ENVIRONMENTAL EFFECTS OF THERMAL DISCHARGES - PUBLIC POLICY

by

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To identify the elements which must or should be taken into account in formulating a rational public policy with respect to controlling the manner in which electric utilities utilize water resources for the purpose of dissipating the excess or waste heat developed by the process of generating electricity, we must begin with a clear understanding that for the foreseeable future, the amount of heat which must be absorbed by the environment will grow even faster than our recently experienced very high rate of energy consumption growth.

Year by year, the fraction of our energy mix in the secondary form of electrical energy grows. The fraction of our electrical energy derived from nuclear facilities will grow, too, and for the next few years, thermal efficiency of nuclear generation will be less than that of new fossil-fired plants. And year by year, problems of siting new facilities and of delays in their authorization and construction will probably cause management to defer the retirement of their older and inefficient plants otherwise scheduled for replacement.

The technically qualified members of this panel have described the physical phenomena and dimensions of the heat by-product. Whether stated in BTU's per kilowatt-hour of generation, or in quadrillions of BTU's of annual output, we know that our energy-based economy is eating into the stored solar energy which required millions of years to accumulate, in the process of multiplying man's work output by many thousandfold. Social scientists can and do paint a very black picture about the future of mankind if the present patterns of growth continue. Pollution of the environment is one danger; another is the prospect of having no more fuel to burn.

As a public official with responsibilities in this general subject-matter area, my limited purpose is to concentrate upon the governmental response to the question of thermal discharges.

My own assumptions can be briefly stated. I assume continued growth of our population and our economy, and see no useful purpose in debating these assumptions here. However, I can parenthetically observe that if we should, as a nation, decide that "zero economic growth" was a desirable policy there would be no more efficient way to achieve that goal quickly than to prohibit any expansion in our capability for energy conversion.

I assume also a continued pluralism in the responsibility for electrical generation and distribution in this country. There are more than three thousand separate entities engaged in these functions, in three major groupings: investor-owned private companies, customer-owned cooperatives, and public instrumentalities, federal, regional, state and local.

And finally, I assume a continuation of our federal system which divides governmental responsibilities between states and the federal government, and which divides the federal responsibility among branches of government.

An overriding factor in formulating public policy with respect to thermal discharges is the level of the national awareness of the issue itself. Man is an adaptive and social animal; cumulative deterioration of his environment has to reach a certain critical level before organized action can be taken to stem or reverse the process. London and Pittsburgh had to become virtually uninhabitable before the people could unite to combat the situation. The most advanced political and governmental mechanisms for pollution control function in the Ruhr Basin in Germany, but this is less a tribute to Teutonic efficiency than a recognition of how really bad the situation was before the stringent control methods became viable.

Thermal pollution was barely recognized as a genuine environmental problem five years ago. At the present time it seems that more attention is given to this particular source of pollution than is given to the continuing flow of industrial municipal wastes into our waterways. Thermal pollution seems now to have symbolic importance in the public mind.

Everyone can smell and see the discolored effluent of manufacturing plants, and taste the chlorine residue which evidences coliform pollution. Thermal pollution is the special concern of an elite segment
of society. There is a certain "status" in joining the battle against thermal pollution, because only well-informed people can articulate its dangers.

Public awareness of environmental deterioration, concern about it, and determination to do something about it, are not focused and directed, but are general and much of the time amorphous, uninformed, and emotional. It constitutes a vast reservoir of social energy, and those who would tap it are not always completely responsible.

In New York, a coalition of environmental and political leadership has stymied the attempts of the local public utility to expand its facilities to meet the growing demands of the metropolis for energy in this form. The opposition has been in the name of concern for the environment. One may ask, on the hot summer day when this paper goes to press, whether the environmentalists' opposition to each and all of the company's proposals for building new capacity might lead to a dangerous discrediting of environmental leadership, if the "public" should associate a crippling power failure and its attendant breakdown of public services and amenities with the opposition to the company's building plans.

In the winter of 1969-1970, we noticed that a reciprocal relationship seemed to exist between concern about the Vietnam war, and concern about the environment; students and some other segments of society "took up" ecology with the same dedication and militance and this was hailed as a socially good thing. Soon, however, second thoughts were heard. With their knowledge and dedication and energy, the students quickly turned their attention to the larger issues of growth, of life-style, and of the relevance of most of our institutions.

Public clamor for action has tended to outpace the ability of the political and social leadership of our society to contain and channel these forces toward constructive ends. In a sense, Congress, the courts, the executive branch, and the regulatory agencies at the federal level, and all of their counterparts at the state and local level, have been in a race to catch up. In the metaphor of the French Revolution, leaders have been trying to catch up with the mob they are supposed to lead.

Regulatory agencies such as the Federal Power Commission have broadened their definitions of the public interest to include concern about the environment, and even so occasionally have found the courts prodding them even farther down this road. Partisan lines have been erased as legislators have attempted to outdo each other in the kinds of proposals they can introduce for legislative action. The President of the United States devoted a section of his first State of the Union message to the environment, and followed it up with a special message, with support of a bill to create a Council on Environmental Quality, and with Reorganization Plans to group federal functions for a better attack on the problems of pollution and of restoration of environmental quality.

To quote the vaudeville phrase, everybody wants to get in the act.

Failure to recognize fallacies in some of the current public thinking on this subject will surely lead to counter-productive results. It is a fallacy to expect technological developments to eliminate the inherent inefficiencies of energy conversion, and the associated necessity of dissipating unwanted heat. In absolute terms, the amount of heat to be dissipated is going to go up, even though greater thermal efficiencies are still to be attained.

It is a fallacy to believe that today's environmental evils are entirely traceable to bad planning, or absence of planning. It is a fallacy to believe that coordination and consultation and endless studies and commissions will eventually produce solutions to these problems. An equivalent mistake associated with concern about the environment is to seek a public administration analogue of ecology itself. Seeing our environment as a single, interrelated system does not mean that governmental administration of environmentally related programs must be united into a single, interrelated system.

And it is the biggest fallacy of all to consider electric energy generation as a source of pollution without considering the pollution potential of any alternate method of supplying energy needs, and without considering electricity's vital role in eliminating other forms of pollution.

The public's concern being pervasive, a contest for leadership and control of so powerful a force is inevitable. The struggle is similar to that in the civil rights area, in poverty and welfare, in education, and in the opposition to some of our international commitments, marked by a growing militance and extremism. In the area of the concerns of this symposium many examples can be given. The subject matter of thermal pollution is complex and hard to understand, so the leaders or would-be leaders necessarily have to develop various kinds of oversimplification. The fault is said to lie with a craze for profits by utility management; the fault is with corporate blindness to what technology could do, if only enough money were spent for research; the fault is in the advertising programs, asking people to buy more air conditioners, or to use electric heat.

It is not my purpose to criticize the leadership of any group which opposes the construction of a power plant, whether fossil-fired or nuclear, on the ground that heated water will do grave damage to the environment when returned to stream or lake or estuary. They are entitled to simplify the issues in their terms.

It is my purpose to criticize the way governmental
officials have reacted and responded. It is not reasonable to expect public officials to refrain from statements which contribute to an uninformed conclusion that it is possible to generate electricity without producing heat which has to be absorbed by the environment in some fashion. Broad statements about ‘restoring’ the environment sustain the false belief that we can have our energy-based progress without paying nature irreparable penalty.

It is irresponsible, in my opinion, for public officials to compartmentalize their responsibilities, making one group of agencies responsible for the continued reliability and adequacy of power supply, while another set of agencies assumes only the responsibility for improving the environment.

In our system of government, the production of electric energy is the most completely regulated of activities; it is the responsibility of public officials concerned with the environment to understand the complexities of the system of regulation, as well as the complexity of the technology.

The costs of the system are borne by ratepayers, not taxpayers, and the likelihood that the cost of environmental protection will be distributed in a most uneven fashion has to be recognized. The penalties for failure of a utility to meet standards of environmental quality in the matter of thermal discharge most predictably will consist of inhibiting or delaying service. It is incumbent upon public officials to be aware of where the burden of these consequences ultimately falls—if an entire community is blacked out, the attendant economic dislocations and threat to health and safety must be seen as environmental consequences, also.

Certainly public officials ought to have a clear understanding of the state of the technological art, and of the basic economic facts of the various alternatives which may be available for disposing of waste heat. Perhaps it is acceptable rhetoric for a conservation leader to say that cost is no object; but in case of a government official, he at least must know how much cost he is talking about, and who will be paying it, and the economic and other consequences of the increased costs. You may be sure that we are not talking about charging these costs to the salaries of the utility executives, or to the holders of their bonds. These are regulated companies, generally speaking, so the constitutional entitlement to at least the opportunity of earning a fair return on investment does not mean that increased investment costs may cost the stockholders more; rather, it means that the increased costs will broaden the earnings base, and rates will be allowed to reflect these costs.

It is also incumbent upon the public official who is dealing with environmental standards to know that one trade-off for passing big volumes of water or cooling over condensers may be the consuming of smaller quantities of water. This is often an acceptable alternative, but it is not useful for us ever to forget that water itself is not in unlimited supply. Furthermore, the venting of the heat to the atmosphere in the form of vapor may have other environmental detriments.

At the present time, government activity with respect to thermal pollution is widely dispersed, with a number of different functional approaches to the problem operating simultaneously. The principal activity with the broadest impact is setting standards for water quality. Applying some of the principles outlined above, the lesson to be drawn from this activity as it has been carried out is the seeming isolation within which it has operated. Announcements of objectives have not been coupled with any evidence that there has existed a clear understanding of the consequences of the particular standards on existing and projected utility plants.

Another activity has been to ask the courts to enjoin activities based on existing statutes, including such ones as the 1959 Flood Control Act. This brings the Justice Department into the regulatory field, for that department must review the facts and agree to bring the action. Here, again, criticism can be leveled at seeming lack of concern about the responsibility of maintaining utility service, if the object of the suit should be attained.

The Atomic Energy Commission and the Federal Power Commission, in their licensing activities, have a much better record of relating environmental considerations to the need for electric energy, and certainly these expert agencies can, indeed must, state the public interest considerations in each direction which are taken into account in determining to license or not license, and in the specification of conditions which must be accepted.

The greatest impact of regulatory activity is at the state level. The weighing of environmental values against the need for electric energy by state agencies is affected by the pervasive public concern about the issue, just as it is in the federal courts, the federal agencies, and in the halls of Congress and the State legislatures. The absence of any clear pattern as to how the states are responding does not conceal the fact that a higher quality of awareness is evident in the state actions.

The suspicion cannot be avoided that environmental consciousness may be exploited by those whose real concern may be entirely selfish. Here, again, the prescription I make for a higher sense of responsibility on the part of government officials is applicable.

Finally, of course, we can turn to the Congress and examine the many different ways it has found to evidence its interest in a better environment. Sadly, it must be said that most of the proposals affecting the utility industry do not show a good understanding of even the simplest of physical or economic relation-
ships in the matter of thermal discharges. A senator in one hearing wanted to know whether 85-degree discharge into 90-degree water would contribute to heating the water. Some legislative proposals seem to be premised upon generating electricity without producing excess heat, as if such a "breakthrough" were just around the corner. Almost never is it stated that the amount of heat which our environment must absorb is going to continue to go up, no matter what steps we take, or how much money we spend.

In summary, I believe that we can do a much better job about the management of waste heat. But to do so, we are going to have to acknowledge some hard facts, physical and economic. We are going to have to see the consequences of our ameliorative steps in their correct perspective, with particular attention to equitable apportionment of costs. We are going to have to exercise greater self-restraint in our rhetoric, and abandon the devil-theory in formulating and executing policy. We may need to reorganize some of our institutions, but I give a much lower priority to that approach than I give to the enhancement of responsible education of the public about how much electric energy we must still build for, how much heat this will produce, where we physically can put that heat, and the costs and benefits of the various alternatives, and how these costs and benefits should be equitably shared.