ILLINOIS POLLUTION CONTROL BOARD
June 30, 1988

IN THE MATTER OF:	)	
	)	
PETITION OF THE CITY OF	)	
JOLIET FOR A SITE SPECIFIC	)	R84-20
RULE FOR THE EAST SIDE	)	
JOLIET WASTEWATER TREATMENT	)	
FACILITY	)	

PROPOSED RULE. FIRST NOTICE.

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

This matter is before the Board on a May 29, 1984 petition for site specific rulemaking filed by the City of Joliet. Joliet asks that its East Side Wastewater Treatment Plant (EWTP), which discharges into Hickory Creek, be exempted from the effluent limitations for biochemical oxygen demand (BOD) and suspended solids (SS) applicable to Hickory Creek. Those limitations, found at 35 Ill. Adm. Code 304.120(c), are 10 milligrams per liter (mg/l) and 12 mg/l, respectively. Instead, Joliet requests that the discharges from EWTP be subject to the BOD and SS limitations applicable to the Des Plaines River. Those standards, set forth at 35 Ill. Adm. Code 304.120(b), are 20 mg/l BOD and 25 mg/l SS.

The merit hearing in this matter was held on September 25, 1984 at Joliet City Hall. The Illinois Environmental Protection Agency (Agency) submitted supplemental information on November 5, 1986, and Joliet provided additional information on November 10, 1986 and January 15, 1987. On October 14, 1987 the Department of Energy and Natural Resources (DENR) submitted its economic impact study (EcIS), entitled "The Economic Impact of Proposed Site Specific Changes to Water Pollution Regulations Affecting Joliet, Illinois." (Ex. D.) An economic impact hearing was held at Joliet City Hall on March 29, 1988. The comment period closed on April 29, 1988.

Background

Joliet's EWTP is an activated sludge plant with a design average flow of 22.5 MGD. The plant has a primary treatment capacity of 33 MGD, a secondary treatment capacity of up to 45 MGD, and provides disinfection only for flows from 45 to 66 MGD. The treatment units include mechanical trash screens and comminutors, velocity control (non-aerated) grit chambers, rectangular primary clarifiers, aeration tanks with diffused aeration equipment, peripheral feed final clarifiers, return sludge pumping equipment, and chlorination facilities. Primary

sludge and waste activated sludge are digested in the primary anaerobic digesters. The digested sludge is concentrated in the secondary digester and applied to farmland.

The plant is located along Hickory Creek near its confluence with the Des Plaines River. Hickory Creek flows into the Des Plaines just below Brandon Dam. Plant effluent is discharged into Hickory Creek through outfall 001, which is located 450 feet upstream from the Des Plaines. Outfall 002 operates as an emergency bypass, with those flows receiving only disinfection. This second outfall, located upstream from outfall 001, was used only twice between 1981 and 1984. (Transcript of September 25, 1984 (Tr. I) at 37.) Most of the land along Hickory Creek below the plant's outfalls is owned by Joliet. Access to the creek is limited by the plant to the north and dense vegetation to the south. There is a foot bridge over the creek about 1500 feet upstream of the outfalls. (Tr. I at 15-16, 51.) The lower portion of Hickory Creek, where the EWTP is located, has been channelized by the Illinois Department of Transportation for flood control purposes. (Transcript of March 29, 1988 hearing (Tr. II) at 53; Tr. I at 43.)

Between January 1984 and October 1985, the average BOD in the plant effluent was 16.5 mg/l, and the average SS was 17.3 mg/l. (Ex. F at 6.) The concentration of BOD in the creek is more than twice as high downstream from outfall 001 (85 mg/l) than it is upstream from the outfall (39 mg/l). (Tr. I at 19-20.) The levels of SS are roughly the same. Joliet states that the increased BOD concentration is due to backmixing from the Des Plaines River. Dennis Duffield, Director of Public Works and Utilities for Joliet, testified that the flow of the creek literally changes direction, so that sometimes the river backs up into the creek. (Tr. I at 17.) The testimony of Richard Pershall, the principal author of the EcIS, supports Joliet's contention. Mr. Pershall explained that the backmixing is a hydrologic phenomenon. Because the Des Plaines is at a higher elevation than Hickory Creek, water from the river flows into the creek to a point a few hundred feet upstream of the EWTP. (Tr. II at 27-28.)

Joliet has been working with the Agency to evaluate alternatives to upgrade the existing wastewater collection and treatment system since the mid-1970s. As a condition of the National Pollutant Discharge Elimination system (NPDES) permit for the EWTP, Joliet is required to develop and submit for review a municipal compliance plan to upgrade its wastewater facilities to meet existing rules and regulations. That plan, prepared by Clark Dietz, Inc. and revised in July 1986, has been admitted into the record of this case as Exhibit F. The recommended additions and modifications to the system are to be completed in seven phases between 1984 and 2007. The total project cost in

May 1985 dollars is estimated at $55,688,000. (Ex. F. at 1.) The phases of the plan are: (1) construction of separate storm sewers throughout Joliet; (2) the elimination of combined sewer overflows (CSO) where storm sewers have been constructed, and the reduction in frequency of CSOs at other locations; (3) upgrading the EWTP, including addition of final clarifiers and an anaerobic digester, modification of the chlorination facilities, and construction of an interceptor at McDonough Street to transfer some flow from the EWTP to the West Side Wastewater Treatment Plant (WWTP); (3A) approval of this site specific rule change or construction of a new effluent sewer so that the EWTP may discharge at levels applicable to the Des Plaines River; (4) the monitoring and evaluation of the existing CSOs, so as to identify priorities for the elimination of the CSOs; (5) design and construction of improvements at the EWTP to provide for nitrification; (6) a final assessment of the improvements in water quality as a result of the construction of storm sewers; and (7) any additional work if required, based upon the results of the final assessment of phase 6. (Ex. F at 48-55.) The Agency approved this plan in July 1986, and Joliet has begun work on many of the phases. (See Tr. II at 46-52.)

Compliance Alternatives

There are five identified alternatives available to Joliet for reducing BOD and SS discharges from the EWTP. The first three alternatives involve additions to the plant in the form of advanced wastewater technologies, and include multi-media filtration, carbon absorption/multi-media filtration and chemical coagulation. The fourth and fifth alternatives, although failing to reduce effluent levels, relieve Joliet from meeting water quality standards for Hickory Creek by routing the plant's outfall to the Des Plaines River which has higher standards of 20 and 25 mg/l for BOD and SS, respectively. One alternative for rerouting the outfall is for it to run south under the creek, then west in order that it discharges downstream from Hickory Creek. The other alternative would involve routing it directly west so that it discharges in the Des Plaines, upstream from Hickory Creek. The EcIS examined these five alternatives, and made the following estimates of costs for each alternative:

Multi-Media Filtration (Alt. 1)	$ 9,258,719
Carbon Absorption (Alt. 2)	$19,377,263
Chemical Coagulation (Alt. 3)	$17,834,638
Relocate Outfall (under Hickory Creek) (Alt. 4)	$ 855,890
Relocate Outfall (directly west) (Alt. 5)	$ 491,958

(Ex. D at 29-45; Ec. D, Table 4.)

Joliet has rejected the advanced treatment technologies (Alt. 1-3) as too expensive. (Petition at 10; Tr. I at 23.) If its petition for a site specific rule is not granted, Joliet will construct Alternative 4 and thus extend the outfall pipe under Hickory Creek and then west to the river. (Tr. I at 21-23; Ex. F at 53.) Joliet does not believe that Alternative 5, which calls for routing the outfall directly southwest of the EWTP to the Des Plaines just below the dam, can be constructed as estimated in the EcIS. Mr. Duffield stated that the discharge at that point would be immediately adjacent to the storm sewer outfall which is located in the toe of the riverwall. (Tr. II at 54.) Another disadvantage with Alternative 5 is that some or all of the effluent would end up in Hickory Creek as Des Plaines River backwater, since the outfall would be upstream from the mouth of the creek. (Ex. D at 44.) A sixth alternative is to run the outfall directly west of the plant to the Des Plaines, above Brandon Dam. However, both Joliet and the EcIS rejected this option. Since the existing river wall is 20 feet higher than the treatment plant property, a pump would be required, adding significantly to the cost of the project. (Tr. I at 26-27; Ex. D at 44.)

Economic Impact

Joliet does not contend that compliance with the BOD and SS limitations is not technically feasible, but argues that the cost of compliance is economically unreasonable when compared to the small benefit to the environment. Joliet points out that it is undertaking a significant effort to upgrade its treatment facilities and that its municipal compliance plan will result in a better class of treatment than is now provided. The upgrading of the EWTP will result in a longer detention and aeration time so that ammonia nitrogen will be removed. Mr. Duffield testified that the proposal would at least retain the same level of BOD in the effluent, if not reduce that level. (Tr. II at 63-64.) Therefore, Joliet asks that instead of directing funds to the construction of a new outfall the City be allowed to use those funds towards the upgrading of their wastewater system, with a greater positive impact on the environment. (Tr. II at 70.)

In addition to evaluating compliance alternatives and estimating their costs, the EcIS calculated the costs to Joliet's utility customers of implementing each alternative. Assuming an average monthly bill of $10.10, utility bills would increase as follows:

	Monthly Increase	% Increase
Multi-Media Filtration (Alt. 1)	$3.38	34%
Carbon Absorption (Alt. 2)	$5.93	59%
Chemical Coagulation (Alt. 3)	$5.20	52%
Relocate Outfall (under Hickory Creek) (Alt. 4)	$ .21	2%
Relocate Outfall (directly west) (Alt. 5)	$ .10	1%

(Ex. D at 4.) The EcIS also assessed the benefits of reduced levels of BOD and SS in regard to six direct benefit categories: (1) recreational opportunities; (2) aquatic life; (3) stream maintenance; (4) flood control; (5) agriculture; and (6) human health. The EcIS concluded that only recreational opportunities and stream maintenance could be quantified: the other four categories are significantly impacted by reduced pollutant levels. (Ex. D. 58-66.) The benefit to recreational opportunities was calculated at $460 (Ex. D at 59-60), and the benefit to stream maintenance was valued at $2332 (Ex. D at 64-66). The EcIS thus found a large disparity between the costs of each alternative and the associated benefits.

	Costs	Benefits
Alternative 1	$ 9,258,719	$2792
Alternative 2	$19,377,263	$2792
Alternative 3	$17,834,638	$2792
Alternative 4	$ 855,890	$2792
Alternative 5	$ 491,958	$2792

(Ex. D at 5; 73-78.) The cost of Alternative 5, the least costly option, is 176 times as great as the value of direct benefits.

Joliet believes that the EcIS supports its contention that the EWTP outfall should remain in its current location and that the additional expense to relocate the outfall does not provide benefits even approaching the cost. (Tr. II at 55.) However, Joliet disputes the cost estimates made by the EcIS for Alternatives 4 and 5. (Tr. II at 52-53.) The EcIS estimated the cost of Alternative 4 at $855,890, while Clark Dietz estimated the cost of relocating the outfall under Hickory Creek at

$3,425,000. (Ex. F at 62.) Mr. Duffield testified that he feels that Clark Dietz's estimate is very conservative, but stated that the actual cost would approach $2,000,000. (Tr. II at 53.) The difference in estimates is partly attributable to the fact that the Clark Dietz estimate done for Joliet provides for a longer run of pipe out into the river rather than ending the pipe at the river bank as the EcIS assumed. (Tr. II at 53.) Mr. Duffield stated that he thought that Clark Dietz had proposed to extend the outfall out into the river so as to get good mixing of the effluent with the flow of the Des Plaines. (Tr. II at 62.) The difference in estimates for Alternative 4 is also partly due to Joliet's belief that construction of the outfall will be very difficult, since the pipe will run under the channelized portion of Hickory Creek and then out into the river. This will involve rock excavation in the river, since the pipe will be buried. (Tr. II at 53, 60, 62.) As previously noted, Joliet does not believe that Alternative 5 can be constructed as proposed. (Tr. II at 54, 60-61.)

At the economic impact hearing Mr. Pershall presented some cost estimates to bring the outfall into the Des Plaines. He estimated that to bring the outfall structure 300 feet into the river (1/3 its width) would cost $1,030,000. Bringing the structure 450 feet into the river (1/2 its width) would cost $1,112,500. (Tr. II at 19.) Mr. Pershall testified that there is no federal or state requirement that the outfall be actually in the river, and that most wastewater treatment plants only bring the outfall to the edge of the river. (Tr. II at 20.)

Environmental Impact

The record in this case contains no information on the water quality in the stretch of Hickory Creek downstream from the EWTP outfall, and very little information on the water quality of the Des Plaines near its confluence with Hickory Creek. Joliet states that due to the substantial backmixing of the Des Plaines in the lower stretch of the creek, the water quality in the creek at this point would be expected to closely resemble that of the Des Plaines. Joliet has provided 1976 data from a monitoring station in the Des Plaines downstream of Hickory Creek which shows a mean value of 9.0 mg/l of dissolved oxygen (DO) and 3.03 mg/l of ammonia nitrogen. (That monitoring station was closed by the Agency in 1976 due to budgetary constraints.) At the merit hearing the Agency asked if the effluent from the EWTP causes any water quality standard violations of DO or ammonia nitrogen in Hickory Creek. Joliet stated that it had no information on that, and promised to do sampling and investigate the issue further. (Tr. I at 46-47.) However, no such information has been received. In sum, Joliet's position is that since the downstream portion of Hickory Creek is so closely integrated with the Des Plaines River, little benefit can be achieved by extending the outfall from the plant into the river. (Petition at 9.)

The EcIS used water pollution models in an attempt to predict the impact of BOD and SS on the water quality in Hickory Creek. The EcIS concluded that the environmental degradation associated with current levels of effluent is minimal. The BOD model, using various concentrations of effluent BOD, showed that in all average conditions the DO in Hickory Creek remained above 5 mg/l, which is considered sufficient to support a healthy aquatic environment. (Ex. D at 49-53.) Suspended solids discharged from the EWTP will not routinely settle in the creek because of their minute particle size. Turbidity is not expected to cause problems because current concentrations are well below harmful levels. (Ex. D at 53-55.)

In its post-hearing comments, the Agency again expressed its concern that the levels of DO and ammonia nitrogen might be adversely affected by Joliet's proposal, and pointed out that Joliet had promised to investigate the matter. The Agency stated that it continues to support Joliet's request for effluent relief, but intends to require water quality monitoring as a specific NPDES permit condition. (Public Comment (P.C.) #6 at 1-2.) The Agency points out that Hickory Creek is channelized for flood control purposes and is therefore unlikely to support a diverse aquatic community regardless of water quality. The Agency insists that this fact does not justify degradation of water quality, but states that it does not anticipate that Joliet's investigation of water quality impacts will reveal any water quality problems. (P.C. #6 at 3.)

The Agency does contend that the BOD model contained in the EcIS should be discounted by the Board. First, the Agency states that Mr. Pershall indicated that he did not really model BOD and its effects on the creek's DO, but rather did a simple mass balance calculation of the DO after the effluent mixes with the creek. (Tr. II at 34-35.) Second, the Agency maintains that the EcIS's assumption that the DO in the effluent varies directly with the BOD concentration is simplistic and typically inaccurate. Third, the Agency notes that the BOD model assumed that there is no entrapment of the creek flow at its mouth, while Joliet has documented the likelihood of such occurrences. Finally, the Agency submits that the model addressed only average stream conditions, giving the model limited utility in a low flow situation where adverse impacts are more likely to occur. (P.C. #6 at 3.)

The Board notes that the Des Plaines River is part of the Illinois & Michigan (I&M) National Heritage Corridor. The Hearing Officer specifically solicited comments on whether that status should have any bearing on the proposed regulation. Responses to this request were received from the Agency (P.C. #6), the I&M National Heritage Corridor Commission (P.C. #2), the Illinois Department of Conservation (P.C. #3), the United States Environmental Protection Agency (USEPA) (P.C. #4), and Joliet

(P.C. #5). These comments agree that the Des Plaines' status as part of the Corridor should have little impact on the Board's consideration of Joliet's proposal. The Agency and Joliet state that they believe approval of the rule would not adversely affect the character of the river. Additionally, both the Corridor Commission and the Department of Conservation point out that the federal legislation which created the Corridor specifically states that such status is not to change existing environmental standards. (Public Law 98-398, Sec. 115(a).)

The comments submitted by the Department of Conservation and USEPA also addressed the merits of the proposal. The Department of Conservation opposes Joliet's request, based upon its concern that a greater BOD load in the lower stretches of Hickory Creek would adversely impact the area's fish. The Department states that a 1983 fisheries sample below Brandon Dam included 12 species of fish, a substantial improvement over the 4 species collected in 1974. The Department feels that granting Joliet's petition would be in direct opposition to the Department's efforts to improve the DO situation and the fisheries. (P.C. #3.)

On the other hand, by a letter from Valdas Adamkus, Regional Administrator, USEPA states that overall, Joliet's proposal appears appropriate. USEPA feels that the petition is not contradictory to federal or state antidegradation provisions, and appears consistent with federal antibacksliding provisions. USEPA concurs with Joliet's contention the expenditures to relocate the outfall to the river do not appear justified at this time. However, USEPA does note the concerns with assuring protection of water quality in Hickory Creek in the future. USEPA believes that as a condition of approval, adequate monitoring be required downstream from the EWTP to characterize both average and potential low flow conditions in the creek. USEPA concludes that granting temporary relief should recognize the potential need for additional treatment in the future, if necessary to protect water quality or potential uses. (P.C. #4.)

Conclusions

After considering the record in this case, the Board concludes that Joliet has demonstrated that relief is warranted. Therefore, the Board will propose for First Notice a regulation exempting Joliet's EWTP from the BOD and SS limitations applicable to Hickory Creek. Instead, the BOD and SS limitations applicable to the Des Plaines River will apply to the EWTP. The Board believes that the cost of relocating the outfall to the Des Plaines is not justified by any predicted environmental benefits at this time. The Board also notes that Joliet is spending significant sums to upgrade its wastewater collection and treatment system by carrying out the municipal compliance plan, with resulting environmental benefits. Further,

the Board notes that Joliet's chosen compliance alternative (relocating the outfall) would not reduce the levels of BOD and SS discharged from the EWTP, but simply discharge the effluent directly to the Des Plaines. Thus, the denial of Joliet's petition would, at best, improve the water quality of only the 450 feet of Hickory Creek between the present location of the outfall and the creek's confluence with the Des Plaines.

However, the Board shares the concerns voiced by the Agency, the Department of Conservation, and USEPA about the effect of the proposal on water quality standards, especially levels of DO and ammonia nitrogen. The little information in the record on water quality is either outdated or speculative. Therefore, the regulation proposed today will be temporary, and will expire on January 1, 1994. This period will allow Joliet to conduct water quality monitoring for approximately three years, and still have time to petition the Board for permanent relief if the monitoring results are positive.* Joliet should work with the Agency to develop a monitoring program. That program shall include information on, among other things, average and low flow conditions in Hickory Creek downstream from the EWTP, especially levels of DO and ammonia nitrogen. The program shall also address the effects of the EWTP discharge on the area fish and their ability to move between the Des Plaines and the upstream portion of Hickory Creek. By promulgating a temporary regulation the Board is able to grant relief to Joliet while addressing the water quality concerns raised in this proceeding.

ORDER

The Board hereby directs the Clerk of the Board to cause publication in the Illinois Register of the First Notice of the following amendment.

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

PART 304
EFFLUENT STANDARDS

SUBPART C: TEMPORARY EFFLUENT STANDARDS

Section 304.302 City of Joliet East Side
Wastewater Treatment Plant

*This schedule assumes that the proposed regulation will be finally adopted and effective before January 1, 1989. Of course, Joliet need not wait until then to begin a monitoring program.

This Section applies only to the City of Joliet's East Side Wastewater Treatment Plant which discharges into Hickory Creek in Will County, Illinois. The discharges of that plant shall not be subject to the standards of Section 304.120(c), provided that those discharges meet the five day biochemical oxygen demand (BOD) and suspended solids limitations of Section 304.120(b). This Section will expire on January 1, 1994.

(Source: Added at 12 Ill. Reg. _____, effective _____)

IT IS SO ORDERED.

I, Dorothy M. Gunn, Clerk of the Illinois Pollution Control Board, hereby certify that the above Proposed Opinion and Order was adopted on the 30th day of June, 1988, by a vote of 7-0.

Dorothy M. Gunn

Dorothy M. Gunn, Clerk
Illinois Pollution Control Board