual discharger to treat the waste, rather than the impact on water quality. This treatability basis was enunciated in the Board's opinion adopting effluent standards, R70-8, January 7, 1972, and repeated in the Board's review of those effluent standards in R76-21, September 24, 1981. The concept was that all discharges should be treated to the degree that the Board found feasible and reasonable.

Here there is no question the technology is available to treat the discharge. The Water Company can treat the wastewater rather than discharging it untreated into the river. The Water Company has testified however that it would be costly to include any treatment and that treatment would raise the rates of the users. In deciding this case the Board must consider whether these are sufficient grounds to grant relief. If the Board decides that relief here is warranted then it should explain this departure from the usual theory of setting effluent standards. This explanation will greatly aid the Agency and other dischargers in determining future effluent limitation policy" (PC. 2, p. 4-5).

THE RESOLUTION

In its above-cited remarks, the Agency has accurately reflected the Board's general philosophy in enacting effluent standards. However, in so doing, the Board noted that the desirability of generally applicable effluent standards in part flowed from the fact that "[d]etermining discharge requirements on a case-by-case basis so as to tailor discharges to stream quality requirements is a very time-consuming procedure that creates a great deal of uncertainty" (R. 70-8, 3 PCB 401 at 401, January 6, 1972). Too, in that Opinion, it was noted that the effluent standards for both TSS and total iron were predicated in part on prevention of "undesirable" or "harmful" bottom deposits (Id., 3 PCB at 416, 419).

The Mississippi River is naturally high both in TSS and iron. In this case, the study of the Company's discharge by the State Water Survey indicates that the bottom deposits are at worst benign, and may be beneficial. Assuredly, the Board gives greater weight to the Survey's analysis than it might to that of another consultant-contractor, based on the Water Survey's nationwide reputation and the Board's own history of dealings with it. Given this environmental analysis, the high costs of removal of TSS and iron from the Company's discharge are not justifiable. The Board will therefore grant the relief requested by the Company.

In reaching this result, the Board realizes that it has not provided the easily applicable guidelines the Agency has requested. The Board further acknowledges that this may be troubling particularly in light of another recent site-specific rulemaking petition for discharge of TSS into the Mississippi River [i.e. Sauget/East St. Louis, R81-12, September 23, 1983 (proposed rule)], and further petitions anticipated pursuant to the Part 306, Subpart D "Exception Procedure". However, in the last analysis, conditions for the granting of site-specific relief are not capable of precise legal or technical definition. Additionally, the fundamental goal of all standards, regardless of how established, is to enhance stream quality. In this case, the "time consuming procedure" demonstrates with reasonable certainty that the application of the general effluent standards will contribute minimally, if at all, towards stream quality enhancement. Given this "reasonable certainty" the Board does not feel that the discharger should bear the costs of compliance outlined in this case.

In its January 3, 1984 comments on the first notice Proposed Opinion and Order (PC 3), the Agency objected to the "sweeping language" of the above three paragraphs. Its objection, in a nutshell, is that

"Thus the Board's resolution is flawed in the extent to which it relies on the unquestionably reliable proof of no impact. The fact is that the discharger is so small that one would not expect to find that it was having an impact. Further it ignores the question of the impact if all similarly situated dischargers were to dump suspended solids in the river without treatment. This impact would not be discernible from a study of the discharge of the Alton water plant.

This rule change shows implicitly the dangers of relying on impact in making site by site decisions on effluent standards. While relief for Alton water company might be justified by consideration of the special difficulty that they have in adding suspended solids treatment because of their lack of space at the plant and nearby, a justification on the basis of no impact would serve for many water treatment plants on the Mississippi or Illinois Rivers. While the Agency can acquiesce in relief for a plant as Alton's it would be difficult to justify relief for any other plant which was not so awkwardly situated.

***Even in a site specific rule change the Board should not lose sight of the need for or importance of technology based effluent standards." (PC 3, p. 3-4).

These comments reflect a misapprehension of the Board's reasoning in this matter. Granting of this relief does not represent a philosophical departure from the enforcement of general, technology-based effluent standards. It is, further, rather unlikely that two dischargers would ever be so "similarly situated" that a Board determination in one case would serve to control its determination in another. The Board has not granted relief solely based on the assimilative capacity of the Mississippi River for TSS and iron discharges; it has instead considered this as but one factor in a situation also involving "benign, if not beneficial, bottom deposits", lack of feasible options to off-site sediment disposal due to the plant's lack of acreage, the effect of the discharge on downstream water supplies, side land use, the costs of the treatment technology required by the general rule, etc. To attempt to pinpoint which of these considerations is the most crucial in this, or any future case, is as unavailing as an attempt to determine which strand in a rope shapes it as a whole.

In redrafting the rule as proposed, the Board has added provisions tying the exception to the Company's current 18.3 mgd treatment capacity; any additional expansion will necessitate a rule change and new environmental effects analysis.

ORDER

The Board hereby adopts the following rule, which shall be filed with the Secretary of State:

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

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

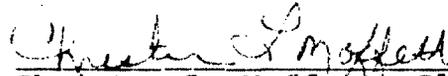
Section 304.206 Alton Water Company Treatment Plant Discharges

This Section applies to the existing 18.3 million gallons per day potable drinking water treatment plant owned by the Alton Water Company which is located at, and discharges into, river mile 204.4 on the Mississippi River. Such discharges shall not be subject to the effluent standards for total suspended solids and total iron of 35 Ill. Adm. Code 304.124.

IT IS SO ORDERED.

Board Member B. Forcade dissents.

I, Christan L. Moffett, Clerk of the Illinois Pollution Control Board, hereby certify that the above Opinion and Order was adopted on the 8th day of March, 1984 by a vote of 5-4.



Christan L. Moffett, Clerk
Illinois Pollution Control Board