Published in Fortnightly--
June 19, 1969 issue

Legislating for Electric Power Reliability

by

John A. Carver, Jr.
Commissioner
Federal Power Commission

May, 1969

Legislating for Electric Power Reliability

> "There are some five million parts in the Apollo Saturn space vehicle that flew out to the moon. If one achieved a level of 99.9 percent for the reliability of these parts, it would mean that one part in a thousand might fail. Thus, on each flight, we would have something like five thousand parts fail. We have tried to design our equipment to be 99.999 percent reliable--a level of reliability that had never been achieved in our country. The fact is that only five non-critical parts actually failed on the whole of the Apollo 8 flight is a demonstrated reliability of 99.9999 percent--a phenomenal level of reliability."
>
> Statement by Dr. George Mueller, Associate Administrator for Manned Space Flight of NASA, before the New York Society of Security Analysts, New York City, January 28, 1969.

> "Just what is the reliability 'problem'? Our customers have electric service available to them 99.98 percent of the time. We are not satisfied with even this high record--but what is the best way to tackle the remaining two hundredths of one percent?"
>
> Statement of Robert H. Gerdes, President of the Edison Electric Institute, before the Committee on Interstate and Foreign Commerce, House of Representatives, March 28, 1969.

These two statements, each for its own persuasive purpose, focus on the attained success of complex technologies in statistical terms. Neither, however, reflects the full significance that attaches to fractional deficiencies, no matter how miniscule. Dr. Mueller fails to

"weigh-in" the minutes or hours of delay that occur in preparatory countdowns or the tragic fire that delayed Apollo for several months. Mr. Gerdes evokes no reminder of the public concern, ranging from mild disgruntlement to near panic, that arose when 30 million people were plunged into darkness and mechanical immobility over an 80,000 square mile area.

It is in the failures of our technology, not its successes, that we get the headlines, and it is from the headlines that we get widespread public interest in reform or change. That there would now be a determined drive for "reliability legislation" if the P-J-M failure had not come so soon after the Northeast Blackout is at least doubtful. These big events completely dominated the public consciousness, and created a political compulsion for public officials both elective and appointive to favor some form of legislation in the field of electric power system operation, a reaction cynically called "blackout insurance."

The magnetic attraction of this issue as the subject of legislative sponsorship is amply demonstrated. During the 89th Congress, which was sitting when the Northeast incident occurred, one bill was introduced. That was a relatively simple and conventional measure to regulate

EHV transmission lines. After the P-J-M incident, the 90th Congress was faced with a proliferation of bills, nine to be exact. The eight bills before the 91st Congress have attracted well over half a hundred sponsors and include still a new variant in the form of the National Association of Regulatory Utility Commissioners' concept of "joint boards" drawn from State regulatory agencies.

Entirely apart from the flurry of legislative interest, other concrete results flowed both from the events and the public reaction to the events. The steps taken in the areas affected by the blackouts included the commitment of hundreds of millions of dollars for system improvements. Utilities remote from the affected areas looked to their own situations, and committed equivalent sums as a response to the lessons taught by their unfortunate colleagues.

It is significant that neither in 1967 when the first comprehensive bill was introduced, nor since, has it been suggested that legislation was needed because of technological insufficiency. The bills have not called for a government program

to get better quality or better designed equipment. It is also significant that no criticism has been laid at the doorstep of really basic operating or engineering anomalies, such as might be the case if different power systems could not be electrically synchronized. However different our ownership patterns in the United States, these differences do not lead to equipment incompatibility. Furthermore, the technical personnel of the electric power industry, whatever their segment of origin, can achieve unanimity in the evaluation of the most complicated cascading power failure.

Why, then, is legislation needed? Is it motivated entirely by a political desire to get "on the right side" of the issue of preventing blackouts?

The answer to this question can't be a simple one. No student of the problems which the electric utility industry faces for the future would dare say that anomalies requiring Congressional attention are nonexistent. Improvements which only the Congress can make would end a number of frustrating hold-ups in vital projects.

Unfortunately, little attention seems to be paid to this opportunity for improvement in many of the pending bills. No bill identifies delay as a factor which threatens the integrity of electric power systems in the

future. Quite to the contrary, new procedures would be prescribed which would contribute to delay and stretch out the lead-time factor in facilities planning.

Many of these new procedures are in the environmental quality provisions of the various bills. It is perhaps only happenstance--the juxtaposition of unrelated events--which brought the issue of environmental quality into the public debate in such a way as to lead to a conclusion, certainly false, that engineering and operating reliability is a positive function of heightened concern about environmental quality. A secure and reliable bulk power supply system in the future may require us quite soon to face some politically unpalatable realities in connection with developing controversies over siting generating plants, both nuclear and conventional, and in connection with the acquisition of needed rights-of-way.

When the Johnson Administration's Reliability Bill (S. 1934, 90th Congress) was first introduced in 1967, a considerable controversy was already swirling around the location of a transmission line near Antietam National Battlefield, in Maryland. At the very first day of hearings, two separate public questions were injected. One was whether and how far the Federal government might go to require rerouting of a transmission line, and who should make this determination for the Federal government.

A second was the adequacy of State laws to protect the rights of individuals against arbitrary exercise of eminent domain power by a utility. Important as these issues are, they were not primarily "reliability" questions, yet in a political sense, the concepts are now firmly tied together. The elaborate provisions for a Council on the Environment, engrafted to the first reliability bill by several senators and congressmen, is the key bill so far as the 1969 congressional hearings are concerned, since there is now no Federal Power Commission bill and no Administration bill before the Congress, and that bill adds a whole new, time-consuming layer to the coordinating powers.

Without questioning the importance of surveillance over decisions affecting environmental matters, one may doubt whether the subject at hand is the appropriate vehicle for so far reaching an innovation. In the present context, indeed, a more direct response to environmental considerations would seem to be in the direction of Federal financial support for accelerated research and development in the undergrounding of high voltage transmission lines. Modest proposals to this effect (total cost about one percent of the 1969 outlay for the Apollo program), as contained in Interior Department appropriation

requests since 1967, have fallen on sterile ground at Budget Bureau and Congressional levels[1/] on the principal ground that this would provide a subsidy to an industry fully capable of underwriting its own technological needs.

The National Association of Regulatory Utility Commissioners, in its version of a "reliability bill" recommends the creation of "State Joint Boards" composed of a State commissioner from each State in a power pool area. These State Joint Boards would be empowered to determine routing of transmission lines, based upon considerations of reliability and protection of historical, recreational and scenic values. They, too, would add to the advance planning time.

It is possible, perhaps even probable, that in the long run these new procedural requirements will save time,

---

1/ The report of the President's Council on Recreation and Natural Beauty, From Sea to Shining Sea, U. S. Government Printing Office, Washington, D. C., 1968, p. 143, errs in its statement that funds had been appropriated to begin such a program.

compared with any foreseeable alternative. Nevertheless, the shortening of the process is not clearly the predicate for the requirement, whether or not it turns out to be a result.

In the same way, the suggestion that the Federal Power Commission be given authority to certify the public convenience and necessity of extra-high voltage transmission lines is not entirely motivated by a need for eliminating delays attendant upon justifying new facilities in several States, each with different standards for its own review. This is probably the provision of the various proposals for new legislation which comes nearest to being utility-oriented in its motivation. But as this feature would be handled in some of the bills, emphasis attaches to details of routing, and to publicizing decisions on precise routing, rather than on the wholly different problem of the impact of particular State laws on what constitutes public convenience and necessity. Specifically, if the regulatory commission in State A judges the public convenience and necessity of a proposed line or generating plant only in respect to the citizens of State A, constraints may be imposed on what a company can build in that State which will adversely affect either system reliability, or economics, or both, with respect not only

to its own customers but customers of interconnected systems.

Features of reliability bills which may seem remote, even antithetical, to reliability objectives in a conventional sense, may still be entirely supportable in the public interest. In the case of the environmental problems, it seems to me that it is valid for the affected industry to suggest that Federal legislation on this subject should not be specially focussed on it. Furthermore, I believe it would contribute to the quality of the debate on this sensitive subject for clear distinctions to be made between those reforms which relate to simplifying or speeding or improving the process of getting power systems built on time, and those which are designed to remove elements of unfairness or of aesthetic obliviousness from utility planning processes.

In my judgment, a key problem with the various reliability proposals is that they give so much attention to a particular mechanism for cooperation and coordination of the various segments of the utility industry. Given the nature of the segmentation of the industry, I do not believe the form of coordination can erase the substance of continuing conflicts, particularly in the economic area.

It is the thesis of the bills that reliability will be enhanced by attacking anomalies growing out of the diversity of ownership patterns. It is within the realm of the student of public and business administration, and of political scientists, to evaluate the question of whether and how almost 500 investor-owned generating systems, two thousand plus non-Federal public systems, one thousand cooperative systems, and about two score Federal systems, can be motivated to subordinate their individual "sovereignties" to common goals in reliability councils or any other mechanism.

So far as I know, evaluations by public administration experts or political scientists have not been made. Questions about the ultimate size of the councils, voting arrangements, dealing with noncooperators and recalcitrants, and the like, are not spelled out in the bills, and the answers which have been given are answers of engineers, not administrators, and of government officials, not operating officials.

In my judgment, a really critical problem arises with respect to the Federal government's own participation. The rules under which Federal power generating operations are carried out do not lend themselves to easy participation of bureaucratic subordinates in coordination councils.

Besides the public administration expert and the political scientist, it may be that social scientists could contribute some insight on the relative degree of cooperation which could be achieved with and without a legislative prod. It is undeniable that really remarkable breakthroughs in cooperation have been achieved between ownership segments traditionally suspicious of each other. The cooperatives and the investor-owned segment jointly own the Cardinal generating plant in Ohio; the cooperation between the Federal and other public segment in the Northwest with the Federal Bonneville Power Administration would really surprise the idealogues of even ten years ago.

Cooperation has not been noteworthy in other areas, in some of which highly litigious situations persist.

Problems arising from the segmented nature of the utility ownership patterns into investor-owned, public, and cooperative groups, are, nevertheless, real ones. At the point where two units from the same segment would make one kind of decision, either in facility or operating

terms, units from different segments may tend to make a different decision. From a strict reliability standpoint, the result is arguably undesirable based on underlying considerations arising from conflicting views on the economic considerations, institutional objectives and land-water-air uses.

Considering the breadth and diversity of these conflicts the various reliability bills approach these problems with understandable caution and differences. Economic and institutional differences are generally consigned to regional councils for solution and without benefit of any legislatively imposed scale of values to resolve the conflicts. The FPC bill of the 90th Congress had a provision for resolution of conflicts arising from reliability and land-use considerations by making the United States the steward of the latter values giving the Federal government a limited-veto after deferring initially to State and local initiative. The Kennedy-Ottinger-Moss version offers a different perspective. It, in effect, subordinates reliability, or at least cheaper reliability, by giving extensive powers to a Council on the Environment. Congressman Ottinger, with an assist from my colleague, Commissioner Bagge, has introduced a bill to deal with the interface problem

by bringing the municipal and cooperative (but not Federal) segments of the electric power industry under the regulatory wing of the FPC. A kind of interface problem, namely one created by the disparate impact of State regulation where State lines are crossed, is attacked by the so-called NARUC reliability bill.

When it is necessary to take abnormal operating steps to match electric generation and transmission capability with electric loads, which may involve voltage, frequency reduction, block loading, load-shedding or system-islanding, attention must be given to the matter of definitions and priorities. The phenomena giving rise to these steps are of physical origin, and they occur however broadly or narrowly interconnected the systems may be.

If this problem is to be brought into the legislative arena, it must be by providing a way to arrive at operating criteria in terms of the legislatively ordained objective goals of reliability. Since service may fail at any time attention must be accorded to such matters as who gets dropped first. Definitionally, this requires classification of utility customers which will be adverse.

In such situations, it may be useful for the standards to be specified by a public agency but the pending bills

do not take this approach.

I think it is demonstrated that taken together, the various proposals for new legislation in the name of enhanced electric reliability generally rest on tenuous and shifting assumptions. Stated baldly, they seek in one way or another to legislate for more cooperation and coordination. In giving more attention to the form or structure of the coordinating mechanism, and little or no attention to resolution of underlying real conflicts, within the industry, it is entirely possible that more controversy between segments will be intensified, rather than reduced. Once Congress takes the responsibility for the coordinating mechanism, it will have to take the responsibility for ultimate resolution of the controversies which grow out of it. This can be done by giving the Federal Power Commission refereeing power, creating another agency like a Council on the Environment, or preparing to grapple with the worst questions itself. Given the nature of the competitors, and particularly when one of them is the federal government itself, it is not reasonable to expect that the councils will be able to resolve all the problems which come up.

I do not conclude that no legislation is necessary. Quite the contrary, for solutions to some of our reliability problems can only be achieved with the aid and support of Federal authority.

Certain of these legislative targets have already been delineated or suggested in the preceding discussion, but to sum up and fill the interstices, I venture to suggest that national policy efforts at this time should be concentrated on the following points of concern:

-- Provision of the enabling authority essential to timely construction of critical transmission facilities. In some instances this will involve the actual construction of Federal segments of interconnection systems or backbone grids; in others, the planning and expeditious acquisition of transmission corridors or rights-of-way will be the proper focus on governmental authority.

-- Reconcilement of industry cooperation and coordination with Federal anti-trust and anti-monopoly policies. Inter-company coordinated action cannot be encouraged, demanded or mandated under the cloud of possible liability; clear and reasonable standards as to the permissible extent of joint action must emanate from the source of our anti-trust policies.

-- Creation of a forum or mechanism for the establishment, continuing review and promulgation of technical standards and practices. Expertise which is unsurpassed anywhere in the world is available to focus on a matter which is crucial to our energy-based society; we have but to marshal it and provide the framework, preferably in the simplest possible terms, for the distillation of broad experience and profound insights. At this stage, it is less important whether the resulting standards have regulatory status than that they be drawn. If acceptance is not compelled by the force of public interest and concern, there will be later opportunity to provide the necessary degree of compulsion.

-- Assure the full participation of the Federal segment of national power resources in the general effort. While this might be accomplished by executive mandate, industry confidence would be buoyed by a legislative policy having equal application to all segments of an interlocking complex.

But legislation whose touchstone is cooperation and coordination cannot be soundly developed in an atmosphere of suspicion and resistance. The emphasis on "blackouts" is not conducive to a good atmosphere for needed legislative reform, for every knowledgeable person knows that no amount of legislation will remove the possibility of occasional serious outages. The concern about environment is genuine, but the problem is far more general than just in the regulated electric utility segment of our national life. Cooperation among States, and between States and Federal government, is highly desirable, and given a proper chance could solve many vexing delays.

The Congress itself, in the final analysis, is going to make the first decision as to <u>whether</u> legislation is necessary and the final one as to <u>what kind</u> is necessary. The committees should have before them the widest range of alternatives, and the most realistic and dispassionate appraisals of them. Included in this should be an improved evaluation of the workability of any coordination mechanism which is proposed to be legislatively established.