

ment in removal of nitrates, in terms of removal of solids, in terms of removal of biological oxygen demand, and in terms of removal of micro-organisms.

Some of the figures that have come to my attention in this matter are interesting. First of all, the raw-waste system—flocculation system—can be used in primary plants where the solids-handling equipment is adequate and where the plant is adequate to the needs, and can result in significant increases in the efficiency of the plant. Raw-waste flocculation can be used in almost every secondary plant.

Chemical treatment could be applied now to additionally prevent some 240,000 tons per year of organic solids from reaching our waters. With adequate sludge facilities at a capital cost of some \$5 million, an additional 118,300 tons per year of organic solids could be retained and could be removed from our waterways.

In cities where raw-waste flocculation could be successfully applied now, a tremendous amount of increase in terms of efficiency could be achieved for the modest cost of \$15 million. I would point out, Mr. Chairman, that the level of addition of these chemicals to the waters is very, very slight. In some instances as few as five parts per million can create enormous increase in efficiency of the plant.

I would point out, Mr. Chairman, that in a number of other cities where raw-waste flocculation could be successfully applied, if sludge capability was made adequate, would cost an additional \$5 million.

In cities where phosphate removal is required—some eight cities, having about 1,103 million gallons per day—this could be accomplished for about an additional \$6 million.

The total costs for a program of the kind that I have indicated would run about \$24.6 million or just a little less than the amount authorized.

The cost for application in terms of removing solids and improving solid removal would be \$3 to \$8 per thousand gallons—rather per million gallons. And phosphate removal can be improved for \$10 to \$20 per million gallons. And it is conceivable that if these new devices and these new chemical additives are used properly that we could reduce without increasing significantly our expenditures for capital construction the pollution to our waterways by about 40 percent.

This is a tremendous improvement in terms of our endeavors to abate the pollution of our waterways, and it is quite important.

I do have something that I found in Chemical & Engineering News, a rather excellent article about chemical removal of phosphorous being feasible, something which is one of our major problems, and I will submit that for the record at this point if I may do so.

Mr. BLATNIK. Without objection, so ordered.

(“Chemical Removal of Phosphorus Feasible” follows:)

CHEMICAL REMOVAL OF PHOSPHORUS FEASIBLE

[From the Chemical & Engineering News]

Removal of 90 to 95% of phosphorus from municipal waste waters can be achieved today in a typical 10-million-gallon-per-day treatment plant for 5 cents or less per 1000 gallons. This is the conclusion drawn by the Federal Water Pollution Control Administration from an evaluation of phosphate removal cost data. The data have been accumulating from lab and pilot plant tests as well as from full-scale plant operations.

The process which would lead to these costs and which can be designed, constructed, and operated with greatest confidence today would employ chemical treatment, according to Dr. Leon Weinberger, FWPCA's assistant commissioner