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Outline
Testimony of George C. Loehr
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Reliability and *commercial use* of the bulk power transmission system are two entirely different things. Reliability is a function of the reliability standards (or criteria) used, not the amount of wire in the air. A weak system with more stringent standards will be more reliable than a strong system with weak criteria – or any system where even stringent standards are not followed.

Adding transmission in and of itself will not improve reliability, if the same reliability standards are used.

In fact, it might actually make the system less reliable. That's because adding transmission makes the bulk power system electrically tighter –geo-electrically smaller. Thus a severe disturbance is likely to cause a blackout in a much larger area. It isn't an accident that the 2003 blackout affected a larger area, and far more people, than the 1965 blackout.

Also, the 1965 blackout was caused by an incident in the Niagara area of Ontario, essentially on the border of New York State. The 2003 blackout was caused by incidents in Ohio and/or Michigan – much more distant.

If we continue to build transmission, but use the same or less stringent criteria, the next time a major disturbance occurs, it could take down an even larger area. Or, conversely, a disturbance much further away could cause the New York system to go down.

Strong criteria are kind of a basic form of consumer protection.

For more than 35 years, the New York State system has been planned and operated in accordance with the criteria developed by the Northeast Power Coordinating Council (NPCC) -- NPCC's "Basic Criteria for Design and Operation of Interconnected Power Systems." NPCC includes all electric power systems in New England, New York, and the Canadian provinces of Ontario, Quebec, and the Maritimes. These criteria are generally considered to be the strongest in the industry.

The New York State Reliability Council, which is responsible for the standards used in the New York Control Area, mandates criteria which are even more stringent than NPCC's; especially those applying to the New York City metropolitan area. These higher standards are necessary because of the high density of population and the critical nature of the load in New York. In addition, limited transmission rights-of-way have required much larger use of multiple-circuit transmission lines than is common in other parts of the country. These criteria have been existence since the early days of the New York Power Pool more than 30 years ago.

Right now, the North American Electric Reliability Council (NERC) is proposing a set of standards significantly less stringent than those in use today. At the same time, NERC is proposing to change from the concept of NERC criteria as *minimum* standards, to a concept of NERC standards as *absolute, one-size-fits-all* standards. If this change is permitted, New York will no longer be allowed to use its present, stronger criteria.

In brief, the proposed NERC criteria would do away with all contingencies that involve more than a single system element. Thus long-established contingencies like loss of both circuits of a double circuit tower line, a fault on a bus section or internal to a circuit breaker, a fault with a stuck breaker, or loss of both poles of a bipolar DC line, would be dropped. This would constitute a serious degradation in bulk power system reliability.

The House version of the Energy Bill now in conference in the U.S. Congress includes a provision that any state can take action to ensure safety, reliability, etc., as long as such action "is not inconsistent with" national reliability standards. The phrase "not inconsistent with" is somewhat ambiguous. NERC has said that it would interpret "not inconsistent with" to mean "not different than"; thus no one would be permitted to have more stringent standards. NPCC's (and New York's) multiple-element criteria would no longer be allowed.

If, one way or another, NERC's authority is established to mandate universal standards – not minimum, but one-size-fits-all – NPCC's (and New York's) only recourse will be to file its own, more stringent criteria as a "regional difference." This is permitted by the proposed NERC standard. However, this would place NPCC's (and New York's) reliability in the hands of a NERC committee. If, in the future, that committee decided that NPCC's "regional differences" should no longer be permitted, New York, along with the other NPCC systems, would be forced to use NERC's less stringent single-element criteria – with far lower reliability, and more frequent power failures and blackouts.

Even if NPCC (and New York) were able to maintain more stringent criteria, it would still suffer lower reliability. Neighboring systems now use criteria similar to NPCC's. If, in the future, they were to adopt NERC's less stringent criteria, NPCC (and New York) would be subject to multiple-element contingencies in neighboring systems, and thus would still experience an increase in the number of cascading outages, system separations, and blackouts.

As a power system reliability expert with more than 40 years of experience, I consider it critical that New York be able to use at least the same level of criteria that is has in the past. Therefore, I strongly recommend the following principles:

1. NERC criteria are *minimum* criteria; any entity may have more stringent criteria.
2. Any entity with more stringent criteria should not be required to obtain approval from NERC.

Despite these considerations, the question remains as to how New York might protect itself from disturbances which occur outside of New York State.

Some neighboring systems have claimed that their superior standards, better protective equipment, or quick-acting system operators protected their own systems, or "stopped the spread" of the blackout on August 14. This is all nonsense. Blackouts don't spread like some electrical equivalent of the '50s sci-fi movie, *The Blob*. When a synchronous interconnection or "grid" begins to go unstable, as happened on August 14, nothing can stop it. It happens in seconds, so there's no time for operator intervention. Whether a system winds up in the blacked out area or not is purely a function of the characteristics of the overall system, its configuration just prior to the initiating disturbance, and the nature of that disturbance – in other words, dumb luck.

As long as New York State is part of the gigantic Eastern Interconnection, which stretches from the Atlantic Ocean to Colorado, and from northern Manitoba to the Gulf of Mexico, it will be vulnerable to disturbances in other systems. This interdependency is growing. It's also being exacerbated by deregulation.

Deregulation has brought a large increase in the number of entities involved in electric power production, transmission and distribution. It has separated the ownership of generation from transmission and distribution. It has also replaced a culture of *cooperation* and *coordination* with one of *competition* and occasionally *confrontation*. These changes have significantly increased the complication of operating the electric power system.

These institutional complications can be offset by making the physical system simpler. The best way to accomplish this would be to break up the two large North American grids into a series of smaller ones – tied together, not with today's alternating current transmission lines, but with direct current lines. Direct current, or DC, doesn't behave the same as AC. With AC, what happens in one place on the grid affects everywhere else. So a major disturbance in Ontario is felt as far away as Oklahoma, Florida and Maine. This doesn't happen with DC – it would insulate one small grid from the others.

Nor would smaller grids just create a number of local or regional markets instead of the single larger market economists prefer. Power could still be exchanged over the DC ties. In fact, it could be controlled completely – something impossible with AC. Markets would function more efficiently and more transparently. Existing AC lines could even be used, without modification, for DC.

But converters would have to be built at each end of every DC line. The converter equipment is pretty expensive. I've done a rough cost estimate, and we could break the two huge North American grids into a series of smaller grids, with DC ties matching or equaling the transfer capability of today's AC ties, for between $7 and $8 billion. That seems like a lot, but compared to the $50 to $100 billion I've heard bandied about, it may be a bargain. Some have estimated the cost of the August 14 blackout at $6 billion.

The details of my proposal can be found in my paper, *"And There Will Be Blackouts,"* a few copies of which are available here. It can also be found on the web page of the American Education Institute, at www.ameredinst.org.

As a final recommendation, I would urge that real experts be included on all boards and other policy making entities. This is not the case today. And this is one of the major underlying reasons for many of the problems experienced since deregulation. Some of us predicted years ago that these problems would occur. Yet, today, those whose predictions were consistently wrong still get most of the attention. Shouldn't those who were *right* be listened to more than those who were *wrong*?