

INTERSTATE SANITATION COMMISSION RESPONSE TO NEW YORK CITY
DEPARTMENT OF ENVIRONMENTAL PROTECTION'S TECHNICAL REVIEW OF THE
INTERSTATE SANITATION COMMISSION REPORT ON DISSOLVED OXYGEN
ASSIMILATIVE CAPACITY IN THE NEW YORK HARBOR COMPLEX

INTERSTATE SANITATION COMMISSION
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New York City has issued a critique of an Interstate Sanitation Commission report and the Commission's action in denying concurrences in 301(h) applications. The City report is entitled "Technical Review of the Interstate Sanitation Commission Report on Dissolved Oxygen Assimilative Capacity in the New York Harbor Complex". In this Technical Review, the City of New York takes the position that, if its applications were granted, the waters of the New York Harbor Area would meet the dissolved oxygen requirements of existing standards: i.e. 3, 4, or 5 mg/l, as the case may be. The City's conclusion is incorrect because the supporting assumptions and analyses on which the conclusion is based contain errors of kinds which materially affect the outcome. These errors are set forth and discussed below. The City's Technical Review also contains a number of errors not discussed in this response. They are not considered because those grouped in the four numbered categories are most likely to have significant effects on the City's assertions and conclusions.

1. Wasteloadings

The information put into the Areawide Model used to calculate water quality conditions consisted of understatements of the wasteloadings proposed to be permitted for discharge from the sewage treatment plants of the City and of other Publicly Owned Treatment Works (POTWs) under 301(h) waivers. The City has run the Model with waste discharges containing approximately 110,000

pounds per day less of the polluting biochemical oxygen demand (BOD) content than would be allowed if the 301(h) applications were granted. If one makes an analysis assuming effluent discharges of much better quality than actual 301(h) applications request, the resulting portrayal will show dissolved oxygen content of the waters to be much better than in fact it would be under the higher loadings actually requested for the permits.

To assess the City's report, it is necessary to review the content of the City's 301(h) waiver applications, as well as its application of the Model to estimate the water quality conditions. It is difficult to follow what the City did because it understated wasteloads in its applications as well as in the Technical Review, but not in exactly the same way. For the Technical Review of the Interstate Sanitation Commission Report, the City modeled with inputs that would have been correct for its three Upper East River plants if it were requesting permits to discharge its effluents after providing secondary treatment but, in fact, it applied for 30 mg/l of BOD at these three plants (a much greater pollutant discharge than would be produced by applying the 85% removal part of the secondary treatment requirement).

In its 301(h) applications, the City understated the wasteloads from the three plants by inputting to the Model its plant operations reported loadings. These also were much less than 30 mg/l for which the applications were made. There is no explanation of the reason why it was done. This difference, a change in

the rainfall assumption and the Hudson River flows used, and changed figures for combined sewer loadings make the Model results calculated by the City in its applications and the Technical Review somewhat at variance with each other. On the whole, the modeling done for the applications shows better quality for the receiving waters than is estimated in the Technical Review. In both cases, however, the substantial underloading of the Model makes the predictions of water quality more optimistic than they should be. Nevertheless, the point to be made is generally the same. Consequently, the following paragraphs deal only with the discrepancies between the City's inputs to the Model for the purposes of the Technical Review and the actual effluent allowances for which the City applied.

The numbers used by the City's Technical Review for summer conditions set the polluting BOD discharges at amounts which add up to 109,860 pounds per day less than those which should have been used. Charts 1 and 2 show the major discrepancies. They are Tables 2-2 and 2-3 of the Technical Review with handwritten corrections using the loadings that conform to the 301(h) waiver applications actually made by the City of New York and the other applicants.

For the Wards Island, Bowery Bay, and Hunts Point Plants, the Technical Review's calculations for BOD inputs to the Model are made assuming values of 9.4, 17 and 11.6 mg/l, respectively, instead of the waiver value of 30 mg/l applied for in each instance. The text of the City's application for each of these

plants explains that the plant will continue to operate at secondary treatment, but the actual permit request in the application says otherwise. The permit request is for a discharge of 30 mg/l with no mention of the 85% removal element of the secondary treatment formula (see Wards Island application pp. IIA-1, IIA-5, IIA-13, IIA-16 and Exhibits IIA-13 and IIA-14; Bowery Bay application pp. IIA-1, IIA-4, IIA-12, IIA-15 and Exhibits IIA-13 and IIA-14; Hunts Point application pp. IIA-1, IIA-4, IIA-13, IIA-16 and Exhibits IIA-13 and IIA-14). This makes it clear that the City proposes to operate at less than secondary treatment as defined by EPA and New York State.

In the applications for the three Upper East River plants, in the section entitled "Modified Treatment/Disposal System", for the period May 15 - November 14, the following appears:

Wards Island, p. IIA-5, "The effluent from this process will contain an average of 30 mg/l of BOD and 30 mg/l SS. The removal rates during this portion of the year are 48 and 63 percent for BOD and SS, respectively."

Bowery Bay, p. IIA-4, "The effluent from this process will contain an average of 30 mg/l or [of] BOD and 30 mg/l SS. The removal rates during this portion of the year are 73 and 72 percent for BOD and SS, respectively."

Hunts Point, p. IIA-4, "The effluent from this process will contain an average of 30 mg/l of BOD and 30 mg/l SS. The removal rates during this portion of the year are 57 and 63 percent for BOD and SS, respectively."

In dealing with the discharges from the Middlesex County Utilities Authority (MCUA), the City's Technical Review misloads the Model in a similar fashion. It uses the MCUA assertion that it proposes to operate at secondary treatment after the granting of its waiver application to mean that the discharge value will be 30 mg/l. However, the MCUA application states that the discharge value for which it requests a permit is 50 mg/l (MCUA application, Part II, p. A-3-2).

For the Passaic Valley Sewerage Commissioners' plant, the City's Technical Review achieves a lower poundage of BOD by incorrectly using a discharge flow of 276 MGD instead of 300 MGD. While the 276 MGD is an estimated 1988 flow for Passaic Valley, the Passaic Valley Sewerage Commissioners' application is for a flow of 300 MGD.

Even with the model underloaded, the Technical Review states that the waters would fail to meet the applicable standards at a few places and would barely pass at some others. Moreover, this does not take into account a number of other factors discussed below.

2. Boundary Conditions

The City has used optimistic boundary conditions, especially in Long Island Sound. The quality of the water at the edge of the model area probably is a less important factor than the underloading of the Model, because the latter has a direct and substantial impact on the pollution levels depicted for the water of New York City and adjacent New Jersey. Nevertheless, assuming a

more favorable dissolved oxygen boundary condition in Long Island Sound does contribute something to water quality results estimated from the modeling.

The City's contention is that in the model runs for the ISC Report, the dissolved oxygen deficit at the Long Island Sound boundary is incorrectly set at 1 mg/l. The Technical Review uses 0.0 mg/l and, in the alternative, 0.5 mg/l; but 0.0 mg/l is the value on which reliance is placed. Underlying the use of the 0.0 mg/l deficit is the assumption that there is no pollution from BOD in Western Long Island Sound. While there are some surface data that can be selected to support such an assertion, they are at or near one extreme of the range. Other data show considerable oxygen deficit. One mg/l was selected as the boundary value in Long Island Sound for use in the ISC model runs. In fact, data exist that can support a dissolved oxygen deficit at the Long Island Sound boundary in the neighborhood of 3 mg/l. Thus, the selection of 1 mg/l for the ISC Report is much more reasonable than the Technical Review's choice of 0.0 mg/l.

In its explanation of its choice of boundary values, the Technical Review states on page 2-2 "A preliminary examination of the ISC verification of the summer 1981 data indicates that a D.O. deficit boundary of 0.0 mg/l may be more appropriate to match the data in the Upper East River. This is based upon the characteristics of the Model at this location and not actual deficit conditions in Long Island Sound."

This is the direct opposite of what should be done. A model

is useful only as a simulation of reality. The principal purpose of both the ISC Report and the City's Technical Review is to provide information on water quality conditions. The Model depictions are being used as part of the basis for determining whether the City and other communities should be allowed to decrease treatment of sewage discharged into the New York Harbor Area.

If the Model is to have any legitimate use, as close to actual data as possible should be input to it and the simulations made in accordance with it. If necessary, the Model should be adjusted to the data. The above quoted passage explains that, at least with respect to the Long Island Sound boundary, the City used different boundary conditions than ISC because they fit the Model better. But this assertion is only partly correct. The use of 0.0 mg/l may fit the Model better in Western Long Island Sound, but it fits it not as well as the ISC use of 1 mg/l when compared with actual data in the East River and for the model area as a whole.

3. Combined Sewers

The Technical Review attacks the use in the ISC Report of sewer loadings of 150 mg/l and 225 mg/l as possible alternative hypotheses to that of the Rainfall/Runoff Model. Although discrediting the Model in other respects, the Review argues that its results, so far as affected by combined sewer overflows, should be taken as correct.

In presenting the Model results for the conditions that would occur in the waterways for dissolved oxygen if all POTWs

were providing secondary treatment, and if certain "major" dischargers were discharging at higher pollutant concentrations, the ISC model runs do not use the values of 150 and 225 mg/l. ISC used only the results of runs with the methodology employed in the "208 Study" and now also used again for the City's Technical Review.

However, the ISC Report does repeat the long held view of the Commission that due to the dry weather settling and its effect on the subsequent wet weather discharge of sewage, these values assumed for modeling purposes are too low. The City Review agrees that combined sewer discharges require further study and that the true situation will not be fully known until further investigations are made.

In the context of the ISC Report and the Technical Review, the point is that the two documents display water quality conditions that do not differ because of disparate assumptions about combined sewer overflows (i.e. equal combined sewer loadings were used for both the ISC Report and the City Technical Review).

In fact, the Technical Review displays either ambivalence or inconsistency in dealing with the combined sewer factor. As just noted, its conclusion appears to be that further study is necessary. Yet, earlier in the text there is an explanation of the City's 208 work which seems to state that by some sampling and statistical analysis, the City in that study ascertained that combined sewer overflows were a relatively minor factor.

The sampling done by the City is reported to have shown

the wet weather overflows to contain 90 mg/l - 110 mg/l of BOD and minimal "first flush" increases due to discharges of solids and associated material which accumulate in the sewers during dry weather. It is said that any such deposits most likely are conveyed to the treatment plants during the beginning of a rain and so do not overflow without treatment.

The City's method for sampling and analysis obscured the "first flush" discharges. Most sampling was done only hourly; a few samplings were done at 15-minute intervals. Furthermore, the CSOs sampled were chosen only from among so-called "tight systems" where the investigators determined that they could account for all flows entering and leaving the system. In view of the unrepresentative sampling of the entire system, it is unreasonable to conclude that the results obtained were representative.

It is generally recognized that the City's combined sewers and their regulators have been insufficiently maintained. Many regulators discharge almost immediately after a rain begins. The great outpourings of accumulated pollutants which the Commission believes to occur during the onset of a rainfall were not detected by the sampling which took place once an hour (or even every 15 minutes). More frequent sampling (at least at 5-minute intervals) in the beginning of the overflow would have been necessary. In 1972, the ISC did this more frequent sampling in a limited study of combined sewer effects and found tremendous discharges during the early part of the bypassing.

The City contends that there is no evidence to substantiate

larger accumulations being discharged raw through regulators. In doing so, it ignores the meaning in the ISC Report of the discussion of overflows containing large quantities of BOD and solids.

The Technical Review confuses waste generation rates with its own 208 estimates of BOD in combined sewer overflows. Comparisons of 150 mg/l or 225 mg/l and the statistically derived 90 mg/l - 110 mg/l, which the City asserts to be the BOD concentration in storm overflows, is a misconception of the ISC Report's discussion of the combined sewer problem.

Normal sewage from domestic sources generally contains approximately 150 mg/l of BOD in the aggregate as it is discharged into public sewer systems. Combinations of such domestic sewage and industrial waste (such as are present in the sewers serving industrial areas of the City) can reasonably be estimated to contain an average of 225 mg/l of BOD. Since the influents to City treatment plants are characteristically very weak (100 mg/l of BOD or less), a vital question for understanding of the combined sewer problem is: Where does 50 mg/l or more of BOD go during dry weather? The City suggests that such amounts may be diluted by infiltration or water main breaks. This might be plausible if on the whole these sources approached one half of the flow in the sewers. This does not seem to be reasonable. Although many sewers and regulators are in disrepair, they are not nearly so bad as the City's suggestion would need to make them.

The only answer that appears to fit the known facts is that large amounts of BOD-laden solids are deposited on the bottoms

of the large combined sewers and are flushed raw into receiving waters during rainfalls. The large sludge banks present at many regulator outfall points where currents are not strong enough to carry them off also indicate that major accumulations of solids are repeatedly flushed from the combined sewers. The Rainfall/Runoff Model underestimates this pollution source by assuming very little dry weather deposit.

The point made by the ISC Report is that combined sewer overflows in the Region (and particularly in the New York City sewers whose large diameters and flat bottoms accentuate the settling phenomenon) contain large quantities of solids and BOD. Thus, the low values assumed by the model runs or statistically derived in the 208 Study understate the contribution of BOD pollutants from combined sewers to the waterways.

For years, the Commission has advocated a comprehensive study of actual combined sewer conditions in both the New York and New Jersey parts of the Interstate Sanitation District. If done properly, such a study would be valuable.

4. Model Use

The City uses the Model results literally (as though its simulations were accurate to the last tenth of a mg/l) when those results may be interpreted as compliance with the applicable water quality standards. It disavows the Model and complains that it is untrustworthy when the results show failure to meet the applicable water quality standards.

It is generally agreed that the Model has serious inadequa-

cies in its present form. The ISC has used it with qualifications in its own Report. A justification for running the present Model is that no other model of the entire regional estuarine waterway system exists. However, one cannot obtain a realistic picture of conditions, nor even an arguably correct view of them, by trusting the Model when its results are favorable to a particular position and ignoring it when the answers it yields are unsupportive of a particular viewpoint.

The City's Technical Review of the ISC Report contains errors of fact and methodology. All of them favor the attainment of the conclusions desired by the City: i.e. it could be allowed to discharge worse effluents than presently permitted without contravening water quality standards. This circumstance, as well as information gained by the ISC from years of actual sampling of waste discharges and receiving waters throughout the area make it apparent that running the Model with corrected data and analytical procedures must show failure to meet standards in many parts of the Region, if the City is allowed permits with the effluent values it seeks. In other waterways of the area, compliance would be so marginal as to be open to question.

Conclusion

The purpose of the City Technical Review is to convince the regulatory authorities and the public that its 301(h) applications for lesser waste treatment should have been approved.

In this application procedure, it is the City which must

carry the burden of proof. It advocates changes which no one could contend would improve the environment. The most that the City claims is that discharges in accordance with its proposals would not materially worsen water quality from what it would be with full secondary treatment. But the City itself asserts that the evidence which it has produced and the instrument used to develop it are insufficient and unreliable. We do not see how this makes a case, either technically or legally, for the modification of discharge permits to include the allowances proposed in the City's applications.

We agree with the City that better information is highly desirable and that it will not be available until sufficient and proper investigations are made to fill the gaps in existing knowledge of actual conditions. A decision on whether to apply for reduction of requirements for waste treatment under Section 301(h) was made by each eligible applicant. If an applicant did not have proper or sufficient evidence to support an application, it should have taken that fact into account in deciding whether to apply. If at a later time the necessary evidence is developed, or the applicant is able to present proposals which it can adequately support with evidence, and if the law is consistent with the granting of such an application, the situation may be different.

TABLE 2-2

SUMMARY OF PROPOSED 301(h) TREATMENT LEVELS⁽¹⁾

1988

POTW ⁽²⁾	Receiving Segment	1988 Flow mgd	BOD					
			Summer		Winter			
			Conc. mg/l	Load lbs/day	Conc. mg/l	Load lbs/day		
<u>New York⁽⁴⁾</u>								
1. <u>Newtown Creek</u>	102	310	45	116,300	45	116,300		
2. <u>North River</u>	26	154	57	73,210	90	115,600		
3. <u>Red Hook</u>	100	60	90	45,000	90	45,000		
4. <u>Bowery Bay</u>	121	128	30 17	32,045 18,180	80	85,400		
5. <u>Hunts Point</u>	126	140	30 11.6	35,000 13,544	45	52,500		
6. <u>Wards Island</u>	118	315	30 9.4	10,860 24,695	45	118,200		
7. <u>Mamaroneck</u>	155	18	65	9,760	65	9,760		
8. <u>Belgrave S.D.</u>	143	1.5	30	375	45	560		
9. <u>Great Neck Village</u>	146	0.94	45	350	45	350		
10. <u>Port Washington</u>	146	3.39	45	1,272	45	1,272		
11. <u>Long Beach</u>	299	7.91	45	2,970	45	2,970		
12. <u>West Long Beach</u>	299	1.19	45	450	45	450		
13. <u>Cedarhurst</u>	335	1.01	45	380	45	380		
<u>New Jersey⁽⁴⁾</u>								
14. <u>Passaic Valley</u>	46	300 276	30 75	105 60,055	313 78	3,595 720,500		
15. <u>Middlesex County</u>	206	85.5	50 30	35,675 21,400	360 304	2,561 216,800		
16. <u>West New York</u>	30	7.5	170	10,630	170	10,630		
17. <u>Bayonne</u>	408	10.8	165	14,860	165	14,860		
18. <u>Jersey City East</u>	36	16.7	126	17,550	126	17,550		
19. <u>Hoboken</u>	32	15.44	180	23,120	180	23,120		
20. <u>North Bergen - Woodcliff</u>	29	1.63	100	1,360	100	1,360		
21. <u>Edgewater</u>	28	3.42	110	3,120	110	3,120		
22. <u>Jersey City West</u>	401	16.9	-----Denied by EPA-----					
23. <u>North Bergen - Central</u>	352	0.94	-----Denied by EPA-----					
24. <u>Secaucus</u>	353	1.85	-----Denied by EPA-----					
25. <u>Perth Amboy</u>	203	-	-----Not Accepted by EPA-----					

1. Applicant flows and BOD effluent concentrations submitted to the USEPA Region II on December 29, 1982.
2. Publicly Owned Treatment Works (POTW) discharging within the bounds of the N.Y. City 208 Model only.
3. N.Y. City 208 Model segments shown on Figure 2-1.
4. POTW's at less than secondary treatment during the summer are underlined.

CHART 1