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TO: NERC Board of Trustees (BOT)

FROM: Thomas J. Galloway, NATF President and CEO

SUBJECT: NATF Periodic Update to the NERC BOT – November 2017

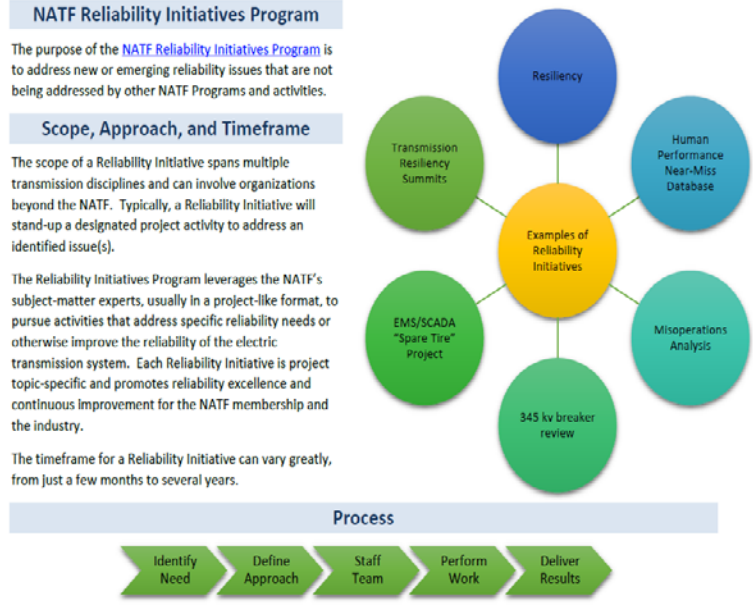
Attachments:
1. NATF RISC Priority Leadership
2. EPRI/NATF Resiliency Initiative
3. NATF External Newsletter – October 2017

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 and attachment 2)**.



As detailed in NATF's June external newsletter **(attachment 3)**, recent work 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.

NATF/EPRI completed an Oct 2017 Resiliency Summit containing detailed information on a variety of superior practices. The next Summit is scheduled for May 2018.

NATF work is ongoing in response to the August 2017 BOT Resolution on Supply Chain Cyber Security. A multi-disciplined Task-team has been formed and general approach developed. Verbal updates in November and written plans to be shared in Feb 2018 BOT.

NATF issues a comprehensive and detailed quarterly newsletter highlighting various programs and activities. A streamlined version is distributed outside the membership. The October 2017 OPEN newsletter is included as **attachment 3.** This issuance highlights out Peer Review program and upcoming workshops.

NATF shares many common objectives with NERC. To advance these common objectives, and minimize redundant efforts, we hold periodic coordination meetings between the senior leadership of both organizations. The last session was completed August 31, with the next planned for 4Q17. August agenda topics included:

1. RISC priorities
2. Resiliency / Security
    a. NERC BOT Resolution re: Supply Chain Standard (NATF role)
    b. NATF/EPRI October 2018 Resiliency Summit
    c. Tangible examples of Resiliency improvements
    d. NATF "Spare Tire" project / emergency communications
    e. Status / Issues re: CIP implementation
3. Protection System Mis-operation initiatives
4. Equipment Performance Issues, including NERC inverter based resource task force
5. Human Performance / 2018 Joint HP Conference
6. Other Coordination Topics
    a. NERC entity data sharing with NATF
    b. NATF Cause Code expansion for TADS
    c. Other Information Sharing / Compliance Implementation Guidance

cc:
ERO: G. Cauley, M. Lauby, J. Merlo, A. Koch, K. McIntyre, C. Edge, S. Noess, T. Buzzard
NATF: R. Carter, K. Keels, C. Sills, T. Aldred, Letter Log

Attachment 1: NATF Focus on Selected RISC Priorities

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

Asset Management (RISC profile 4, selected activities)

- Improve data gathering for equipment failure modes and improve the dissemination among equipment owners, manufacturers, and vendors.
- Evaluate performance trends using additional data collected by event analysis to extract insights, issues, and trends for dissemination across industry participants.
- 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.
- Develop industry guidelines on protection and control system management to improve performance.
- Establish sharing of technologies or processes that aid in condition monitoring, failure prevention, spare sharing, and recovery.
- Implement best practices from the sharing of technologies or processes that aid in condition monitoring, failure prevention, spare sharing, and recovery.

Human Performance / Skilled Workforce (RISC profile 5, selected activities)

- Expand their communication of insights regarding best practices for increasing HP.
- Determine the extent of expected skill gaps and develop recommendations to address the skill gaps (e.g., curricula, programs, industry support).
- Promote expanding training and education programs to include HP and recruitment of the next generation of skilled workers.
- 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.
- Explore the development and widespread use of a near-miss database which will leverage industry data sources to identify patterns and risk.
- Consider and implement high-value recommendations developed to address skills gaps identified in the short-term mitigation mentioned in the 1–2 year timeframe.
- Develop and implement a sustainable process to analyze and disseminate best practices for HP.

Resiliency (Compilation from Natural Events, Physical, and Cyber) (Selected activities, various profiles)

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

Attachment 2. / RELIABILITY AND RESILIENCY REVISITED – JULY 2017

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 water, 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, t*ransmission 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

Efforts to improve reliability and resiliency involve risk-based, strategic decisions that may be different for individual utilities. Available resources, 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.

NEXT STEPS

October 2017 Resiliency Summit – major topics covered

Open session

- External panel: Policy / Regulatory considerations re: Resiliency
- Structural shielding from multiple threats (Blast protection/IEMI/HEMP)
- NATF Supplemental Operating Strategies (Spare Tire) Update
- Summer 2017 Survey Summary Results

Closed (Member Only) Session

- Summer 2017 Survey Detailed Results
- Cyber Resiliency
- Resiliency in Control Center Design and Construction
- Resiliency and protection of critical substations
    - Hardening of Control Houses
    - Protection and control equipment in substations
    - Transmission Line Hardening

May 2018 Resiliency Summit – likely topics

- Compilation of existing superior practices per Mode/Hazard
- Progress towards standardized maturity model
- Next iteration – NATF Resiliency Survey
- Walkthrough EMP Test Lab

North American Transmission Forum External Newsletter

October 2017

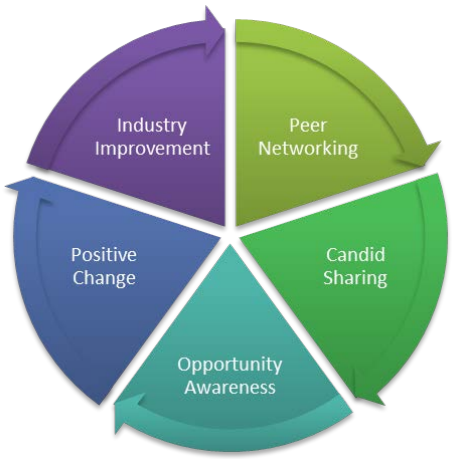
NATF Program Overview: Peer Reviews

The NATF Peer Review Program consists of evaluations of a member company's procedures, practices, and processes by a group of subject-matter experts from other NATF members.

Each review consists of two to four days of interviews and observations, followed by a report to the host member's executives and staff. Best practices are shared with the applicable NATF practice groups, and specific positive highlights and recommendations for improvement are provided to the host.

Peer review team members bring valuable information back to their own organizations after the review because of the discussions during the interviews. Team members exchange practices and lessons learned with one another and build new personal relationships in the process.

Peer Review Improvement Cycle



NATF Posts Documents for Industry Use

To benefit the industry and inform regulators of ongoing work, the NATF posts select documents on its public website (www.natf.net). We recently posted the following four documents:

Document	Description
NATF Practices Document for NERC Reliability Standard CIP-014-2 Requirement R4	Guidance for conducting evaluations of potential threats and vulnerabilities of a physical security attack against a Transmission station, Transmission substation, and/or a primary control center
NATF Practices Document for NERC Reliability Standard CIP-014-2 Requirement R5	Guidance for a physical security plan—includes a template to help with CIP-014 R5 documentation
NATF Document for Implementation and Use of Transient Cyber Assets (TCAs) – NERC Reliability Standard CIP-010-2 Requirement R4, Attachment 1, Sections 1 and 2	Implementation guidance for members and industry related to TCAs; developed on a template conducive to NERC's compliance guidance initiative
Transmission System Resiliency – An Overview	An update to the NATF resiliency summary created in 2015

The CIP-014-2 documents are updates to previously posted NATF CIP-014-1 documents to align with the current version of the standard.

NERC Compliance Implementation Guidance Submittals and Endorsement

On a case-basis, the NATF develops practice or guidance documents related to topics that are associated with NERC Reliability Standards. Below is an update of documents submitted to NERC for consideration as compliance "Implementation Guidance."

Submittals

All three CIP-related documents mentioned in the article above have been submitted to NERC for consideration as Implementation Guidance.

Approval

NERC recently endorsed the "NATF MOD-033-1 Methodology Reference Document" as Implementation Guidance. The document, which provides guidance on model validation, is posted on the NATF public documents and NERC compliance guidance pages.

Business Plan and Budget

Members approved the NATF 2018 Business Plan and Budget, which lists planned activities and resource requirements for next year. The NATF will conduct activities in various program areas (e.g., peer reviews, practices, assistance, training, metrics, reliability initiatives, and operating experience sharing) and coordinate externally to promote reliability and resiliency excellence, with an increased focus on addressing issues and risks related to the scope and pace of electric-industry change.

Workshops

In addition to regular web meetings, NATF working groups hold annual workshops and in-person meetings. Recent and upcoming activities include:

- Operator Training Workshop (August)
- Substations and Asset Management Workshops (September)
- Operating Experience Workshop (October)
- Vegetation Management Workshop (October)
- Resiliency Summit (October)
- Security Workshop (November)
- System Operations Workshop (November)
- Transmission-Nuclear Power Plant Interface Workshop (November)