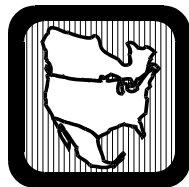


Status Report on NERC  
Implementation of  
August 14, 2003,  
Blackout Recommendations



North American Electric Reliability Council

August 11, 2004

### Introduction

As the anniversary of the August 14 blackout approaches, NERC and the electric industry have taken significant steps to improve the reliability of the bulk electric system. Both NERC and the US-Canada Power System Outage Task Force issued thorough technical reports earlier this year that examined the causes of the blackout and made extensive recommendations on a wide range of actions needed to reduce the possibility of such an outage occurring in the future. NERC is working closely with the government task force to ensure that all recommendations resulting from these investigations are tracked and implemented.

This status report outlines the actions that NERC and the industry have taken to improve reliability since the blackout, including the implementation of the blackout recommendations. The most significant actions taken to date include rectifying the direct causes of the blackout, conducting extensive readiness audits of all major system operators, and substantially revising existing reliability standards and developing new ones to ensure that the reliability “rules of the road” are understood and followed by all entities whose operations affect the reliability of the bulk electric system. Although many important initiatives have been completed or are well under way, some will take years to implement. Taken as a whole, these extensive and cooperative efforts will go a long way to reduce the risk of another major outage on the North American bulk electric system.

One recommendation of major significance has not yet been implemented: the passage of legislation by the United States Congress that would make compliance with NERC reliability standards mandatory and enforceable. Until that occurs, NERC will work with the government and the industry to do everything it can to ensure that all entities whose operations affect the operation of the bulk electric grid comply with NERC standards.

### Near-Term Actions Letter to Industry CEOs

In October 2003, NERC sent a letter to all NERC control areas and reliability coordinators requesting that each entity review a list of reliability practices to ensure that their organizations are within NERC and regional reliability council standards and established good utility practices, with particular focus on matters identified in preliminary findings from the blackout investigation. NERC requested each entity to report that such a review had been completed and the status of any necessary corrective actions. Response to NERC’s request was 100%. Because the content of many of these responses were deemed to contain information pertaining to critical infrastructure security, they were not publicly released. The letter and entities that responded can be viewed at:

[ftp://www.nerc.com/pub/sys/all\\_updl/docs/blackout/NERC-Quick-Actions-List-BOT-FINAL.pdf](ftp://www.nerc.com/pub/sys/all_updl/docs/blackout/NERC-Quick-Actions-List-BOT-FINAL.pdf).

### Implementation of Blackout Recommendations

NERC issued an initial blackout report in February that contained recommendations to address the direct causes of the blackout, strategic initiatives to ensure compliance with reliability standards and track recommendations, and technical initiatives to improve overall electric system reliability and operations. NERC approved an additional four blackout recommendations in June and issued its final blackout report in July. The current status of NERC’s actions on these recommendations is summarized below. To view NERC’s final blackout report and corresponding recommendations, go to: [ftp://www.nerc.com/pub/sys/all\\_updl/docs/blackout/NERC\\_Final\\_Blackout\\_Report\\_07\\_13\\_04.pdf](ftp://www.nerc.com/pub/sys/all_updl/docs/blackout/NERC_Final_Blackout_Report_07_13_04.pdf).

### Recommendation 1: Address the Direct Causes of the Blackout

On February 10, 2004, NERC directed FirstEnergy, the Midwest ISO, and PJM to implement specific improvements to rectify deficiencies identified by NERC and the U.S.-Canada Power System Outage Task Force blackout investigations that were identified as direct causes of the blackout. NERC evaluated the remediation plans for each entity and approved each of the plans subject to certain conditions. NERC provided assistance teams to help FirstEnergy and the Midwest ISO with the implementation of their mitigation plans. Each entity provided a formal certification to NERC that all remedial actions were completed. NERC has since conducted on-site verification to ensure that these plans were properly implemented. To review these reports, go to:

<http://www.nerc.com/~filez/remedialactionresponses.html>.

### Recommendation 2: Strengthen the NERC Compliance Enforcement Program

- NERC approved a set of revised compliance templates (performance measurements) that strengthen and clarify existing reliability standards; these templates have been integrated into the 2004 Compliance Enforcement Program. These templates can be viewed at: <http://www.nerc.com/~comply/annual.html>.
- NERC developed and implemented guidelines for reporting and disclosure of violations of NERC reliability standards and the results of NERC readiness audits of control areas and reliability coordinators. The guidelines require regional reliability councils to report violations of NERC standards within 48 hours of occurrence, and to provide quarterly reports of all violations. Audit teams will conduct onsite investigations if necessary to determine whether a violation occurred and the circumstances of that violation. The guidelines are posted at: [ftp://www.nerc.com/pub/sys/all\\_updl/docs/pubs/DisclosureGuidelines-BOTApproved-6-15-04.pdf](ftp://www.nerc.com/pub/sys/all_updl/docs/pubs/DisclosureGuidelines-BOTApproved-6-15-04.pdf).
- NERC developed a new vegetation management compliance template that addresses inspection requirements, trimming clearances, an annual work plan, and outage reporting.
- NERC developed a new operator training template that requires each operating entity to have a documented operator training program that meets certain criteria. Operators are also required to provide at least five days of training per year in system emergencies; the initial five days of training were to be completed by June 30, 2004.

### Recommendation 3. Initiate Regular Control Area and Reliability Coordinator Readiness Audits

- By June 30, NERC had audited 23 control areas representing majority of all electricity generation in the U.S. and Canada, and provided audit reports with conclusions and recommendations to each organization. These readiness audits included MISO, PJM and FE. These audit reports are posted on the NERC website as they are finalized. They identify areas for improvement, which NERC will follow up on, as well as best practices identified in the audits. The audits are posted at: <http://www.nerc.com/~rap/audits.html>.
- NERC will conduct readiness audits of all electric control areas and reliability coordinators on a three-year cycle. Teams of peer reviewers are led by NERC and joined by experts from the NERC regions, FERC, and Canadian regulatory authorities.

**Recommendation 4. Evaluate Vegetation Management Procedures and Results**

- NERC developed a vegetation management compliance template that requires all transmission owners in North America to report all vegetation-related outages. (A similar program was implemented in WECC following the 1996 blackouts, and has proven very effective in reducing the number of vegetation-related outages.) This template is included in the 2004 Compliance Enforcement Program.
- NERC is developing a new vegetation management standard. It can be viewed at: <http://www.nerc.com/~filez/standards/Vegetation-Management.html>.

**Recommendation 5. Establish a Program to Track the Implementation of Blackout Recommendations**

- NERC is addressing recommendations in U.S.-Canada Power System Outage Task Force report, with emphasis on the Group II recommendations that support and strengthen ongoing NERC blackout initiatives. NERC is working with the task force to develop a database to track and report on progress in implementing all applicable blackout recommendations.

**Recommendation 6. Improve Operator and Reliability Coordinator Training**

- NERC required all system operators to receive at least five days of training on emergency operations by June 30, 2004, and annually thereafter.
- NERC is developing additional options and recommendations to address the system operator training and certification issues identified during the blackout investigation.
- NERC is drafting a new standard that would establish more specific system operator training requirements.

**Recommendation 7. Evaluate Reactive Power and Voltage Control Practices**

- NERC's technical committees are reviewing effectiveness of the existing standards on reactive power and voltage control and how they are being implemented in practice among the ten NERC regional reliability councils. They will also recommend revisions to the standards and process improvements by early 2005.

**Recommendation 8. Improve System Protection to Slow or Limit the Spread of Future Cascading Outages**

- NERC has formed a team of technical experts to evaluate improvements in system protection (relay) systems to slow or limit the spread of outages, including an evaluation and review of the application of zone 3 relays. A document on "Recommendations on Loadability Requirements on Transmission Protective Relaying Systems" was approved and is available on the following NERC website: [ftp://www.nerc.com/pub/sys/all\\_updl/pc/spctf/SPCTF R\\_cs\\_on\\_8A\\_7-20-04.pdf](ftp://www.nerc.com/pub/sys/all_updl/pc/spctf/SPCTF R_cs_on_8A_7-20-04.pdf).

**Recommendation 9. Clarify Reliability Coordinator and Control Area Functions, Responsibilities, Capabilities and Authorities**

- NERC approved revisions to its Operating Policies to clarify the functions, responsibilities, and authorities of reliability coordinators and control areas.

**Recommendation 10. Establish Guidelines for Real-Time Operating Tools**

- NERC is working on a set of “best practices” for system operations. This will include an examination of the current operating systems and “tools” available for system operators to help them monitor and study power flows on the grid.

**Recommendation 11. Evaluate Lessons Learned**

- NERC has procedures in place to analyze system disturbances, and is reviewing the lessons learned from the blackout.

**Recommendation 12. Install Additional Time-Synchronized Recording Devices as Needed**

- NERC is surveying the industry to gather information about the types of data recorders in place, the extent of synchronized time-stamping associated with the data, and the need for additional time-synchronized devices to allow accurate recording of future disturbances.

**Recommendation 13. Reevaluate System Design, Planning and Operating Criteria**

- NERC is working with the regions to reevaluate existing criteria and practices. This two-year project will be completed by February 2006.
- ECAR has completed its review of its criteria to ensure compliance with the NERC standards and this effort is under review

**Recommendation 14. Improve System Modeling Data and Data Exchange Practices**

- NERC is working with the regions to review procedures for validating data used in power flow models and dynamic simulations by benchmarking system model data with actual systems performance. Data exchange practices for planning and operations will also be reviewed.

**Recommendation 15: Develop Standing Capability to Investigate Future Blackouts**

- This recommendation is under review and discussion to determine what changes may be needed to the procedures used to investigate the August 14 blackout.

**Recommendation 16: Accelerate the Standards Transition**

- NERC is accelerating the approval of new reliability standards that will translate the existing NERC operating policies and planning standards, along with the new compliance templates and several new standards, into an integrated and comprehensive set of measurable reliability standards. Version 0 standards expected to be voted on by the industry later this year. If approved, they will be presented for board adoption in February 2005. To view the Version 0 standards under development go to: <http://www.nerc.com/~filez/standards/Version-0.html>.

**Recommendation 17. Evaluate NERC Actions in the Areas of Physical and Cyber Security**

- NERC approved a one-year extension of the existing Urgent Action Cyber Security Standard 1200 until August 2005, when it will be superseded by Cyber Security Standard 1300, currently under development. To view the existing standard and the one under development, go to: <https://www.nerc.net/standards/ReliabilityStandards.aspx?tabindex=2&tabid=14>.

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- DHS and NERC launched a Cyber Log Analysis project in October 2003 designed to distinguish, summarize, and prioritize threatening cyber activity directed against the electric power infrastructure.
- NERC is designing an educational program for physical and cyber security targeted to industry personnel responsible for their firms' physical security, cyber security, system operations, and compliance auditors.
- NERC is working with DHS to implement procedures that will reduce the risk of disclosure of sensitive critical infrastructure information.
- NERC is working with DHS and PSEPC to conduct bi-lateral studies to develop vulnerability assessment methodologies.
- NERC worked with DHS and DOE to develop the National Infrastructure Protection Plan relative to the electricity sector.
- NERC is expanding and improving the Electricity Sector Information Sharing and Analysis Center and improving its communications with DHS and PSEPC.
- In cooperation with DHS, DOE, PSEPC, and vendors, NERC is addressing the security of control systems and electronic protection devices.
- NERC, the Department of Homeland Security (DHS), and Public Safety and Emergency Preparedness Canada (PSEPC) are working to reduce the risk of vulnerabilities to shared electricity infrastructure and cross border interdependencies by undertaking a bilateral (Canada-U.S.) study to develop and update vulnerability assessment methodologies.
- NERC, DHS and PSEPC plan to promote the development of capabilities to detect unauthorized intrusion and surveillance within the electric system.
- NERC, DHS and PSEPC will develop new mechanisms and raise awareness of the existing ones in Canadian and U.S. that will enhance the reporting and sharing of information on physical and cyber security incidents across the private and public sectors.
- NERC, DHS, and PSEPC are working to develop and implement security procedures and awareness training to reduce the risk of or prevent disclosures of information.