

ton, two-thirds of which represents monthly charges, and one-third a demand charge computed from volume and load data for the heaviest month of the previous year. The mill pays no surcharge for BOD, which does not exceed 400 pp. The surcharge itself is not particularly punitive, being only 0.5 cents per lb. BOD in excess of 35 lbs. BOD per ton paperboard. The mill charges per 1,000 gallons are somewhat lower than the average for the total municipal system, reflecting some economies of scale in levying charges.

(2) *Battle Creek, Michigan*.—The Battle Creek Schedule has no surcharge rate, and results in charges of approximately 80 cents per ton for the local mills. Since the 1960 secondary treatment plant expansion proceeded from negotiations to handle the industrial load, there is provision for assessment of fixed charges proportional to the capacity allocated to the mills in the expansion design.

(3) *Middlesex County, New Jersey*.—This trunk sewer and joint treatment system employs a utility block rate approach by which unit charges decrease steadily as sewered load increases. While the schedule therefore does not appear to have a punitive surcharge quality, the rate itself is fairly high, so that if a conventional 200 TPD paperboard mill were to discharge, its rate would approximate 20 cents per 1,000 gallons, or \$2 per ton. A 50 percent increase in load beyond normal would increase these charges by at least one-third to nearly \$3 per ton, far beyond the median charge cited earlier.

(4) *Cincinnati, Ohio*.—The Cincinnati formula also yields charges above the median for normal paperboard wastes. Assuming an effluent just at the surcharge level for BOD and suspended solids, a doubling of both concentrations would add 60 percent to treatment costs.

(5) *Kalamazoo, Michigan*.—The Kalamazoo rate schedule, which was developed concurrently with the engineering studies to determine the degree of local participation, yields variable operating charges well below the median for secondary treatment. A large portion of the new treatment plant cost is covered by new ad valorem city taxes, and these constitute around 50 percent of the total charges for waste paperboard-type effluents. An interesting feature of this rate schedule is the application of additional property tax to participating mills located outside the city limits (for equalization purposes), as well as a collection charge based on distance from the treatment plant to cover trunk sewer costs.

(6) *Monroe, Michigan*.—The newly developed rate schedule for Monroe, which I have not presented here, provides surcharges which penalize effluents in a compound fashion as they increasingly exceed the treatment capacity assigned to the particular discharger in the project design. This approach, which is at variance with the conventional utility block rate systems, may be encountered more frequently as a means of discouraging overloads on closely designed systems, or possibly building reserve funds for interim modifications of facilities to meet such loads.

SUMMARY

After examining the data collected in this industry survey, several points bear statement by way of summary, and as guides to further industry action.

(1) While mill location factors account for the bulk of the public treatment systems now in use, the coincidence of new treatment needs for communities and nearby mills, plus the authorization or availability of public construction grant funds are undoubtedly responsible for the large number of new projects under consideration.

(2) These new projects require increasingly thorough feasibility studies, often involving pilot scale investigation, before proper choices can be made from the numerous alternatives that present themselves. The matter of choice is complicated by the uncertainties surrounding the availability of public construction grant funds.

(3) There is a broad scatter of sewerage charges around the median for given degrees of treatment, as well as great variety in both the methods of rate determination and specific unit costs. This suggests that there is only limited value in examining other rate schedules for specific inputs to a new project schedule.

(4) We do find a growing use of the principles advanced in the Joint Committee report in 1951. These call for engineering and fiscal analysis of capital and operating costs for the different functional parts of a given project to determine what costs should be assigned to (a) property taxes (regardless of sewer use), (b) fixed annual costs on a predicted basis considering capacity reserved in project design to known dischargers, and (c) variable costs assigned based on actual measurements and analysis of effluent discharge.