ILLINOIS POLLUTION CONTROL BOARD
July 13, 1988

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| IN THE MATTER OF: | ) | |
| | ) | |
| JOINT PETITION OF THE AURORA SANITARY | ) | |
| DISTRICT, THE CITY OF AURORA, AND THE | ) | |
| ILLINOIS ENVIRONMENTAL PROTECTION | ) | PCB 85-224 |
| AGENCY FOR EXCEPTION TO THE COMBINED | ) | |
| SEWER OVERFLOW (CSO) REGULATIONS | ) | |

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

This matter comes before the Board on a December 31, 1985 joint petition filed by the Aurora Sanitary District ("ASD") and the City of Aurora ("City") (hereinafter collectively referred to as "Aurora") and the Illinois Environmental Protection Agency ("Agency") for exception to 35 Ill. Adm. Code 306.305 (a) and (b) to relieve Aurora from the requirement to construct and operate certain combined sewer overflow ("CSO") transport and treatment facilities.

Hearing was held at the Aurora City Hall on March 6, 1986. On June 6, 1986 Petitioners filed a Proposed Order ("Proposed Order"). On June 20, 1986 the petition was remanded to the Petitioners by Board Order. On March 27, 1987 Petitioners filed an Amended Joint Petition ("Amended Pet."). On July 1, 1988 Petitioners filed a Second Amended Joint Petition ("2nd Amended Pet."). No additional hearing has been held.

For the reasons described below, the Board finds that Petitioners have made the showings requisite for granting the relief requested. The relief will accordingly be granted, subject to conditions as stipulated to by Petitioners and consistent with the Board's rules and regulations.

## CSO REGULATIONS

The Board's CSO regulations are contained in 35 Ill. Adm. Code Subtitle C, Chapter I, Part 306. They were amended in R81-17, 51 PCB 383, March 24, 1983. Sections pertinent to the instant matter are Sections 306.305 and 306.361(a). Section 306.305 provides as follows:

> 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.

Subpart D allows the discharger to file a petition for an exception either singly, or jointly with the Agency as Aurora has done. A joint petition may seek an exception based on minimal discharge impact as provided in Section 306.361(a):

> An exception justification based upon minimal 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 overflow events, inspections of unnatural bottom deposits, odors, unnatural floating material or color, stream morphology and results of limited stream chemical analyses.

Pursuant to 306.361(a) Aurora and the Agency assert that overflows from its combined storm and sanitary sewer system have minimal impact on the water quality of, and do not restrict the use of, the Fox River and Indian Creek (the receiving streams).

## SUPPORT DOCUMENTS

Petitioners have presented several documents in support of their petition. Included among these is a two-volume combined sewer overflow study undertaken by Walter E. Deuchler Associates, Inc. This document was attached to the Petition and Amended Petition as Attachment A; it was also admitted as hearing exhibit

1. Among other matters, the study contains analysis of impact of the existing CSOs on the Fox River and the reduction of flow and pollutant loads that can be expected from implementation of several CSO options.

In response to concerns as expressed by the Board in its June 20, 1986 Order, Petitioners commissioned and submitted a study: "An Assessment of Indian Creek Bottom Sediments in the Vicinity of Combined Sewer Overflow 25 in Aurora, Illinois", Illinois State Water Survey Contract Report 412, January 1987. This report is Appendix G to the Amended Petition of March 27, 1987.

On January 28, 1988 Aurora completed a study, as an amendment to its Municipal Compliance Plan, which provides an update on relief sewer projects undertaken as part of the overall CSO program. This report was submitted to the Board along with the 2nd Amended Pet as Exhibit I.

## BACKGROUND

The ASD provides wastewater treatment for Aurora, North Aurora, Montgomery, Boulder Hill, and part of Oswego. Its facility plan area encompasses portions of DuPage, Kane, Kendall, and Will Counties. The population currently served by the ASD is approximately 120,000, with a projected population for the year 2003 of 193,000 (R. at 12).

The ASD's only treatment plant is located west of the Fox River and south of Montgomery, Illinois. The plant provides preliminary treatment, primary clarification, biological oxidation and nitrification, tertiary sand filtration, and chlorine disinfection. It has a design average flow capacity of 32 mgd, with a design maximum flow capacity of 68 mgd (R. at 12). Discharge is to the Fox River.

The City of Aurora has both combined and separate sanitary sewer systems, while the remainder of the service area has separate sanitary and storm sewers. The City's combined sewers serve approximately 4,360 acres (6.9 sq. mi.) of the approximately 50 square miles served by the ASD (R. at 52, 89). No new combined sewers have been constructed since 1937 pursuant to a city ordinance (R. at 52).

The system has fourteen CSO overflow points (Amended Pet. at 3). Thirteen are located within the City and one is located at the ASD plant. All of the discharges are directly to the Fox River, with the exception of one City point which discharges to Indian Creek. The overflows occur primarily at diversion structures which serve to limit wet weather flow to the treatment plant. Four of the City overflow points are considered major by

the Petitioners because they collectively receive flow from more than two thirds of the land areas within the City served by combined sewers. These four points, plus the ADS treatment plant overflow, account for 79% of the total overflow volume. The remaining nine City overflow points are considered minor by the Petitioners in that they collectively receive flow from less than 1/3 of the acreage served by the combined sewers and account for only 21% of overflows (Id. at 3-4). The major City overflow points are numbered 1, 4, 8, and 25; 1, 4, and 8 are located at the Fox River at Rathbone Avenue, Hazel Avenue, and Benton Street, respectively; CSO 25 is tributary to Indian Creek.

## CONTROL AND IMPACT-REDUCTION OPTIONS

Aurora has investigated options by which it might moot the need for the relief requested, or, in the alternative, minimize the impact of its CSOs. Six options were considered, including: (1) complete elimination of all combined sewers, (2) construction of facilities necessary to achieve compliance under Section 306.305, and (3) four options - identified in the record as Alternatives A, B, C, and D - which provide for progressively greater reduction in the impact of existing CSOs.

Elimination of all existing combined sewers is estimated to cost at least $160 million[1] (Amended Pet. at 14).

Full compliance with Section 306.305 could be achieved by providing the necessary treatment to combined sewer discharges. The required facilities would include large storage basins at four locations and several relief sewers to assure hydraulic capacity for all first flush flow. Additionally, three treatment facilities with a combined capacity of 51 mgd would be required at the ASD plant to provide treatment for flows up to 10 x average dry weather flow. The total cost of these facilities is approximately $99 million (Amended Pet. at 14).

Petitioners contend that neither the complete CSO elimination option nor the 306.305 compliance option is cost effective (Amended Pet. at 4), and, moreover, that neither would materially improve the water quality or enhance any beneficial uses of the Fox River (R. at 15). Accordingly, Petitioners have turned to the options which would at least reduce CSO impact.

Petitioners have opted to pursue and present to the Board Alternative D, which provides the greatest impact reduction among the four alternatives. Alternative D is designed to assure:

[1] Control option cost figures cited herein are in 1986 dollars.

1) Complete treatment of peak dry weather flow;

2) Complete treatment of up to 2.5 x average dry weather flow;

3) Complete treatment of 57% of first flush; and

4) Complete or primary treatment of 65% of flows in excess of 2.5 x average dry weather flow.

Amended Pet. at 5

Alternative D would conservatively[2] also cause a 58.9% reduction in CSO flows and a reduction in pollutant loads ranging from 50.1% for suspended solids to 77.5% for phosphate (Id. at 6).

At $22.25 million, Alternative D is the most costly of the four impact-reduction options (Amended Pet. at 13-18). Among the activities to be undertaken are sewer separations, addition and replacement of sewer pipes, modification of siphon and weir structures, re-routing of combined sewer flows, implementation of inflow/infiltration reduction strategies, and elimination of one CSO. Aurora has stipulated to carrying out these improvements, and Petitioners request (Proposed Order at 1-2) that they be listed in the Board's Order.

Aurora additionally stipulates to a schedule for completion of the improvements (Amended Pet., Appen. G, as modified in 2nd Amended Pet.), and Petitioners request that this schedule also be incorporated into the Board's Order. However, the Board notes that both the internal and final completion dates for all but two of the many individual projects within the program are now past. Presumably, therefore, all but two of the projects are now complete. For this reason the Board will condition the grant of relief only upon the agreed-upon final dates.

## DOCUMENTATION OF MINIMAL IMPACT

Section 306.361(a) requires that Petitioners seeking a CSO exception on the basis of minimal discharge impact, as is the case here, make a number of showings. Pursuant thereto, Petitioners provide the following information and observations:

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[2] Calculation of CSO impacts under Alternative D was made prior to certain additional improvements made to the Alternative D program at the Agency's suggestion. The precise impact of these additional improvements has not been determined, and is therefore not reflected in the Alternative D impact figures (Amended Pet. at 5, 7).

Receiving Stream Ratios

The average discharge of the Fox River at Aurora is approximately 1,810 cubic feet per second ("cfs"). The average CSO flow rate from all City and ASD overflow points is 3.9 cfs, or 0.20% of the average river discharge. Petitioners also contend that pollution loading of the CSOs is small relative to the load of the Fox River. In support thereof, Petitioners present the following data:

| | Total Load (tons/yr) | CSO CONTRIBUTION Prior to Alt. D (tons/yr) | Percent | After Alt. D (Percent) |
|---|---|---|---|---|
| BOD | 26,800 | 350 | 1.30 | .40 |
| Ammonia-Nitrogen | 530 | 16 | 3.02 | .79 |
| Nitrate-Nitrogen | 3,550 | 2.1 | .06 | .02 |
| Phosphate | 710 | 1.9 | .27 | .06 |

From these data Petitioners concluded that "[i]t is thus apparent that the extremely low ratios of CSO flow and pollutant loads to Fox River flow and pollutant loads assure that the City and ASD CSOs have no significant impact on Fox River water quality" (Amended Pet. at 7).

Indian Creek is an intermittent stream with a ten-year, seven-day low flow of zero (Amended Pet. at 7).

Known Stream Uses

Petitioners report that a 1981 Northeastern Illinois Planning Commission study listed the following uses for the Fox River in Kane County:

(i) fishing;
(ii) canoeing;
(iii) other types of pleasure boating;
(iv) picnicking, fishing, hiking, etc., in public parks along the shore;
(v) agricultural drainage;
(vi) "urban drainage" from commercial and residential land along the river;
(vii) receiving effluents from several wastewater treatment plants and overflow diversion structures.

Petitioners additionally point out that the Fox River in the CSO study area is abutted for the most part by commercial and residential properties (Amended Pet. at 8). They also note that "Indian Creek is basically an urban drainage channel" for its lower 3 to 4 miles, although in its upper reaches it receives runoff from farmlands (Id.).

Accessibility to Stream Side Land Use Activities

Regarding accessibility to stream-side land, Petitioners note:

> The combined sewer portion of the ASD service area consists almost exclusively of residential and commercial establishments. Agricultural land and open space account for but a small fraction of acreage abutting the river in the ASD service area. Some light manufacturing plants and warehouses abut the river in the southwest portion of the combined sewer area. (Appendix A at p. 2-5). Exhibit 4 to the CSO study details the riparian land use in the CSO area. Generally, the river is not readily accessible to the general public, with the exception of boaters who use two designated "boat access areas" in the City of Aurora.
>
> Indian Creek is, for the most part, within the Burlington Northern Railroad right of way and the activities along the stretch both immediately upstream and downstream of OVF. No. 25 can be characterized as industrial.
>
> Amended Pet. at 8-9.

Frequency and Extent of Overflow Events

The CSO study (Ex. 1) estimates that 1,187 overflow events per year, with a total yearly flow of 914 million gallons, occurred prior to implementation of Alternative D. Of these, 663 events and 568 million gallons were attributable to the major overflow points 1, 4, 8, and 25. Full implementation of Alternative D is expected to reduce yearly overflow events to 658 and total overflow volume to 375 million gallons, reductions of 44.5% and 59.0%, respectively (Amended Pet. at 9; see also footnote 2).

Inspections of Outfalls (Bottom Deposits, Odors, etc.)

Regarding inspections of unnatural bottom deposits, Petitioners note:

> In June, 1983, the Fox River was examined for sludge deposits, sewer-related odors, sediment in quiet portions of the river, and sewer-related impact on vegetation. The purpose of the inspections was to determine if CSOs significantly contributed to sludge deposits or adverse environmental impacts.

The CSO study details inspection locations, methods and results. (Appendix A at pp. 3-5 to 3-11). To summarize, approximately 30 locations in the river, including points upstream and downstream of all CSO points, were examined for sediment depth, color, texture and odor. At the same time depth of water, the size of the stream-bed area examined, and the amount and nature of floating debris, if any, were noted. The inspections revealed that, with the exception of the shoreline areas, most of the river bottom is rock or gravel with no sludge deposits. However, some sludge deposits were noted in low velocity areas -- i.e., near shorelines and downstream of islands. Sewage-related odors were detectable at a few small and localized areas near CSO outfalls. Although a relatively large area of sludge deposits was noted upstream of all CSO points, no comparable deposits were found downstream of the overflow points. The study concludes that there is no correlation between the overflow points and sludge deposits in the Fox River in the Aurora CSO areas. (Appendix A at p. 3-11).

In addition to inspecting the river, the contractor reviewed a 1978 NIPC study of sediment oxygen demand in the Fox River. The study showed varying sediment oxygen demands at five different locations in the river. However, no relation between sediment oxygen demand and CSOs could be detected. In fact, of the five sampling points, the highest sediment oxygen demand was found upstream of all of the overflow points. (Appendix A at pp. 2-5 to 2-8).

The Agency survey (Appendix D at p. 4) shows black septic sludge at the site of overflow No. 25. Further investigations reveal that the most severe incidence of bottom deposits is limited to 500 or 600 feet downstream of the overflow.

As noted above, sewage-related odors were detected in localized areas near a few CSO outfalls. (Appendix A at 3-11). Odors are moderate to severe near Overflow No. 25, but they can be detected for some distance downstream ($\pm$500 ft.) and intermittently throughout Indian Creek.

No unnatural colors were noted in the course of the river inspection. Floating debris was found in several locations, but all floating materials noted were unrelated to sewer overflows -- the specific items noted were tree branches, drums, tires, cardboard boxes and pipes. (Appendix A at pp. 3-6 to 3-10).

> Rags, tissue paper, etc. were observed in brush and log jams immediately below OVF No. 25 up to a distance of approximately 200 feet downstream.
>
> Amended Pet. at 9-11

Pursuant to concerns raised at hearing and to the Board's Order of June 20, 1986 Petitioners have caused further investigation of CSO impacts on Indian Creek. In particular, a study was undertaken by the Illinois State Water Survey and reached the following conclusions (Amended. Pet., Appendix G at 9-10):

a) Indian Creek below overflow 25 exhibits some benthic sediment degradation. However, this degradation is relatively minor and is in line with that of other streams receiving intermittent combined sewage overflows or a steady flow of well-treated effluent.

b) Benthos and phytoplankton productivity is low both upstream and downstream of the outfall.

c) The stream supports lush and extensive periphyton growth. Sediment oxygen demand is contributed by bottom-dwelling diatoms, iron bacteria respiration, and ammonia oxidation. The latter accounts for almost two-thirds of the sediment oxygen demand in the outfall area, but none of the sediment oxygen demand at a station above the outfall.

d) Gross visual and aesthetic pollution due to discharges from overflow 25 was not evident.

e) A reduction in the frequency and quantity of the CSO probably would enhance downstream conditions.

Petitioners further note that the sediment oxygen demands of Indian Creek are comparable to those of the Fox River (Amended Pet. at 19), and that the impacts of overflow 25 appear to be localized to the first 600 feet downstream of the outfall (Id.).

Stream Morphology

The condition of the Fox River through Aurora has been described in a Northeastern Illinois Planning Commission 1981 stream use inventory as "natural" with scarce aquatic vegetation and "fair to good" aesthetic appeal (Amended Pet. at 11). The streamside vegetation was noted to be "mature forest/brush" (Id.). Petitioners further note that the river is locally free

of log jams and other accumulations of vegetative debris and that the river substrate is rock or gravel; some channelization has occurred in the highly-developed areas (Id. at 11-12).

Indian Creek has a relatively steep gradient and flows in a series of riffles and pools (Amended Pet. at 12).

Stream Chemical Analyses

Aurora undertook a sampling of CSO water quality and instream water quality during two storm events in 1981 (See Ex. 1 at 3-1 to 3-4 and Appendix B; Exhibit 10; Exhibit 11). From these data Petitioners conclude that "there appears to be little if any correlation between the combined sewer overflows and Fox River water quality during and after rainfalls" (Amended Pet. at 13). No chemical analyses were conducted on Indian Creek because the Petitioners "assumed that during the time overflow is active, the creek would reflect basically degraded conditions" (Id.).

## CONCLUSION

The Board determines that Petitioners have shown pursuant to 35 Ill. Adm. Code 306.361(a) that exception to 35 Ill. Adm. Code 306.305(a), as it relates to first flush of storm flows, and to 35 Ill. Adm. Code 306.305(b) would produce minimal impact on the receiving stream. Accordingly, the Board will grant the exception. The Board further will accept the conditions as agreed to by Petitioners in their June 6, 1986 Proposed Order as modified in the Amended Petition of March 27, 1987 and Second Amended Petition of July 1, 1988.

## ORDER

Aurora Sanitary District and the City of Aurora are hereby granted an exception from combined sewer overflow regulations 35 Ill. Adm. Code 306.305 (a) as it relates to first flush storm flows, and to 35 Ill. Adm. Code 306.305 (b), subject to the following conditions:

1. The City and District shall implement the following system improvements:

    a. Provide an additional 15" diameter connecting pipe at overflow No. 1 located at Rathbone Avenue.

    b. Modify the existing west siphon chamber at Hurd's Island to facilitate maintenance, and provide a manhole at the bend in the interceptor just north of the railroad bridge.

c. Remove siphon over Western United Gas and Electric Co. discharge tunnels and replace it with a 54" diameter connecting pipe.

d. Re-route Basins 8 and 33 to the wastewater treatment plant through the Waubonsie Interceptor.

e. Implement and maintain programmed maintenance on critical areas comprised of overflows 1, 4 and all the siphons.

f. Sewer separation upstream of overflow numbers 4, 8, 22 and 25 to reduce runoff into the combined system. Additionally implement inflow-infiltration reduction strategies in basins 24, 25, 26, 28, 29, 30 and 36.

g. Eliminate overflow number 6 diverting all flows from tributary sub-basins into the Hazel Avenue Interceptor.

h. Raise weirs 6" on overflows 5, 22, and 23 to eliminate bypassing during small storms.

i. Perform sewer separation in a 60 acre tract associated with the Transportation center project.

2. Improvements identified in paragraph 1 above shall be completed by July 31, 1988, with the exception of:

a. 30-inch storm sewer along Plum Street in basins 24 and 25, which shall be completed by November 1, 1988.

b. Removing of storm inlets along Lake Street in Basin 29, which shall be completed by November 1, 1988.

3. The Aurora Sanitary District Treatment facility shall be operated in accordance with the following provisions:

a. All flows received at the treatment plant must be screened and metered.

b. All flows up to 74 million gallons per day ("MGD") must receive a minimum of primary clarification prior to and during any occurrence of bypassing.

c. All flows up to 68 MGD must receive full treatment prior to and during any occurrence of bypassing ahead of or following primary treatment units.

4. Aurora Sanitary District and the City of Aurora shall conduct performance evaluation and reporting of the improvements specified in this Order in accordance with the Plan of Study appended to and which is hereby made a part of this Order.

5. This grant of exception does not preclude the Agency from exercising its authority to require as a permit condition a CSO monitoring program sufficient to assess compliance with this exception and any other Board regulations and other controls, if needed, for compliance, including compliance with water quality standards.

6. This grant of exception is not to be construed as affecting the enforceability of any provisions of this exception, other Board regulations, or the Environmental Protection Act.

IT IS SO ORDERED.

I, Dorothy M. Gunn, Clerk of the Illinois Pollution Control Board, hereby certify that the above Opinion and Order was adopted on the 13th day of July, 1988, by a vote of 7-0.

Dorothy M. Gunn

Dorothy M. Gunn, Clerk
Illinois Pollution Control Board