

RESEARCH IN THE SOCIAL SCIENCES FOR DETERMINING STRATEGIES OF AIR POLLUTION CONTROL ADMINISTRATION

Gilbert B. Siegel, M.S., Ph.D.

THE PLANNING and evaluation of programs for the Air Pollution Control Institute of the University of Southern California (1) have suggested a need for research into strategies of operational decision making in the administration of air pollution control. This need arises in attempting to apply the action model that pervades the literature and professional practice of air pollution control.

The model, which I call the technology model, while not wholly spelled out in authoritative sources, is normative and prescribes preferred approaches. This model for the most part is oriented to technology and science, although certain other aspects are acknowledged. Furthermore, this model is incomplete because it cannot fully guide decision makers.

Strategies of action may be derived from the model. However, information about conditions under which such strategies should be applied is incomplete. Conditions of application relate to numerous factors in the political, social, and economic environment in which the technology is applied and which should influence choice, timing, and variations of technical strategies in particular situations.

My point, therefore, is that research is needed to probe strategies derived from the technical model under different, primarily political, conditions. This research then will allow synthesis of strategies which take into consideration more than features shown in the model.

The technology model (see figure) may be described by using the rubric of problem solving

The first block encompasses groups of activities associated with problem definition, the second block problem isolation, and the third block problem solution.

By implication, one proceeds from definition of the problem to corrective action; evaluation presumably emerges through the feedback process which again relates to problem determination. However, this implication is not necessarily the reality in practice. Obviously the titles and boxes within each major block are generalizations for categories of (a) information, for example, contaminants, (b) practices, for example, air pollution surveys, and (c) programs, for example, administration of controls.

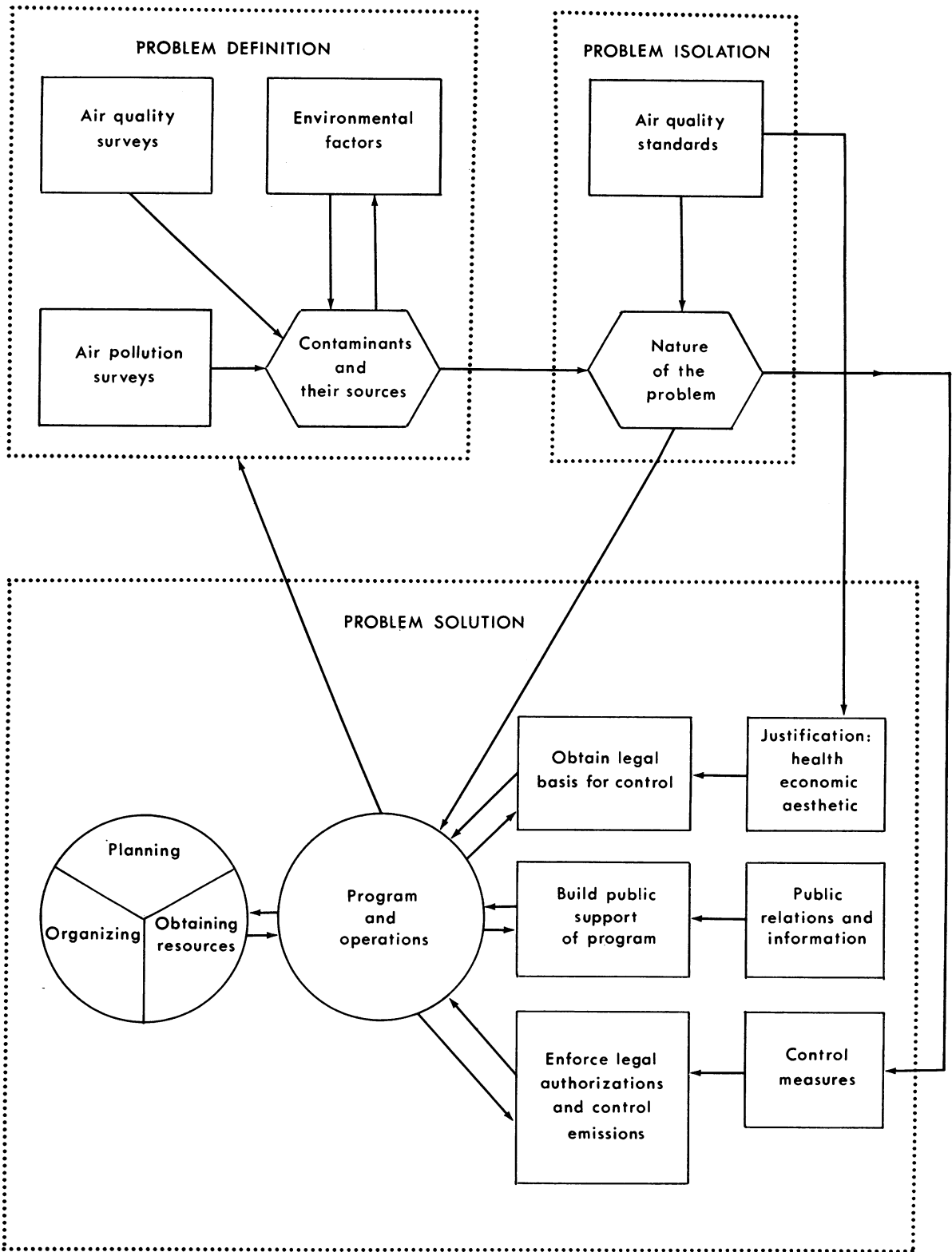
In defining the problem various surveys, such as those of ambient air quality, industrial processes, and public opinion and perception, are conducted. Climatological and other environmental characteristics also are assessed. According to the model, at this point the nature and magnitude of the problem should be understood. Comprehension is increased further by relating analysis of the problem to standards of air quality.

The big question now is what to do about the problem. Planning, organizing, and obtaining resources must precede action. In deciding on a program of control, a variety of choices is possible—obtain a legal basis of control, build public support for the program, enforce legal authorizations, or control emissions through permit systems or various other measures. Each of these elements imposes specific subactivities.

The diagram shows an input-output relationship of the nature of the problem to methods of control and of air quality standards to justification of the program. Although this technology

Dr. Siegel is associate professor of public administration at the University of Southern California, Los Angeles.

Technology model of air pollution control



model has been outlined as a logical sequence, in practice the process of effecting air pollution controls is not so simple and neat.

Often, there is preference initially for activities of problem definition, such as air monitoring and surveys. Definition activities, however, are not the only opening strategies. Various other activities from different subparts of the model might be applied as stratagems depending on the circumstances and the skill of the control official in assessing the situation.

Thus resource seeking is likely to be an opening stratagem, followed by activities to disseminate public information and build support, and overt action to control sources of emissions. A combination of strategies is used by an agency, depending on timing and circumstances.

In view of the somewhat charged political environment of governmental decision making, problem solving obviously can only rarely follow a neat scientific-method sequence. For example, Calvert described the role of the Cleveland Advisory Board on Air Pollution, Water Pollution, and Industrial Hygiene (2). This board was composed of representatives of industry, commerce, education, civic and professional organizations, and the municipal government.

For definition and isolation of the air pollution problem, the board relied on the measurements and analyses of others. The board recommended increased resources and authority for the air pollution control division. The recommendations were to be accomplished by establishing a research program; modifying legal limitations on smoke and particulate emissions; changing the air pollution control division's organization and program by separating its activities for making rules, enforcement, and handling appeals; and establishing a permit system for control. A new ordinance including many of the advisory board's recommendations was passed by the city council.

Calvert was not concerned with strategy. However, he illustrates a stratagem which (a) accepts given information about the definition and isolation of the problem; and (b) concentrates on arrangements for legal authority, organization, and programs for control. Through recommended research activities, isolation of the problem, and justification of the program, this stratagem could be enhanced in the future.

One might label this the advisory committee stratagem.

However, to dismiss a pure problem-solving approach as the prescription is not to suggest that there cannot be science in the application of strategies from the technical model. There is need to identify past successes and failures. Such identification should be based upon analyses of the kind and degree of pollution, the political and other behavioral circumstances, and the model strategies that were applied. Perhaps predictions about the success of a program can be made from such research.

The exact method of probing the political environment in which the strategies will be applied will require additional thinking and investigation. One approach that seems potentially productive is analysis of community power structures, a technique which is current among political scientists and sociologists. There is certainly no shortage of social science theory and research models to explore.

A starting point might be Rossi's typology of community power structure in which models emerging from social science research are developed (3). His scheme has three main types of structures and one logical-residual category.

1. Pyramidal. Lines of power tend to have their ultimate source in one man or a very small number of men. Decision making tends to be highly centralized, with lower echelons mainly carrying out major policy decisions made by the small group at the apex.

2. Caucus rule. Lines of power tend to end in a relatively large group of men who make decisions through consensus. Decision making tends to be a matter of manufacturing consent among the "cozy few" who make up the caucus. Typical power structure in the small town or dormitory suburb.

3. Polyolith. Separate power structures definable for major spheres of community activity. Typically, local government in the hands of professional politicians backed by the solidary strength of voluntary associations, with the community service organizations in the hands of the business and professional subcommunity.

4. Amorphous. No discernible enduring pattern of power, logical residual category. No examples.

These types by no means describe completely whose values prevail in urban decision making; they do provide leads to further analyses however.

For example, Banfield, writing about the politics of Chicago (4), describes how a series

of urban problems were solved by power structures that compare with Rossi's polyolith type. In this city, however, Mayor Daley appears to preside over many, often conflicting, interests. An astute analyst of power, he assesses possible goals and courses of action that are pushed upward from the milieu of clashing power centers and interests. Daley does not lead through initiation of ideas and programs as much as he mediates among interests and assesses winning courses of action. With this and other comprehensive information, one would be better able to judge winning and losing strategies used by the Chicago air pollution control agency.

More related to decision making and forgetting the real situation in Chicago, assume its political dynamics exist in a hypothetical city. One might question a strategy of continuing to collect detailed data on air quality if the nature of the pollution is generally known. Generally known means that control officials are aware of major sources and conditions; the need is for proof rather than definition of the problem.

In this situation an alternative would be to seek out and cultivate powerful groups capable of bringing to bear enough political muscle to force the mayor or other central decision makers to move to regulate known polluters. This example is not intended to deprecate air monitoring; rather, it is to demonstrate how more comprehensive knowledge of a situation lends insight for strategy building.

How does one go about conducting research on how to build strategy? First, from the literature of urban government and politics it will be necessary to extract useful theory and methodology; a growing body of knowledge of political processes in many metropolitan areas is available (5-11). In addition works classified under other subjects may be relevant to decision making in relation to air pollution control. Subjects which encompass related topics include urban or metropolitan problems and politics;

State, local, or municipal government; inter-governmental relations; or case studies of government and politics.

Next, and of fundamental importance, is to gather from control officials case studies of how strategies were applied to the technical model. Attempts should be made to interpret successes and failures in the light of political, social, and economic behavior; governmental structure; and other factors.

Obviously a needed skill is the analyst's ability to develop the social science framework through which models of strategy may be described and evaluated. The ultimate objective is a modest capability to predict the effectiveness of one strategy or block of strategies in comparison with others under varying circumstances.

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