

Now let me come to No. 5. A number of significant correctives, however, do wait upon increased knowledge and these will require strenuous research and development on a variety of fronts, in a combination of governmental and private fronts. They will not be resolved to my own mind from the testimony by one or the other, but by both. These do cover, as you will see in a moment, areas of exploration of great significance and should be undertaken as promptly as possible.

No. 6, in the areas of agreement: These hearings essentially are directed to shed light on a simple basic equation which someone has phrased, that if society spends on a program "X" or a series of projects which I call "X" a number of "Z" dollars, will it accomplish the purposes of our objective "Y."

Now, let me go to the areas for exploration. These are not given in any order of priority. All of them lend themselves to available time for exploration. In other words, they cannot be resolved on a crisis basis. And may I add that there is time to do research and development in these areas for exploration. And I list them as I say not in order of any priority.

No. 1 is the behavior of estuaries. That could be on the Delaware, on San Francisco Bay, on the estuary of the Potomac River. The reason many witnesses listed this is that it turns out that our understanding of the biological behavior of estuaries, which will and do now receive the wastes from great metropolitan areas, is not very well understood.

May I illustrate this by reference to one of the few examples which has already been accomplished over the last several years; namely, the study of the Delaware River estuary, costing somewhere between \$1 and \$2 million. This study was reported upon to the Delaware River Commission about 2 weeks ago. It is the first example that I know of where systems analysis, the use of mathematical models, highly computerized observations, were made over several years in order to determine what effect various policy decisions would have on the behavior and quality of the estuary. In oversimplification, it attempts to answer, and I think does answer very well, what happens if you decide that the estuary should have three parts per million of oxygen instead of four parts per million, or five instead of four parts per million; that is, what are the implications for the rest of the river, implications incidentally which would require a tremendous amount of expenditure. The findings indicate that one may have a choice of expenditures running from \$30 to \$40 million to something a little short of \$500 million, depending upon which parameter or parameters your official agency decides shall control the quality of the estuary.

Now I mention this because this is an example of what remains to be done in a series of estuaries throughout the United States, no two of which probably behave the same way.

Mr. DADDARIO. Dr. Wolman, what is the danger of putting the lower price tag and therefore the lower quality in these proposals as the figure around which public opinion would rally?

Dr. WOLMAN. Well, they do not try to do this. They merely try to answer the question that everyone asks: What are the choices that one would be confronted with, say, in the Delaware estuary if your