gram implementation effort, adequate planning and administration, and competent manpower. Research and development is needed to provide new and improved analytical tools, scientific knowledge, and engineering controls. I, of course, do not intend to minimize the importance of role of research and development; however, we should recognize that many of the water pollution problems facing our nation today can be alleviated by the application of existing technology. In fact, in the immediate future, the most significant progress will be made in this way. Through research and development, we will find solutions where none now exist, we will better define the effects of impurities on water uses, we will improve the effectiveness of available solutions, and we will reduce the costs of waste treatment systems. Gentlemen, I have complete confidence that we will find solutions—acceptable solutions, in my opinion—to all our pollution problems.

The solutions will be satisfactory from a scientific and technical point of view, but *they will cost money.* Although you may believe that it is obvious that pollution control will cost money, there are many polluters who are apparently unwilling to recognize any solution as acceptable unless it is a zero cost solution. We shall seek these zero cost solutions—indeed, in some instances, through wastes recovery or by-product development, a profit may be realized—but we must be willing to pay for pollution control. What is meant by an economically acceptable solution is certainly to be the subject of considerable debate. Conventional cost-benefit analyses are not totally applicable because we are not able to define in a quantitative manner all the benefits of water pollution control nor assess the total damages resulting from water pollution. Research into the socio-economic aspects of water pollution control may provide us with some of these analytical tools—tools which will enable us to evaluate the "intangible" benefits.

COSTS AND BENEFITS OF WATER POLLUTION CONTROL

Our knowledge of the costs and benefits associated with water pollution control is rapidly improving.

The Federal Water Pollution Control Administration has just completed a study entitled "The Cost of Clean Water." This is in response to Section 16(a) of the Federal Water Pollution Control Act, as amended, which directs the Secretary of the Interior to conduct a comprehensive analysis of the national requirements for and the cost of treating municipal, industrial, and other effluent to attain water quality standards established under the Act. These first analyses are required to be submitted to the Congress in January 1968 to cover Fiscal Years 1969–73, inclusive, and to be updated each year thereafter.

These studies are extremely important because, although there is widespread agreement that water pollution is a significant, growing problem which must be dealt with, there are no firm estimates as to what the national requirements are, or what it will cost the Federal Government and other affected units of government to achieve a satisfactory abatement level. Various cost estimate studies of municipal and industrial needs have been conducted in the past but they have not been sufficiently comparable in geographical coverage, time phases covered, cost criteria, types of facilities included, or in cost estimate technique to provide a fully meaningful guide to the national requirements and costs involved.

The "Cost of Clean Water" study represents the initiation of what will be a continuing evaluation, aimed at developing more accurately the national costs of pollution control. Although it has not been possible to arrive at a completely definitive estimate of required costs, it is believed that the present study provides a more comprehensive cost estimate than has previously been developed and a sound base of information upon which to build future analyses. This estimate is expected to improve in accuracy with each yearly updating.

Other studies being completed under the requirements of the Federal Water Pollution Control Act include a study of the economic impact on affected units of government of the cost of installing waste treatment facilities, and a study of possible economic incentives to industry for pollution control. Both these studies will add substantially to our knowledge of the economics of the problem.

Determination of benefits is far more difficult, since many of the benefits of pollution control are non-monetary in nature. However, some progress in quantifying pollution control benefits is being made. A specific example is in the compre-