

hensive water quality control study conducted by the Federal Water Pollution Control Administration in the Delaware River Estuary. In that study five water quality objectives were analyzed to determine the costs of their achievement by various means and the financial and economic benefits expected to accrue from their fulfillment. The study was conducted over several years with the cooperation of State and local governments and industry. Therefore, considerable detailed data not usually available were analyzed in developing the proposals. The study has become a model for this kind of exercise and is being adapted in other regions in those cases where this type of analysis is needed to guide pollution control decisions.

RESEARCH AND DEVELOPMENT PROGRAM AND PLANNING

Figure 1 illustrates the program structure and elements of the research and development program of the Federal Water Pollution Control Administration. It represents the framework within which we can plan our program, establish goals and determine needed resources to achieve goals, allocate available resources, and evaluate the effectiveness of ongoing research. Subprograms 11, 12, 13, 14, and 15 contain the elements dealing with specific sources of wastes; subprogram 16 is a general category containing the elements of pollution identification, fate and persistence of pollutants in the environment, water quality control, eutrophication, water resources planning and resource data, cold climate research, and basic research; subprogram 17 contains the elements dealing with waste treatment; and subprogram 18 is the research on water quality requirements or effects of water pollutants on all water uses. The element 1608—Water Quality Control encompasses pollution control techniques such as recovery and reuse, product modification, process change, elimination, dispersion, dilution, detention, diversion and environmental treatment. This structure for categorizing our research and development was established last year and we believe will facilitate interagency coordination and cooperation. The categories are compatible with those established by the Committee on Water Resources Research of the Federal Council for Science and Technology.

RESEARCH PRIORITIES

The research program of the Federal Water Pollution Control Administration is directed primarily to the *solution* of water pollution problems.

In planning research, a major task is to establish priorities of research within available resources and the directives provided by legislation. In our program, priorities are based on the needs, recommendations, and ongoing research of the following:

1. FWPCA Regional Directors and their staffs. They are knowledgeable of the problems as they exist or may develop in their respective regions (river basin),
2. FWPCA program directors at headquarters,
3. Other Federal agencies,
4. State and local agencies,
5. University professors and researchers,
6. Consultants and advisory groups,
7. Committee on Water Resources Research, and
8. Industrial groups.

The setting of research priorities and the allocation of research resources is still, to a considerable extent, based on a subjective analysis. The analysis, however, has considerable merit when carried out by competent knowledgeable people who have available to them the information obtained from answers to the following series of questions:

1. What is the problem?
2. What is the magnitude of the problem?
3. What answers or solutions do we need?
4. What answers or solutions are available? (The statement of problem should not be considered equivalent to needed research.)
5. When do we need the solutions?
6. What are the specific objectives being sought? What answers are being sought? How will you know when these objectives have been achieved or answers found?