TO: NERC Board of Trustees (BOT)
FROM: Thomas J. Galloway, NATF President and CEO
SUBJECT: NATF Periodic Update to the NERC BOT – August 2017

Attachments: 1. NATF RISC Priority Leadership
2. NATF External Newsletter – June 2017
3. NATF / EPRI Resiliency Initiative

The North American Transmission Forum (NATF) mission is to promote excellence in the reliable operation of the electric transmission system, with the vision to see reliability continuously improve. To augment our strategic goals, the NATF has five 2017 focus areas:

1. Resiliency / Security (tangible actions to mitigate, respond to and recover from severe casualties)
2. Human Performance / Skilled Workforce (reduced error frequency/consequences)
3. Equipment Performance and Asset Management
4. Operating Experience Exchange – cause analyses, corrective action, and lessons learned
5. Continuous performance improvement / mechanisms / processes / training

Over the last several years, the Reliability Issues Steering Committee (RISC) priorities have matured and stabilized. The NATF sees considerable industry benefit to focus on RISC priorities to advance reliability, security, and resiliency; leverage strengths of various organizations; and avoid duplicative effort. To that end, NATF has added emphasis on RISC priorities in our long-range plans. (see attachment 1).

NATF’s Resiliency efforts are managed under our Initiatives program (see below).

As detailed in NATF’s June External Newsletter (attachment 2), recent Resiliency work includes NATF’s “Spare Tire” project (posted publicly), a comparison of Spare Tire with NERC-FERC PRASE, and work with EPRI to differentiate Reliability and Transmission Resiliency and set the stage for clarifying Transmission Resiliency in a larger resiliency context (see attachment 3).
The NATF shares many common objectives with NERC. To advance these common objectives, and minimize duplicative efforts, we hold periodic coordination meetings between the senior leadership of both organizations. The last session was completed April 20, with future meetings on August 31 and October 10. April agenda topics included:

1. NERC RISC priorities
2. Resiliency / Security
3. NERC data sharing to NATF
4. Equipment Performance Issues
5. 2018 Joint HP Conference
6. Vegetation Management
7. Misoperation Reduction / Measure Definitions
8. Information Sharing / Compliance Implementation Guidance

cc:
NATF: R. Carter, K. Keels, C. Sills, T. Aldred, Letter Log
Attachment 1. NATF Focus on RISC Priorities

NATF work (leading, supporting, advising) on specific RISC priorities has industry benefits to reliability and resiliency. The NATF board supports work on a select set of RISC priorities consistent with our focus, and that would limit duplication of effort. Logical candidate topics for the NATF involvement include asset management, human performance and skilled workforce, and resiliency. Examples are listed below.

Asset Management (RISC profile 4 actions in parentheses)

- Improve data gathering for equipment failure modes and improve the dissemination among equipment owners, manufacturers, and vendors. (2)
- Evaluate performance trends using additional data collected by event analysis to extract insights, issues, and trends for dissemination across industry participants. (4)
- Learn from successful asset management programs, maintenance, and lessons learned to gain insights on trends in effective asset maintenance and increase dissemination of best practices. (5)
- Develop industry guidelines on protection and control system management to improve performance. (6)
- Establish sharing of technologies or processes that aid in condition monitoring, failure prevention, spare sharing, and recovery. (8)
- Implement best practices from the sharing of technologies or processes that aid in condition monitoring, failure prevention, spare sharing, and recovery. (11)

Human Performance / Skilled Workforce (RISC profile 5 actions in parentheses)

- Expand their communication of insights regarding best practices for increasing HP. (1)
- Determine the extent of expected skill gaps and develop recommendations to address the skill gaps (e.g., curricula, programs, industry support). (2)
- Promote expanding training and education programs to include HP and recruitment of the next generation of skilled workers. (3)
- Promote the use of (standardized) cause codes to establish a common understanding of HP triggers, collect and evaluate trends in data, and develop metrics as needed. (4)
- Explore the development and widespread use of a near-miss database which will leverage industry data sources to identify patterns and risk. (5)
- Consider and implement high-value recommendations developed to address skills gaps identified in the short-term mitigation mentioned in the 1–2 year timeframe. (6)
- Develop and implement a sustainable process to analyze and disseminate best practices for HP. (7)
Resiliency (Compilation from Natural Events, Physical, and Cyber) (Profiles / Actions)

- Leverage best practices and the sharing of lessons learned to expand coordination during extreme weather events among RCs, BAs, and TOPs. (7.8)
- Identify and promote specific resiliency best practices to plan for extreme events. (7.10)
- Develop a catalog of regional/national exercises that incorporate extreme physical events and share, thus supporting increased participation across industry. (8.6)
- Promote specific resiliency and vulnerability assessment best practices with planning for extreme events, including good physical security assessment practices. (8.7a)
- Develop an event guideline outlining prevention strategies and event response and recovery protocols for sabotage scenarios. (8.7b)
- Review and update restoration plans to account for physical security scenarios. (8.9)
- Develop mitigation strategies and physical security assessment best practices. (8.15)
- Facilitate planning to reduce the number/exposure of critical facilities. (8.17, 9.8)
- Create and foster an internal culture of cyber awareness (9.10)
- Develop a risk process to address the potential impacts of physical and cyber security threats and vulnerabilities (8.8, 9.3)
- Develop a peer review process for emerging (cyber) risks (9.9)
- Develop agreed-upon levels of cyber-resilience suitable for BPS planning and operations (9.15)
- Develop industry operating guidelines that incorporate an agreed-upon level of cyber resilience. (9.17)
Attachment 2. NATF External Newsletter

June 2017

NATF Resiliency Work Ongoing

Resiliency continues to a focus area for the North American Transmission Forum (NATF). Our members continually work to harden their systems and improve response/recovery processes and capabilities. The NATF shares information both internally and externally and coordinates with other organizations to leverage expertise and efficiencies. Here are some examples:

- **January 2017 Transmission Resiliency Summit co-hosted by NATF and EPRI**
- **Public sharing of "spare-tire" documents (BES operation absent EMS/SCADA)**
- **Member sharing of work to address GMD issues as called for under NERC Standard TPL-007-1**
- **Formation of a group to provide direction to EPRI and NATF on resiliency issues**
- **Participation in NERC’s Reliability Leadership Summit**
- **Review of NERC RISC Priorities (see article below)**
- **Member sharing of work on mobile resiliency transformers**
- **Member sharing of a disaster response and recovery framework**

Recent external-sharing efforts include public postings of “spare-tire” documents mentioned above and a coordination meeting with the Electric Subsector Coordinating Council (ESCC)—the organization that posed the question, “How would we operate the Bulk Electric System (BES) if both primary and backup control center capabilities were lost?”

The NATF’s “Bulk Electric Systems Operations absent Energy Management System and Supervisory Control and Data Acquisition Capabilities - a Spare Tire Approach” document, posted to the NATF public site in June, discusses the results of an assessment of operating strategies and reliability tools present for Bulk Electric System (BES) operations during such events and identifies future areas of industry work and research to better enable operations during scenarios where there is a total loss of EMS/SCADA capability.

RISC Priorities

The NATF is currently reviewing RISC Priorities—developed by the North American Electric Reliability Corporation (NERC) Reliability Issues Steering Committee (RISC)—to identify where and how it can offer support and leadership. Logical candidate topics for NATF involvement include asset management, human performance and skilled workforce, situational awareness and resiliency. As we
align on activities to pursue, we’ll incorporate into our operational and business plans. A key aspect of this effort will be coordination with other industry organizations to limit duplication of effort.

**NATF Program Overview: Assistance**

In the NATF Assistance Program, NATF staff and subject-matter experts help member companies develop action plans to improve on selected topics or issues to promote operational excellence.

Engagement options and offerings include on-site and virtual “assistance visits,” surveys, discussion boards, challenge boards, and group webinars to share and gather experiences. Topics currently being addressed with members include:

- Relay misoperation rates
- Cyber and physical security
- Switching, tagging, and clearances
- Cause analysis
- Safety
- Internal controls and risk assessment

Each of the options results in information, including lessons learned, being shared with the broader membership.

**Long-Range Operational Plan**

NATF members approved the “NATF 2017–2021 Long-Range Operational Plan” in June. The plan establishes proposed NATF activities and resource requirements for the next five years. The NATF plans to continue its current activities (e.g., peer reviews, practices, assistance, training, metrics, reliability initiatives, and operating experience sharing) and external coordination, with increased focus on addressing issues and risks related to the scope and pace of electric-industry change.

**NERC Compliance Implementation Guidance**

NERC recently approved the “NATF CIP-014-2 Requirement R1 Guideline” as “Compliance Implementation Guidance.” The NATF document provides information on performing initial and subsequent risk assessments of transmission stations and substations that if rendered inoperable or damaged could result in instability, uncontrolled separation, or cascading within an interconnection.

The document is an update to our previous version, which was also endorsed by NERC as Implementation Guidance, to account for the change in standard from CIP-014-1 to CIP-014-2. The document is posted on the NATF [public documents](#) and NERC [compliance guidance](#) pages.

**Workshops**

NATF practices groups hold annual workshops. Recent and upcoming activities include:

- Control Center Workshop (March)
- NATF-NERC Human Performance Workshop (March)
- Joint Compliance/Security Practices Workshop (May)
- System Protection Practices Workshop (May)
- Transmission-Nuclear Power Plant Interface Practices Workshop (May)
- Joint NATF-NERC Modeling Workshop (June)
- Metrics Face-to-Face Meeting (June)

**New Overview Video**

We recently posted a new overview video about the NATF on our public website. The video explains our programs, highlights our mission and vision, and features testimonials from current members. Our members also provided the footage.
In November of 2015, the North American Transmission Forum (NATF) published a short document addressing reliability and resiliency, and highlighting the electric industry's efforts related to these tasks. Since its initial publication, significant activity, research, and results have been achieved, and the Technical Advisory Group (TAG) created jointly between the Electric Power Research Institute (EPRI) and the NATF determined it was time to update, revise, and reinforce certain aspects related to reliability and resiliency.

BACKGROUND

The electric grid serves as a vital societal function and an essential aspect of national security. Every sector of the national economy, from food production, banking, manufacturing, and retail distribution, depends on it. Electricity users have come to expect a high degree of electric reliability and availability, and meeting those customer expectations is a fundamental delivery requirement for all electric utilities.

Beyond the economy, extended power outages can also have severe consequences on national defense, communications, water and waste, healthcare, emergency management, transportation, and law enforcement. There are also interdependencies among other critical infrastructures (e.g. the gas and electric industries), as well as needs for workforce support, and considerations for local, state, and federal levels of collaboration and assistance.

While delivery of electric service has been very consistent and highly reliable for much of the past 100 years of the development, expansion, and continuous operation of the power grid across North America, it was realized that the focus solely on reliability, based on frequency and duration of power outages, may be insufficient in improving system integrity and availability of electric power going forward.

Today, risk-based strategic planning and communications decisions are called for that may be different for each utility. One size does not fit all because of the many variables each utility faces, including dissimilar threat levels, available resources, corporate cultures and risk tolerances, geographical locations, and regulatory policies. Appropriate and cost-effective solutions must be determined by each utility.

RELIABILITY

Electric system reliability has been, and will always be, a fundamental objective of electric utility providers because keeping the lights on and delivering electric service that meets customer expectations is the ultimate goal. For our purposes, transmission system reliability is defined as the ability of the system and its components to withstand instability, uncontrolled events, and cascading failures, during normal operation and routine (i.e. reasonably expected) events.

RESILIENCY

Electric utilities typically manage system reliability through redundancy and risk-management strategies to prevent disruptions from routine hazards. It is the new hazards and extreme events, coupled with society's increased dependency on electricity, that have raised the importance of grid resiliency.

Therefore, in our context, transmission system resiliency is defined as the ability of the system and its components (i.e. both the equipment and human components) to minimize damage and improve recovery from non-routine disruptions, including high impact, low frequency (HILF) events, in a reasonable amount of time.

Resiliency includes a diverse range of topics, such as flexibility, hardening, security, and recovery.
HOW ARE NATF AND EPRI MEMBERS ADDRESSING RESILIENCY?

Improving resiliency requires a systematic, strategic approach, and seeks cost-effective solutions that may be unique for individual utilities. More resilient system designs can be integrated into the planning, design, and construction processes. System investment strategies for hardening, upgrading assets, and spare equipment need to be cost-effective, flexible, agile and permit the adoption of new technologies.

Since 2013, EPRI and the NATF have co-hosted numerous industry summits to drive action on various aspects of resiliency. The industry continues to make tremendous investments to improve their systems, such as GMD studies, more robust security measures (including work to address requirements of CIP V5 and CIP-014), new control centers, improved spare equipment strategies, the creation of new modeling software to determine potential weak spots that were previous unrecognized, etc.

The NATF has been hard at work on a “Spare Tire” Project investigating system operations under severely degraded control and communications conditions. In April 2016, EPRI launched a three-year project studying the potential impacts of an electromagnetic pulse (EMP) on the power grid. The results of this research and development will provide a factual basis for the industry regarding the threats, consequences, and potential mitigation measures for EMP. Additionally, a new EPRI project is looking at emergency recovery communications to be used after catastrophic (i.e.: “Black Sky”) events.

CONCLUSIONS AND NEXT STEPS

Efforts to improve reliability and resiliency involve risk-based, strategic decisions that may be different for individual utilities. Available resources, the level of risk tolerance, geographical locations, and regulatory policies will influence the type of investments, planning, designs, construction, upgrades, and operations for each system. New threats, hazards, and vulnerabilities continue to arise even as utilities work to protect against today’s challenges, so utilities must also remain vigilant for emerging threats.

The joint TAG will develop and publish additional resources covering in greater detail the many facets (i.e. flexibility, hardening, security, recovery, etc.) of reliability and resiliency.