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BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Reliability Technical Conference	Docket No. AD13-6-000
North American Electric Reliability Corporation	Docket No. RC11-6-004
North American Electric Reliability Corporation	Docket No. RR13-2-000

RELIABILITY TECHNICAL CONFERENCE

PANEL I:
STATE OF RELIABILITY AND EMERGING ISSUES

WRITTEN STATEMENT OF
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Thank you for the opportunity to participate today in this Reliability Technical Conference. I am Allen Mosher, Vice President of Policy Analysis and Reliability Standards for the American Public Power Association ("APPA"). I am happy to report that I currently hold no committee leadership positions within NERC, although I have served in past years as Chair of the Standards Committee, Chair of the Adequate Level of Reliability Task Force and as a member of the NERC Standard Process Improvement Group and the Reliability Issues Steering Committee. I am a longtime observer and participant in all things NERC, beginning in 1998 when I left the Commission to join APPA. We have on this panel and those that follow an exceptional group of engineers, analysts and industry leaders who are far more qualified than I am to opine on the measurable state of bulk power reliability and the emerging issues that face the industry, NERC and the Commission.

So I'm going to talk primarily about something more amorphous, but equally important, which is the pivotal role of organizational and institutional culture. Within that context, I will also discuss NERC's role in reliability risk assessment and event analysis and how they affect NERC's implementation of its standards reform and Reliability Assurance Initiatives. I also offer some limited observations about extreme weather events and cyber security as they affect the electric system.

We each have a duty to inculcate a culture of reliability, security and safety, within our companies and within NERC. The Commission should promote this cultural shift as well. Industry, through our companies and trade associations, NERC, and industry peer-group organizations such as IEEE and the Transmission Forum, must take a leadership role in setting realistic but demanding performance expectations for ourselves and for the other entities we are interconnected with. However, peer group pressure alone was not and is not sufficient to ensure reliable performance. Indeed, the electric power industry led the advocacy effort for the Electric Reliability Title that later became section 215 of the Federal Power Act. We did so because we recognized that coordination, cooperation and peer pressure alone were inadequate to ensure bulk power reliability in a highly diverse, restructured, competitive, yet highly interconnected electric industry. We needed and sought mandatory electric reliability standards, developed by industry, enforced by an independent ERO and its regional entities, backstopped by the regulatory oversight and policy direction provided by this Commission.

Yes, I know what you're thinking. In EPAct 2005, we got more or less the statutory framework we wanted. And yet we've spent the last eight years arguing that we are drowning in standard development due process, paperwork to comply with standards

that often seem tangential to reliability, and enforcement actions often described as exercises in “administrivia.”

And yet, once every few years, some extreme Class 4 or 5 event, similar to the 2003 Eastern Interconnection Blackout, albeit smaller in scale, scope and duration, takes place, clarifies our minds, and leads us all to say, this event was preventable, we have to do better to meet the expectations of our customers and the nation.

The underlying purpose of section 215 is reliable operation of the BES to prevent or mitigate the impact of *“the big three:”* cascading, instability and uncontrolled separation of the bulk electric system. Indeed, that is the heart of the revised definition of Adequate Level of Reliability that I helped develop and NERC submitted to the Commission back in May.[1]

The question is, of course, how do we reduce the risk of major events, by preventing them where possible, but more likely by reducing their frequency, scope and impact? NERC’s emerging strategy for achieving that risk mitigation depends on analyzing and understanding the causes of BES events and then fostering high levels of performance within our companies, through a corporate culture of reliability, coupled with the knowledge and tools to achieve the required reliability outcomes. A culture centered first and foremost on compliance will never achieve that end.

As I see it, major event risks to electric system reliability in the United States appear to fall into three fairly distinct causal categories: (1) extreme weather, (2)

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[1] *See:* NERC May 10, 2013 *Informational Filing on the Definition of "Adequate Level of Reliability"* in Docket RR06-1-000, posted at: http://www.nerc.com/FilingsOrders/us/NERC%20Filings%20to%20FERC%20DL/Informational_Filing_Definition_Adequate_Level_Reliability_20130510.pdf

cybersecurity attacks, and (3) major BES outages attributable to breakdowns in organizational capabilities and performance.[2]

NERC's May 2013 State of Reliability Report[3] states at page 9 that "[t]he top ten most severe events in 2012 were all initiated by weather." In last year's report, NERC determined that nine out of the 10 most severe events in 2011, based on the NERC Severity Risk Index, were in part weather-related in their causation.[4] In fact, the impacts of most weather and other severe natural events, including those summarized by NERC, are confined to utility distribution systems. But that fact does not make them any less disruptive to the public welfare, particularly when they are regional in scope. My personal observation is that customer expectations of uninterrupted service are increasing. Policy makers throughout the nation are increasingly concerned about issues of infrastructure resiliency. However, at least with respect to electric distribution system reliability, the policy choices are fundamentally state and local in nature.

Most extreme weather events are well beyond the design basis for reliable operation of the electric system – including the BES – but that does not mean that electric utility performance goals do not include planning for and execution of strategies to minimize the impact of severe weather on our systems and to restore service as quickly as possible. During Superstorm Sandy, APPA staff was embedded over at DHS' National

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[2] In much of the developing world, the root causes of electric service outages include inadequate electric generation, transmission and distribution infrastructure, which tends to exacerbate deficiencies in other critical infrastructures. Some nations also face physical attacks on the electric grid.

[3] See NERC, *State of Reliability 2013,* May 2013, available at: http://www.nerc.com/pa/RAPA/PA/Performance Analysis DL/2013_SOR_May 15.pdf

[4] See NERC, *State of Reliability 2013,* May 2013, available at: http://www.nerc.com/news/Headlines%20DL/2012_SOR.pdf The remaining top-ten event for 2011, the September 8, 2011 Arizona-Southern California outage, was certainly exacerbated by the extreme heat on that day. The California ISO in fact hit its annual peak that afternoon.

Response Coordination Center, working with FEMA, DOT, DOE, DOD and other agencies on the logistics to bring public power crews and equipment from as far away as Florida, Texas and California, in some cases through military airlifts. Over 160 public power utilities and 3,000 individual employees rose to the challenge to restore power, to get the lights back on in states such as New York and New Jersey. Those are the days that make me proud to be public power.

In the area of cybersecurity, history is not a particularly useful guide, unless your education began with Stuxnet, Conficker and Shamoon. APPA urges the Commission to approve NERC's CIP Version 5 petition without conditions or directives. We need to get on with the CIP Version 5 program as quickly as possible, because there is so much else to do on the cyber security front. While the specific security controls in the CIP standards provide a foundation, we also need to build an entire edifice of knowledge and capabilities within the industry that includes best practices, information sharing, analytical tools, communication technologies, and incident response planning. This effort must encompass entities throughout the electricity sub-sector, federal agencies such as the Departments of Energy and Homeland Security, and our asset owner-operator counterparts in other critical infrastructure sectors. To this end, APPA and its members are participating in a variety of executive branch activities to help carry out the President's Executive Order on Cybersecurity and the accompanying Presidential Policy Directive PPD-21.[5] These activities include participation in the development of the NIST

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[5] "Executive Order 13636—Improving Critical Infrastructure Cybersecurity," 78 FR 11739 (February 19, 2013), *available at* http://www.whitehouse.gov/the-press-office/2013/02/12/executive-order-improving-critical-infrastructure-cybersecurity *and at* http://www.gpo.gov/fdsys/pkg/DCPD-201300092/pdf/DCPD-201300092.pdf

Cybersecurity Framework and continued support for DOE's existing Cybersecurity Capability Maturity Model and Risk Management Process Guideline.[6]

Turning back to the bulk electric system, NERC's 2013 State of Reliability Report actually indicates highly reliable performance, with unplanned AC transmission circuit and transformer outage rates around 1% for the last three years. As for generation availability, the Equivalent Forced Outage Rate for summer 2012 ranged between two and six percent, depending on the region. That's not perfect, but it is nonetheless far lower than the rates we saw in decades past.[7]

So let's dig a bit deeper. Take a look at the Common/Dependent Mode Event ICC Study discussed at page 31 of the 2013 Report. It says that: "CDM events are those that result in multiple transmission element outages," and thus present a potential risk to system reliability. However, NERC's analysis of five years' of CDM Initiating Cause Code data indicates that no ICC grouping had an hourly probability of occurring over 1.1% and a severity weighted risk of over 0.003. In other words, lots of different things could go wrong, whether due to equipment failure, human error, severe weather, power system conditions, fire or other factors, but in any given hour at any one location, the risk is quite low. In the vast majority of events, the BES performs as designed. When equipment outages occur, we reconfigure or add new resources before an adverse reliability impact can occur. During extreme events, we generally, but not always, manage outages in a controlled manner and restore the system as quickly.

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[6] Go to: http://energy.gov/oe/downloads/electricity-subsector-cybersecurity-capability-maturity-model-may-2012

[7] See pages 31 and 49.

This gets me back to my broader point, of organizational culture and performance. To improve and sustain reliable BES performance, we can't just serially chase down small performance deficiencies. Rather we need to inculcate a culture of reliability that is dedicated to learning from mistakes, and an internal culture that is focused on quality assurance and performance, coupled with management that has a clear understanding of the reliability risks that need to be mitigated and that can allocate resources needed to mitigate those risks.

These BES risks are not fully internalized within any single company; rather, these are risks to the BES at an interconnection-wide level. NERC has a critical role analyzing both BES performance data as well as doing forensic analysis of major system events. However, it is equally important for industry participants to work with their peers to distill lessons learned, and take them back to their own systems and integrate them into their operations. Organizations like the North American Transmission Forum appear to be doing some interesting work in this area.

Next, NERC must continue to ensure that its reliability standards encourage this focus on reliability, by writing results-based standards that require responsible entities to achieve a performance outcome or a risk mitigation strategy, or alternatively, to develop organizational or individual capabilities, rather than a requirement to document that a document has been developed. Significant opportunities remain to improve NERC standards, particularly by eliminating administrative requirements and rewriting those that remain to clarify the reliability objectives that must be achieved.

The Standards Committee has worked for several years to refocus and prioritize NERC's standards development plan based on risk and to help drafting teams write clear

results based standards. That work continues under the able leadership of Brian Murphy and Mark Lauby, who appear on Panel 3. I am equally pleased to have participated in the creation of NERC's new Reliability Issues Steering Committee, chaired by Chris Schwab. The RISC's charter gives it a unique, cross-cutting role within NERC of identifying and prioritizing strategic risks to the BES. Most importantly, often the best, most effective and immediate response to an emerging risk is not a new standard, but rather a focused effort to define the nature of the risk and educate the industry on effective strategies to mitigate such risks.

NERC can and should refocus its compliance and enforcement programs as well, through the Reliability Assurance Initiative and the Find, Fix and Track program, to focus on BES risks and to encourage responsible entities to develop and adopt effective internal controls. As APPA said in its recent CIP Version 5 NOPR comments, the NERC CIP standards emphasis on identifying, assessing and correcting performance deficiencies, in conjunction with the programmatic approach to protecting low impact assets and cyber systems represents a paradigm shift in how NERC standards are written and enforced, emphasizing the development of management controls that responsible entities will use to ensure the performance outcomes and provide assurance to NERC compliance and enforcement staff that they can rely upon that organization to sustain its performance level over time. It is my hope that these and similar applications of NERC's Reliability Assurance Initiative will over time free up significant industry, NERC and Commission resources, from documenting compliance to insisting upon and rewarding performance.

Another way to free up resources for better uses is for NERC to deregister many small entities that do not have a material impact on reliability. For example, most small distribution providers have no ability to materially affect BES operations. Unless they own under frequency or BES-facing under-voltage load shedding relays, to the BES, all they are is load. So NERC should take these small entities off the NERC Compliance Registry. If NERC or operating authorities need data for planning or operational purposes, then create a separate load and resource data registry.

Finally, I would like to commend FERC for its focus in the last panel on the Southwest Outage. There is much to learn there. In the future, I would hope to see a change in how post-event outage studies are conducted. While FERC is properly concerned about potential violations of reliability standards, direct industry participation in the investigations will increase the value of these outage reports, the underlying technical studies, and early industry assimilation of the lessons learned. To this day, my colleagues at APPA and in the WECC region have unanswered questions about what happened and why.

The final panel has also been asked to address the potential for capacity shortages due to environmental regulation and an increasing reliance on natural gas and renewables. While some would argue this is the wrong technical conference in which to raise this issue, I must mention APPA's strong concerns about RTO-administered mandatory capacity markets and the role they play (or, more accurately, do not play) in assuring resource adequacy. One of the essential elements of system reliability is sufficient generation and demand-side resources to assure regional resource adequacy under a broad array of operating conditions and contingencies. New generation resources

require substantial lead times to construct, and substantial contractual and financial commitments to fund. "Eastern style" RTO-run centralized capacity markets simply do not provide a sufficient revenue stream or the predictable price signals needed to support the diversified portfolio of new generation resources required to meet future reliability needs and public policy goals. What is now a market design problem will eventually become a reliability problem if left unaddressed. We should not wait that long.

Thank you for the opportunity to speak to you today. I look forward to your questions.