They bring techniques that assist us in computerizing our control facilities in the acqueduct. We are trying to maintain this acqueduct in a unique manner. For example, endeavoring to keep it ever full because otherwise it might require a 3-week delay to get water from this intake to the point where it is needed. We need this aqueduct operating on a split second basis. Just as though the water were within a pipe.

This is theoretically possible but it hasn't been practically possible heretofore owing to the length of time required for communication and for sending a man out to refix the headgate, and this kind of thing.

We are using the techniques of systems management in setting up a program here in combination with experienced engineers and business administration people that we think is going to make it possible to readjust gates instantly and keep the acqueduct full and at the same time prepare the bills for the water users so that it all comes out of the same operation.

Mr. VIVIAN. Have your water reclamation people, who have been in business for years, found systems engineers of great assistance?

Mr. WARNE. I can't answer that. I think we are just now getting into areas where we believe they are going to be of great value to us. I mean, the most complex water program we have is the one I have just described to you. I know the metropolitan water district is thinking along some of these same lines.

They are perhaps the next most complicated water operation in the State.

Mr. VIVIAN. The nature of my question is simply that there has been much opposition to the use of systems engineering for pollution abatement. I have no objection to it, but it is not altogether obvious that the clear-cut areas of value have been established.

Mr. WARNE. We think that the kinds of controls that are going to be necessary in the future at least, to maintain acceptable water quality standards in the San Francisco Bay are apt to involve this kind of thing.

Mr. VIVIAN. Thank you.

Mr. WARNE. There are a number of other apparent possibilities for use of waste water that, to my knowledge, have not been exploited to date. These include irrigation of shrubs and plants used for landscaping freeways, washing gravel, compacting soils in construction projects, replenishing of underground strata from which oil has been removed, as well as secondary recovery of oil. The use of such supplies is already feasible, particularly in water-deficient areas.

There is one area where technical knowledge is less advanced than is desirable, and this is in the understanding of disease-producing organisms in water. For years water supply engineers judged the effectiveness of their treatment processes by studying changes in the density of coliform organisms. The presence of certain strains of these organisms can be related to such waterborne diseases as typhoid, dysentery, and other intestinal disorders.

In more recent years we have learned that viruses are responsible for polio and hepatitis. To date, although we can identify a number of major groups of viruses, there are no generally applicable methods which can be utilized in routine pollution studies.