ILLINOIS POLLUTION CONTROL BOARD
August 9, 1990

IN THE MATTER OF:	)	
	)	
PETITION OF THE CITY OF	)	AS 90-1
JACKSONVILLE FOR ADJUSTED	)	(Adjusted Standard)
STANDARD FROM 35 ILL. ADM.	)	
CODE SECTION 306.305(b)	)	

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

This matter comes before the Board upon the filing of a petition for an adjusted standard by the City of Jacksonville ("Jacksonville"). Jacksonville seeks relief from the disinfection requirement for post-first flush flows that is contained in 35 Ill. Adm. Code 306.305(b).

PROCEDURAL HISTORY

On January 31, 1990, Jacksonville filed its petition for an adjusted standard and a motion requesting leave to file a limited number of copies of the appendices to its petition. On February 22, 1990, the Board issued an order accepting Jacksonville's adjusted standard petition and directing it to comply with the with the publication requirement contained in 35 Ill. Adm. Code 106.711. The Board also directed the Illinois Environmental Protection Agency ("Agency") to file a response to the petition in accordance with 35 Ill. Adm. Code 106.714. On March 8, 1990, the Board issued a second order granting Jacksonville's motion requesting leave to file a limited number of copies of the appendices to its petition. On March 31, 1990, the Agency filed its response, supporting the adjusted standard. No hearing was held.

BACKGROUND

The City of Jacksonville is located in the central part of Morgan County, Illinois, approximately 35 miles west of Springfield. The City owns and operates a wastewater treatment plant ("WWTP") that employs approximately 10 full-time employees and serves approximately 20,084 residents. The plant processes a maximum of 15 million gallons per day and discharges into the Mauvaise Terre Creek ("Creek"), a tributary of the Illinois River. The WWTP consists of an activated sludge process, including an influent pump station, grit removal facilities, a primary clarifier, contact stabilization biological treatment facilities, final clarifiers, chlorination facilities, aerobic and anaerobic sludge digestion facilities, and grit and sludge storage tanks. At present, Jacksonville's WWTP does not have the capacity to handle the combined sewer overflows ("CSOs") that occur during heavy precipitation. This results in much of CSOs being discharged to the Creek untreated.

In late 1983, Jacksonville and the Village of South Jacksonville ("South Jacksonville") submitted a Facilities Planning Area Study to the Agency.* The study proposed treatment facilities that would comply with the Board's CSO regulations. After the plan was approved, Jacksonville conducted additional flow monitoring and sampling. It then submitted a Basis of Design for WWTP and CSO improvements to the Agency in July of 1987. On November 2, 1988, the Agency approved the final Basis of Design for the improvements. Jacksonville then submitted the final design to the Agency on January 12, 1989. The Agency approved the design on May 10, 1989. Jacksonville has continued to investigate CSO treatment alternatives, however, because the subsequent construction and annual operating cost estimates for the proposed project were much higher than the original estimates and because Jacksonville lacked the financial resources to construct the project as originally planned. Discussions between Jacksonville and the Agency are ongoing regarding the appropriate scope of Jacksonville's CSO treatment facility improvements.

Concurrent with the above actions, Jacksonville, South Jacksonville, and the Agency were negotiating a consent decree to establish enforceable effluent limitations and compliance schedules for the WWTP and CSO facility improvements. Pursuant to the consent decree, Jacksonville agreed to improve its WWTP, and South Jacksonville agreed to cease using its WWTP and to connect its sewer collection system to Jacksonville's WWTP. Section VII.C of the consent decree requires Jacksonville to design and construct the CSO project according to a compliance schedule set forth therein. People of the State of Illinois v. City of Jacksonville and Village of South Jacksonville, No. 89-CH-2 (Ill. Cir. Ct. 7th Car., February 22, 1989). The consent decree also requires Jacksonville to reevaluate the proposed CSO project to reduce costs without compromising environmental protection by either complying with the Board's CSO regulations or by petitioning the Board for relief from the regulations. It was agreed that any such evaluation would not hinder the progress of the CSO project.

Jacksonville has already constructed several improvements to its wastewater collection system to reduce CSO. Originally, the collection system contained six CSOs; however, four CSOs have been closed and only two remain.** One active CSO is located at an abandoned WWTP adjacent to the existing Jacksonville WWTP, and

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* South Jacksonville is located directly south of Jacksonville and has a population of approximately 3,346 residents. It owns and operates a WWTP consisting of two parallel stabilization lagoons.

** An additional CSO exists between the South Jacksonville and Jacksonville wastewater collection systems. This CSO will be eliminated as part of South Jacksonville's compliance project pursuant to the consent decree.

the other active CSO is located at an abandoned WWTP on the Southeast side of Jacksonville. Untreated wastewater is discharged from these two CSOs to the Creek when the Jacksonville WWTP reaches hydraulic capacity.

Jacksonville is currently constructing the WWTP improvements pursuant to the consent decree with the Agency, at a projected cost of ten million dollars. Jacksonville's WWTP improvements consist of the following: modification of the screen channel and influent pump station, improvement of the aerated grit basin, construction of a grit and solids handling system, an upgrade of the primary clarifier system, expansion of the aeration capacity, conversion of the activated sludge process from contact stabilization to the complete mix process, installation of new secondary clarifiers, provision of postaeration when necessary, replacement of the primary sludge pumps, construction of a new secondary sludge pump station, construction of a new anaerobic digester and control building, and construction of buildings for laboratory, maintenance, and chlorination control equipment.

As previously stated, Jacksonville is in the design stage of its CSO project. The proposed CSO treatment facility will collect the combined flow at the two existing overflow points and pump it to overflow treatment facilities adjacent to the Jacksonville WWTP. The CSO project, as currently designed, will consist of pumping stations, force mains, first flush storage tanks, primary clarifiers, and chlorine contact basins. In implementing the proposed CSO improvements, Jacksonville will be providing full treatment and disinfection for all dry weather flows and the first flush of a twelve-month recurrence storm, as well as primary treatment for a volume of CSO equal to ten times the average dry weather flow, as required by Board regulations. The only difference between the proposed CSO project and the Board regulations is that Jacksonville is proposing not to chlorinate CSO beyond the first flush.

This petition represents Jacksonville's decision, pursuant to the consent decree, to seek an adjustment to the CSO regulations to eliminate the disinfection requirements for post-first flush flows.

REGULATORY FRAMEWORK

The Board's CSO regulations are contained in 35 Ill. Adm. Code 306. They were amended in R81-17, 51 PCB 383, March 24, 1983. Section 306.305 provides as follows:

Section 306.305 Treatment of Overflows and Bypasses

> All combined sewer overflows and treatment plant bypasses shall be given sufficient treatment to prevent pollution, or the violation of applicable water standards unless an exception has been granted by the Board pursuant to Subpart D.

Sufficient treatment shall consist of the following:

a) All dry weather flows, and the first flush of storm flows as determined by the Agency, shall meet the applicable effluent standards; and

b) Additional flows, as determined by the Agency but not less than ten times average dry weather flow for the design year, shall receive a minimum of primary treatment and disinfection with adequate retention time; and

c) Flows in excess of those described in subsection (b) shall be treated, in whole or in part, to the extent necessary to prevent accumulations of sludge deposits, floating debris and solids in accordance with 35 Ill. Adm. Code 302.203, and to prevent depression of oxygen levels; or

d) Compliance with a treatment program authorized by the Board in an exception granted pursuant to Subpart D.

As can be seen in subsection(d) above, Subpart D of 35 Ill. Adm. Code 306 allows a discharger to file a petition for exception from the treatment requirements contained in 35 Ill. Adm. Code 306.305. Because 35 Ill. Adm. Code 306.373 states that the Board shall not accept a petition for exception after January 1, 1986, however, Jacksonville has decided to use the Board's adjusted standard procedure pursuant to 28.1 of the Act to obtain an "exception" from the Board's CSO treatment requirements.

Section 28.1 of the Act authorizes the Board to grant adjusted standards if a petitioner can justify such an adjustment. Section 28.1(b) applies if the level of justification needed for an adjusted standard can be found in the rule from which the adjustment is sought (i.e. the rule of general applicability). If the rule of general applicability does not contain a specific level of justification, however, Section 28.1(c) of the Act sets forth the burden of proof that a petitioner must meet in order to obtain an adjusted standard.

While not necessarily quantified, the substantive provisions in the Subpart D exception procedures do express, cumulatively, the levels of justification required to support an exception to the rules of general applicability. While the deadline has passed for the filing of petitions pursuant to the procedural mechanisms in Subpart D, the justification requirements contained in the rule remain in effect. The adjusted standard provisions of Section 28.1 of the Act were enacted after the Board had created the CSO exception procedure and, in fact, reflect many aspects of the CSO exception procedure. Section 28.1 authorizes petitions for what are now called adjusted standards, including CSO "exceptions", and the Board has adopted the required procedures that now may be used in lieu of the discontinued CSO

exception procedures. Thus, because the level of justification here is contained in the rule of general applicability, Section 28.1(b) applies, and Jacksonville quite properly utilized the substantive requirements in Subpart D to justify its proposed adjusted standard.

PROPOSED ADJUSTED STANDARD

As previously stated, Jacksonville requests that the Board grant it an adjustment from the disinfection requirement imposed by Section 306.305(b). This adjustment would allow Jacksonville not to chlorinate the post-first flush CSO produced by a twelve-month recurrence storm. In other words, Jacksonville is asking for relief after it fully treats and disinfects all dry weather and first flush flows of a one-year recurrence storm and after it provides primary treatment to additional flows of ten times the average dry weather flow.

Jacksonville proposes the following adjusted standard in its petition:

> The City of Jacksonville is granted an adjustment to the disinfection requirement of 35 Ill. Ad. Code 306.305(b). This adjustment is conditioned upon the construction of CSO facilities sufficient to provide (1) full treatment and disinfection of all dry weather flows and the first flush of a twelve-month recurrence storm (except for November 1 through April 30 during which the City's seasonal disinfection exemption applies), and (2) primary treatment, but no disinfection, of additional flows of ten times the average dry weather flow.

TECHNICAL FEASIBILITY AND ECONOMIC REASONABLENESS

Jacksonville states that its proposed adjusted standard is primarily justified by the fact that it is technologically infeasible to chlorinate post-first flush CSOs. Jacksonville claims that there are four reasons why the installation of post-first flush chlorination facilities to disinfect the treated CSO effluent is technologically infeasible. First, Jacksonville states that it is difficult to achieve and maintain the required fecal coliform reduction rates and residual chlorine levels on a consistent basis because the CSO facility effluent fluctuates significantly in terms of flow, suspended solids, and fecal coliform concentration. Second, because CSOs occur intermittently and vary in rate, volume, and duration, Jacksonville argues that it is difficult to accurately adjust the chlorine flow rate to reduce fecal coliform levels without discharging effluent with excessive residual chlorine concentration. Third, Jacksonville states that the variations in total suspended solids, organic and inorganic compounds, and

fecal coliform concentrations affect the chlorine demand of the wastewater and that the problem is exacerbated by the fact that there is a fifteen minute time delay before the effect of a chlorine flow adjustment is seen. Finally, Jacksonville argues that, even if appropriate chlorine levels can be maintained, chlorination cannot disinfect many of the fecal coliforms entering the chlorine contact basin because the primary clarification process is not designed to allow all the solids to settle out of the CSO effluent. As a result, the chlorine cannot penetrate beyond the surface of the remaining suspended solids to neutralize the coliform contained therein. The protected fecal coliforms are then released when the materials disintegrate downstream.

Jacksonville also claims that the proposed adjusted standard is economically reasonable. Jacksonville retained Casler, Houser & Hutchison, Inc., Consulting Engineers ("CHH") to consider design alternatives for CSO improvements. Jacksonville states that total cost for full compliance with the Board's regulations will be $8,525,000. The annualized capital cost and annualized operations and maintenance costs will be $1,001,722 and $98,000, respectively. The elimination of disinfection at the CSO facilities, however, would save Jacksonville $627,000 in capital costs and $12,000 in annual operating and maintenance costs, for a cost savings of approximately eight percent of the equivalent annual project cost.

ENVIRONMENTAL IMPACT

In addition to arguing that compliance with the regulations is technically infeasible, costly, and, at best, only marginally beneficial, Jacksonville also maintains that there will be no adverse environmental impact resulting from the discharge. In reviewing the environmental impact of eliminating disinfection, CHH analyzed the fecal coliform levels downstream of the discharge point and concluded that the levels exceed the 200 per 100 milliliter ("ml") fecal coliform water quality standard of 35 Ill. Adm. Code 302.209. Evidently, the stream gauging station downstream from Jacksonville, at Merritt, Illinois has recorded fecal coliform levels that ranged from 90 per 100 ml to 140,000 per 100 ml*. The data represents the combined impact of Jacksonville's CSOs and the direct runoff from non-point sources because the above readings were taken when no other CSO facilities were in service. When CHH modeled this data, it found that, at the time of the highest fecal coliform levels, Jacksonville's CSOs contributed approximately 97,000 per 100 ml and the direct runoff contributed approximately 43,000 per 100 ml. CHH also discovered that Jacksonville's fecal coliform contribution will drop over 73,000 per 100 ml if the proposed CSO

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* Jacksonville, in its Adjusted Standard Petition, incorrectly cites the fecal coliform levels as ranging from 90 to 140,000 mg/l.

project is completed without disinfection beyond the first flush. Based on the above information, Jacksonville argues that although the proposed CSO project's dry weather and first flush flows, as well as the primary treatment of additional flows, will significantly reduce fecal coliform levels, the chlorination of the post-first flush flows will not create any significant additional reductions in light of the technical difficulties with chlorination beyond the first flush.

Jacksonville also states that chlorination may have a negative impact on the Creek because of the difficulty to achieve the required fecal coliform reduction rates and residual chlorine levels on a consistent basis. Evidently, the inability to accurately adjust the chlorine rate results in either too little chlorine, making disinfection even more ineffective, or excess chlorine, which may harm the Creek by having a negative effect on certain aquatic wildlife. Jacksonville argues that elimination of the chlorination requirement, on the other hand, should increase the health and diversity of some fish populations in the Creek.

As for the human health risks, Jacksonville surveyed forty local residents in 1988 to determine how the Creek is used. The results indicate that there is little or no primary contact use of the Creek. Specifically, the survey indicates that no one uses the Creek as a source of personal drinking or non-potable wash water, and only a limited number of people use the Creek for crop irrigation, livestock watering, or for recreational purposes such as fishing or swimming. In support of its contention that there is little primary contact use of the Creek, Jacksonville also completed a Site Access Point Survey which indicates that the majority of the access points adjacent to the Creek provide little access to the general public. Based on the above, Jacksonville concludes that chlorination would not significantly reduce the health risks of primary contact activities in the Creek because even existing CSOs do not appear to have a significant impact on stream use given the minimal primary contact uses especially during and after CSOs.

Finally, Jacksonville argues that although no CSO improvement can make the Creek safe for primary contact use, the proposed CSO project, even without chlorination, will significantly improve the Creek's water quality. In support of this contention, Jacksonville points to the CSO Report that indicates that the proposed CSO project will significantly decrease the frequency and total volume of CSOs. The project will reduce the average number of annual overflow events from 21 to 4.9, and the total yearly overflow from 46.2 million gallons to 764,000 gallons. The project will also allow natural processes to eliminate unnatural bottom deposits, minimize or eliminate odors, and curtail the discharge of floating material through the two CSOs.

CONSISTENCY WITH FEDERAL LAW

35 Ill. Adm. Code 306.305 implements Section 13 of the Illinois Environmental Protection Act ("Act"), Ill. Rev. Stat. 1989, ch. 111½, par. 1013, and the Board's water quality standards that were developed pursuant to the federal Clean Water Act, 33 U.S.C. 1251 et seq. No corresponding federal regulation exists. Moreover, federal regulations exempt discharges from CSO systems from federal treatment requirements. As a result, CSO treatment facilities are regulated by the states rather than the federal authorities. Therefore, this proposal does not conflict with federal law.

AGENCY RECOMMENDATION

The Agency supports Jacksonville's petition for an adjusted standard based on its view that the chlorination of the excess flows up to ten times the dry weather flow is a technically infeasible and an economically unreasonable method to accomplish disinfection. Specifically, the Agency states that any benefits derived from chlorination of the excess flows beyond the first flush are substantially outweighed by the significant additional costs associated with an additional chlorination system. The Agency even goes so far as to state that it has no reason to believe chlorination of the flows beyond the first flush will produce any quantitative or qualitative benefits or have a significant impact on the fecal coliform levels in the Creek. Although the Agency disagrees with Jacksonville's assertion that there is no substantial primary contact uses in certain areas on the Creek, it notes that there is no evidence that the activities occur when there are CSOs during heavy precipitation.

The Agency suggests that Jacksonville's proposed adjusted standard language be amended, however, because it conditions the adjusted standard on full compliance with the remaining provisions of 35 Ill. Adm. Code 306.305(b). The Agency notes that such a conditional standard is meaningless because, by its own terms, the adjusted standard pertains only to the disinfection requirement for post-first flush flows and not to the other requirements of Section 306.305. Thus, the Agency proposes that the following adjusted standard language be used:

> The City of Jacksonville is granted an adjustment to the disinfection requirement of 35 Ill.Adm. Code 306.305(b). This adjustment allows the City of Jacksonville to discharge combined sewer overflows after the first flush without disinfecting such flows.

BOARD DISCUSSION

Based on the information before it, the Board finds that Jacksonville has made a sufficient showing of economic unreasonableness, technical infeasibility, and negligible

environmental impact to justify an adjusted standard. Specifically, Jacksonville has shown that the disinfection of flows beyond the first flush is technologically infeasible, costly, and will have a marginal environmental benefit, if not a negative impact, on the receiving stream. The technological difficulties arise from the fact that CSOs occur intermittently and vary in terms of rate, volume, duration, total suspended solids, inorganic and organic compounds, and fecal coliform concentration. These factors, in turn, affect the chlorine demand of the water and make it difficult to maintain the required fecal coliform reduction rates, residual chlorine levels, and an accurate chlorine flow rate. Even if appropriate chlorine levels can be maintained, chlorination cannot disinfect many of the fecal coliforms entering the chlorine contact basin because the primary clarification process is not designed to allow all the solids to settle out of the CSO effluent.

Finally, the Board notes that the accompanying order will contain the Agency's proposed adjusted standard language rather than Jacksonville's. As the Agency correctly points out, it is unnecessary for the Board to specify that its grant of relief is conditioned upon Jacksonville's full compliance with the remaining provisions of 35 Ill. Adm. Code 306.305(b) because the adjusted standard, by its own terms, pertains only to the post-first flush flow desinfection requirement in 35 Ill. Adm. Code 306.305(b).

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

ORDER

Pursuant to the authority of Section 28.1 of the Environmental Protection Act, the Board here by adopts the following adjusted standard. This standard becomes effective on the date of this order.

> The City of Jacksonville is granted an adjustment to the disinfection requirement of 35 Ill. Adm. Code 306.305(b). This adjustment allows the City of Jacksonville to discharge combined sewer overflows after the first flush without disinfecting such flows.

Section 41 of the Illinois Environmental Protection Act, Ill. Rev. Stat. 1989, ch. 111½, par. 1041, provides for appeal of final orders of the Board within 35 days. The Rules of the Supreme Court of Illinois establish filing requirements.

IT IS SO ORDERED.

Board Member J. Dumelle concurred.

I, Dorothy M. Gunn, Clerk of the Illinois Pollution Control Board, hereby certify that the above Opinion and Order was adopted on the 9th day of August, 1990, by a vote of 6-0.

Dorothy M. Gunn

Dorothy M. Gunn, Clerk
Illinois Pollution Control Board