has been operated at the city treatment works, handling a simulated mixture of the three effluents to develop necessary process design data. Target date for secondary treatment at Macon is 1971.

(2) *Erie, Pennsylvania.*—Hammermill has undertaken a $150,000 company-financed study, in cooperation with the City of Erie, of the possibility of expanding the local modified activated sludge plant to handle the weak pulping, bleaching and paper mill effluents now totaling 25 MGD. The sewage plant expansion being considered may run as high as 50 MGD to account for urban growth as well. Study objectives include development of design criteria and project costs, and determination of the possible reduction in nitrogen and phosphorus nutrient discharge from the municipal plant as a result of combined treatment of the nutrient-deficient Hammermill effluent. In view of the importance attached to the problem of Lake Erie eutrophication, this stands as a major feature of the study.

(3) *Green Bay, Wisconsin.*—Four mills and the Metropolitan Sewerage District are collaborating on a similar study, which has received a $250,000 grant from FWPCA covering 75 percent of total study cost, with the mills and the district sharing the remaining 25 percent. The study may lead to a 50 MGD activated sludge plant with 18 MGD accounted for by the four participating mills. All now have some form of pretreatment, with the three sulfite mills recovering or burning a substantial portion of their spent liquor. The degree of liquor segregation and weak effluent recovery can have a strong influence both on project capital and operating cost estimates. Consequently, the mills are investigating additional means for improved liquor collection, including the possibility of reverse osmosis. The latter is the subject of another FWPCA grant-supported project at the Pulp Manufacturers' Research League.

CONTRACT TERMINATION CLAUSES

Companies contemplating public treatment are understandably concerned with contract provisions that specify (a) the public agency's obligations to provide continued treatment, and (b) the company's continuing obligations should discharge be terminated, either because of mill shutdown or development of alternate treatment measures. Some examples of such contract clauses should therefore prove instructive.

(1) *Hutchinson, Kansas.*—A 1958 agreement between the city and the mill specifies that both are obligated toward each other for a 30-year period, with successive automatic yearly renewals, unless notice is served six months before expiration. The mill may withdraw on written notice if the basic sewerage charges, originally set at 3 cents per 1,000 gallons, are increased to 3.3 cents.

(2) *Oswego, New York.*—More recently, Hammermill and the City of Oswego, New York, signed an agreement stipulating that the City must accept and treat the mill's effluent as long as the mill remains in operation. Hammermill agreed to pay the basic charge so long as the City was required to make payments on the construction bonds, even if effluent discharge to the city treatment system were to be terminated. One year's written notice would be required before such discharge could be terminated.

(3) *Kalamazoo, Michigan.*—In the recent Kalamazoo project agreement, the city and the contracting paper mills are obligated for a 30-year period, with successive automatic 5-year renewal periods unless notice is served six months before expiration. The mills are prohibited from acquiring new treatment facilities so long as the city is prepared to provide the necessary treatment. The mills are, however, obligated to continue using existing primary treatment systems.

(4) *Monroe, Michigan.*—The agreements just concluded obligate the city and three mills for 15 years, with automatic 5-year renewal periods, during which the city must provide treatment and the mills must deliver their effluents for treatment, or pay fixed charges if mill operation is terminated. The agreement with the remaining mill runs for 40 years with the mill obligated for at least 15 years of fixed charges should mill operation terminate.

TYPICAL RATE SCHEDULES—SURCHARGES AND PENALTIES

Finally, I would like to examine with you briefly several rate schedules now in effect, and see how they deal with load variations in terms of surcharges and penalties.

(1) *Stockton, California.*—This schedule covers a secondary treatment system treating 22 MGD. Its charges to a local paperboard mill approximate 40 cents per