

As is the case with national defense the public desire is for an effective program. At the same time there are public pressures to maintain fiscal responsibility. The very nature of the environmental pollution problem eliminates a price mechanism or competitive forces in the classic sense.

Whether one is undertaking a problem in military planning, in industrial production, or other forms of systems analysis, the principal elements involved are: definitions of an objective or objectives; the selection of alternatives and the detailed accumulation of information thereon; a study of the costs of resources required which can trace relationships between inputs and outputs, resources and objectives and last, but not least, the selection of a criterion as a test by which one alternative system may be chosen rather than another. As in the case with most systems analysis problems and as has been repeatedly stated in these presentations, the central problem for both the near and long term is the selection of appropriate criteria. The words of Hitch and McKean in their book, "The Economics of Defense in the Nuclear Age," in relation to military problems appear to be most appropriate with regard to systems engineering and systems analysis as related to the environmental pollution problem. In that work they said:

Whatever the particular problem, military or civilian, it is fairly obvious that in choosing among alternative means to our end, we need to scan the end themselves with a critical eye. New techniques or types of equipments may be extremely efficient in achieving certain aims, but these aims may be the wrong ones. Aims that are selected almost unconsciously or at least without sufficient critical thought * * *. While good intentions are sometimes reputed to be excellent paving materials, they do not pave the way to preferred action. In practical problems of military (or other) choice, there are always constraints which prevent us from simultaneously achieving all our objectives.

These exponents of the concepts of systems analysis further went on to say that while ideally we should choose a course of action which would maximize something like "the satisfaction of an individual" or "the well-being of a group" that such a prescription usually prescribes a little more than what is wanted as being "the best." They hypothesize that in practical problem solving, we have to look at an "approximate" criterion, as a practical substitute for the maximization of what we would ultimately like to have. Also there is a need for breaking down the problem into component pieces or subproblems which can be identified as components of the whole, but which are more readily susceptible to practical real time solutions. This is especially applicable to the environmental pollution question. An example of this approach was outlined by Harry Hanson while the Associate Chief for Environment Health, Office of the Bureau Chief, U.S. Public Health Service, in 1964. He suggested that these techniques could be used with smaller and simpler river basin basing systems. All of the existing hydrologic use and quality factors could be established as a framework for analysis. Such a system could then be challenged with hypothetical or predictable conditions of supply, demand, use, reuse, and quality requirements. Out of such an effort more precise environmental resource and environmental quality management programs could be developed. Similar applications to the larger problems of water use requirements, the relation between various pollution implication of solid waste procedures, could be