

pressing for municipal waste—let me rephrase that. We have some alternate ways of accomplishing removal for municipal waste which show as of today more economic promise than reverse osmosis in a municipal plant installation.

Mr. DADDARIO. Proceed, Doctor.

Dr. WEINBERGER. Again referring back to figure 1, which indicates our total R. & D. effort, I would just like to mention some of the problems that stand out as being extremely high-priority items. These include municipal waste treatment, industrial waste treatment and control, improved methods for measuring effective pollutants, that is, water quality requirements including temperature effects, the disposal of impurities or solids removed from waste, mine drainage, irrigation return flows, agricultural land runoffs, storm and combined sewer discharges and lake, estuary, and ocean disposal of treated and untreated wastes.

I have discussed previously the problem of treatment and we have ample evidence to indicate that we can indeed treat waste waters to provide water of better quality than we started with. However, I would like to illustrate some additional areas of research and development that might be considered just under the subcategory of municipal pollution control. Some of these we have already talked about in my responding to questions.

One, improved procedures to accomplish more effective operation of plants; two, methods for increasing the capacity and performance of existing plants; three, improved design and construction procedure, including materials of construction.

Gentlemen, the biggest cost in pollution control is going to be in construction dollars and any improvements that we can make in reducing costs can significantly reduce our overall bill.

Work on design of treatment plants which would occupy a minimum of land area. Land is becoming more valuable, more critical. We have to consider design where land is used more effectively.

New systems for combining the waste water purification steps of the water cycle and perhaps a little bit into the future treatment systems which would result in valuable byproducts.

Mr. RYAN. Before we leave page 17, I would like to raise several questions regarding the treatment of municipal waste and specifically ask what level of treatment is attainable—let me ask that in terms of removal of waste—from municipal sewage.

Dr. WEINBERGER. Mr. Ryan, technology is available today for the removal of virtually all of the impurities which are introduced into our water resulting from municipal use of that water. In one of the summary sheets which I have, reference is made to a plant which is in operation in Tahoe on the Nevada-California border where extremely high degrees of removal are being accomplished. This is not very commonly employed, but I think Mr. Ryan asked what could be done. This is what can be done.

Mr. RYAN. What percentage is being removed in Lake Tahoe?

Dr. WEINBERGER. In Lake Tahoe there is better than 99-percent removal of the organic material. When I say better than 99 rather than 100 percent, our analytical techniques are inadequate in some of these cases to analyze all of the suspended material. Removal of such things