

by authority. The fact that a standard has been established by authority makes it quite rigid, official, or quasi-legal. An authoritative origin does not necessarily mean that the standard is fair, equitable, or based on sound scientific knowledge, for it may have been established somewhat arbitrarily on the basis of inadequate technical data tempered by a cautious factory of safety. Where health is involved and where scientific data are sparse, such arbitrary standards may be justified. There is a tendency, however, for regulatory authorities to promulgate standards of questionable scientific justification to serve as a crutch that facilitates administrative action and enforcement.

A far better word to describe an administrative decision by a regulatory body is "Requirement." It represents a requisite condition to fulfill a given mission. It does not necessarily have the connotation of scientific justification nor does it give an impression of immutability. Requirements are less likely to be as rigid or fixed as standards. In California, the regional water-pollution-control boards are directed to prescribe requirements for every existing or proposed discharge or sewage, or industrial waste, but such requirements may be revised from time to time (Section 13054 and 13054.1 of Division 7, California Water Code). Indeed, "No regional board, by prescribing requirements, shall be precluded thereafter from revising requirements relative to the same disposal area or receiving waters. A discharge pursuant to the prescribed requirements shall not create a vested right to continue such discharge under the same requirements" (Section 13002, Division 7, California Water Code). Examples of requirements by California WPC Boards are given in Chapter III.

The word "objective" represents an aim or a goal toward which to strive, and it may represent an ideal condition that is difficult, if not impossible, of economic attainment. Most certainly, however, it does not imply strict adherence nor rigid enforcement by a regulatory agency. It is gaining favor among engineers on boards and commissions that strive to achieve water-pollution control by persuasive methods and cooperative action. It avoids the rigidity and authoritativeness of standards and it does not have the enforcement element of requirements.

A "criterion" designates a means by which anything is tried in forming a correct judgment respecting it. Unlike a standard it carries no connotation of authority other than that of fairness and equity; nor does it imply an ideal condition. When scientific data are being accumulated to serve as yardsticks of water quality, without regard for legal authority, the term "criterion" is most applicable. For this reason, this report has been entitled "Water Quality Criteria." As a compendium of criteria, it should be useful in prescribing requirements in California, and it can be used as a guide by any agency that desires to establish standards or objectives.

To be useful, a criterion should be capable of quantitative evaluation by acceptable analytical procedures. Without numerical criteria, vague descriptive qualitative terms are subject to legal interpretation or administrative decisions. A criterion should also be capable of definitive resolution, i.e., unaffected insofar as possible by synergism, antagonism, or other complicating factors.

There is a tendency, which should be avoided assiduously, to let criteria become rigid and perhaps ripen into standards. For this reason, every criterion should be regarded as flexible information to be kept constantly under surveillance.

Establishment of quality criteria

The establishment of interim environmental quality criteria for those situations where no requirements have been promulgated by local, State, or Federal agencies is a function of the Medical Departments of the military services. In undertaking such tasks it has been recognized that in many instances the pace and progress of biological science, and the tools of ecological management have not kept pace with the advances in the physical sciences. Often available facts are not sufficient to support or contradict in a conclusive manner preliminary data. There are many pitfalls in attempting to extrapolate to the operation, or even to the test environment results of what are essentially biological or bioenvironmental investigations. Dr. Robert Kehoe, University of Cincinnati, in addressing the 2nd National Congress on Environmental Health at Ann Arbor, Michigan in June 1961 observed that the height of absurdity was reached "when one finds oneself soberly pondering the significance of a conventional mathematical expression of a borderline possibility concerning the effect or lack of effect of a given experimental procedure as-