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What *Really* Caused the Blackout?

Power Engineers Supporting Truth

One afternoon in late August, the lights went out for 60 million Americans...but the investigation of what happened is a true blackout.

An investigation is underway to explain the August 14th, 2003 Blackout. But don't look to our government to blame itself. A federal commission is mandating untried "market restructuring" that pits economic theory against prudent engineering. A recent poll of utility CEO's revealed most believe "restructuring" sacrifices reliability.

Why must Blackout investigators sign confidentiality agreements? This is unprecedented and wrong. If the Blackout report seeks truth, it must also look to the federal government itself, and those organizations whose deregulatory ambitions ignore prudent engineering.

The Federal Energy Regulatory Commission's recent decision to hire more engineers is a candid admission of its own inadequacies. Economic theory will never trump engineering fact.

Blackouts will increase, unless this is recognized.

The true causes of the August 14, 2003 blackout, and the underlying decline in electric power reliability, must be investigated if we are to avoid repetitions. It has been widely recognized for many years that the industry was taking increasing risks. The question became not whether a massive blackout would occur, but when and where.

Following blackouts, as with all major disasters, considerable effort is dedicated to deflecting blame toward others. To this point, the investigation of the underlying causes of the blackout, and the development of remedial actions, has been carefully orchestrated to eliminate any discussion of the effects of restructuring legislation. Likewise, the roles of government and industry organizations in changing focus from long-range reliability and cost reduction to "how do we make the most money now" have been ignored. Such investigations should not be conducted by those either in government or industry who were, or may have been, involved. They must be conducted by an Independent Investigation Board of recognized technical experts appointed by Congress or the President.

The specific events of the recent blackout were clearly the result of changes in the structure of the industry. The federal government, mostly through the Federal Energy Regulatory Commission (FERC), has mandated untried structural changes. It established new rules and procedures which encouraged bad behavior, with no analyses of their potential effect on reliability. The Enron debacle is a case in point. We should not be surprised at the results; in a recent survey, more than half of the utility executives polled said they believed that industry restructuring has caused a decline in reliability. Those who argued that market forces could somehow produce good engineering designs and operation totally lacked technical background, and were totally wrong.

The economic losses from the blackout have been found to be in excess of \$5 billion; the California blackouts in 1996 each cost in excess of \$1 billion; the annual national impact of declining power reliability and quality has been estimated to be in excess of \$50 billion. Deregulation has produced a

focus on “profits now,” with consequent huge reductions in employment in the power industry, in maintenance expenditures, and in other short-term expenditures.

Labor employed by investor owned utilities decreased from 480,000 to 350,000 in the ten-year period from 1990 to 1999. Dept. of Labor data shows national utility employment in power generation dropped from 350,000 to 280,000 over the 1990 to 2000 period, and from 196,000 to 156,000 in transmission and distribution, while electric consumption continued to increase. Reductions in training were one consequence, since personnel often was not available so that others could be released for training programs, as was done in the past. At a recent technical conference in Philadelphia, one individual said, “We have downsized quite a bit of our operating staff.... There is not a whole lot of time left for training.” An independent European analysis has concluded that personnel reductions also played an important part in the recent blackouts there.

In the United States, reductions in personnel have been greater in the deregulated portions of the industry than in those still under regulation. While some reductions in labor are appropriate at times, others are the result of a focus on immediate profits. A competent analysis of the effects of such labor reductions is needed.

Other economic results have not been investigated; e.g., the effect of new dispatch procedures on costs, and the increase in transmission losses. The federal and some state governments have become obsessed with market forces, and have repeatedly ignored warnings about declining reliability and increasing costs to consumers.

Providing electric power is a highly complex technological process; it requires technical competence of FERC itself, and of its staff. With the exception of a few lower level individuals, such competence is sadly lacking. The same is true for the Department of Energy (DOE). Appointments and assignments are based on political loyalty and political affiliation, with no minimum standards for technical knowledge and experience.

Over the last 15 years, the federal government’s focus has been on facilitating markets for electric power. It still is. Policies have been dictated by economists and supported by those in industry and the various professions who expected to gain financially.

Through the years, the importance of technical considerations in FERC proceedings and policies has gradually declined. Following the 1965 blackout, Joseph C. Swidler, then Chairman of the Federal Power Commission (FERC’s predecessor), was instructed by President Johnson to have the best engineering talent available supervise the investigation. This was done. In subsequent years, though, technical questions raised by staff members often led only to transfers. An investigation should be made of the harmful evolution in FERC from a technically competent organization to one with little technical expertise. Recent events clearly show that FERC could have and should have exercised far more technical competence in its activities.

The FERC has been completely reorganized in the past few years, further decimating its limited technical expertise. Staff responsibilities previously divided into separate and distinct electric and gas organizations, were reshuffled to become a single organization dedicated, not to technical expertise, but to the implementation of market forces. We have been personally involved in training programs for FERC staff on the technical and economic functioning of electric power systems. Most participants lacked technical education but were anxious to learn. They commented frequently, however, that technical knowledge was of little interest to their supervisors.

FERC has tried to impose huge electricity marketing areas, without technical analysis of the effects on the development and operation of the actual, physical power system. A specific example was provided in the recent blackout: FERC had approved the operation of the Midwest Independent System Operator (MISO), stretching across part of three reliability councils. While FERC’s purpose was to facilitate

market procedures, no analysis of the technical adequacy of MISO was attempted. There was no appraisal of whether MISO was prepared to assume operating responsibilities, whether the MISO control center was complete, and whether its operators were properly trained or qualified. In April 2003, MISO had prepared its “Regional Transmission Organization (RTO) Reliability Plan.” It was vital that the procedures involved to coordinate MISO’s operations with the existing reliability councils and security coordinators be carefully reviewed. Quoting from the DOE Interim Blackout Report:

“Before approving MISO, FERC had asked NERC for a formal assessment of whether reliability could be maintained under the arrangements proposed by MISO and PJM. NERC replied affirmatively but provisionally. NERC conducted audits in November and December of 2002 of the MISO and PJM reliability plans, and some of the recommendations are still being addressed. The adequacy of the plans and whether the plans were being implemented as written are factors in NERC’s on-going investigation.”

Yet FERC approved the operation of MISO.

The Chairman of FERC recently announced his intention to create a new department to deal with reliability matters, and assume national control of both reliability standards and their enforcement. Thirty engineers would be hired for this purpose. This alone is recognition of past FERC failures – and its inability to understand the problem. The new staffers would work in the Office of Markets, Tariffs and Rates, under the management of those responsible for enhancing market procedures. Given its adherence to economic theory over engineering fact, such a seizure of control by FERC is a questionable and even dangerous step.

The Interim Blackout Report is another case in point. The government carefully selected personnel, and orchestrated its limited content. It controlled the writing of the report, the various public hearings and workshops conducted after the blackout. It even required those involved in the investigation to sign confidentiality agreements – an action unprecedented in the history of electric power in the United States. The Interim Report contains no references to the Regional Reliability Councils, to their standards and criteria, or to their compliance measures. The words “deregulation” and “industry restructuring” are not even mentioned in the report. Throughout the process, the government’s activities have been carefully politicized. This effort has not been confined to the government. The December 14, 2003 issue of the Allentown, Pa., *Morning Call* contained a story about how one utility chief executive, in order to protect his company’s interests, maneuvered to get someone from his staff placed on the commission to investigate the blackout.

Those who headed the blackout investigation had little technical background, and lacked experience with power systems or prior blackout investigations. DOE ran a carefully limited investigation to avoid any review of the government’s role.

Along with FERC and DOE, NERC has been overly concerned with facilitating the market. While NERC is now proposing steps to help prevent and mitigate future blackouts, an examination of its past role and activities casts a shadow on its objectivity. NERC has had responsibility for operator training and qualification, as well as certification of control center facilities; shortcomings in each of these contributed to the blackout. An investigation of how well NERC executed its role in these areas is warranted. The background, technical qualifications, and objectivity of the NERC Board Members and others involved in the conference phone call giving NERC’s stamp of approval to the DOE Interim Blackout Report should be appraised. While NERC’s decisions are vital in maintaining reliability, some NERC Board Members who are aligned with market development organizations seem to be striving for lower reliability standards to enhance profits. Both the management and governance of NERC need a complete review – particularly the bureaucratic procedures adopted to set and enforce reliability standards. The *proper* functioning of NERC or some replacement organization is the key to future electric power system reliability.

The possible role of the managements of some organizations involved in generation, transmission and marketing of electric power should be investigated. Restructuring has resulted in an increased focus on profits. This has sometimes led to conflicts between marketers focused on profits and system operators responsible for reliability, with conflicts arbitrated by top management. The responsibility for the corporate policies involved lies with the corporate Board of Directors. While only a limited number of companies may be involved, a review of the policies that have been set, or failed to be set, is justified.

Congress or the President should support an Independent Investigation Board. Such a body must have extensive experience and technical knowledge, as well as the unquestioned integrity to investigate the roles of government and industry in an objective manner. Past legislation, FERC, DOE, NERC, and power company corporate policies should all be subjects of this investigation. Once these have been examined, before any overhaul of the system can begin, the issue of the competence and integrity of those responsible for technologically flawed and inappropriately mandated regulations, protocols and procedures must be explored. As stated in the 1977 Study on Federal Regulation by the Ribicoff Committee on Government Operation, “No amount of improvements in organization, procedure or substantive mandate of the agencies can overcome regulation problems if inadequate appointments are made to these agencies in the first place.”

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Power Engineers Supporting Truth (PEST) is a new organization of experienced electric power system engineers. Our intent is to provide expert and unbiased appraisals of the various investigations of the recent blackout, and of whatever remedial actions are proposed. Most important, we hope to identify the best ways to make the bulk power systems in the United States both more reliable and more economic. We will make our reviews and recommendations available to the general public – as well as to interested industry groups, government officials, and the media – before industry or government invests huge sums in proposals which may be undesirable or inadequate.