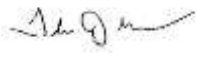


**TO:** NERC Board of Trustees (BOT)

**FROM:** Thomas J. Galloway, NATF President and CEO 

**SUBJECT:** NATF Periodic Update to the NERC BOT – May 2017

Attachments: 1. NATF RISC Priority Leadership Draft  
2. NATF External Newsletter

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 focused on several topics that serve as the base for external collaboration. In both 2016 and 2017 (to-date) those focus areas are:

1. Resiliency / Security (tangible actions to improve response and recovery for all relevant hazards)
2. Human Performance (reduced frequency and consequences of human error) / personnel safety
3. Equipment Performance and Asset Management
4. Operating Experience Exchange – cause analyses, corrective action, and lessons learned
5. Continuous performance improvement (system and processes, worker skills, training)

Over the last several years, the Reliability Issues Steering Committee (RISC) priorities have matured and stabilized. NERC, RISC, Technical Committees, Trades, the NATF, and others have discussed the opportunity to focus on RISC priorities as a primary means of advancing reliability, security, and resiliency; leveraging strengths of various organizations; and avoiding duplicative effort. The NATF supports added emphasis on RISC priorities for these reasons.

Over the next few months, the NATF plans to progressively identify those RISC priorities and associated actions most on-point with NATF's mission, vision, strengths, and focus for prospective leadership. We anticipate the majority of those items to fall into the Asset Management, Human Performance/Skilled Workforce, and Resiliency topics.

The NATF shares many common objectives with NERC. To advance these common objectives, and avoid redundant or conflicting efforts, we have undertaken quarterly coordination meetings between the senior leadership of both organizations. The last session was completed April 20, with future meetings in July, and October. April agenda topics included:

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

cc:

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

NATF Program	RISCPriority	Profile Desc	RISCPriority#	Action#	Timeframe (S=1,M=2,L=3)	Activity / Action
Asset Mgmt	Low	Asset Mgmt	4	4.1	1	Increase the use of NERC's Alert program to provide more detail on information requests from industry on specific assets, earlier dissemination of detailed reports, and potential follow-up activities involving maintenance and management of assets.
Asset Mgmt	Low	Asset Mgmt	4	4.2	1	The ERO Enterprise, <b>in coordination with industry</b> , should improve data gathering for equipment failure modes and improve the dissemination among equipment owners, manufacturers, and associated vendors.
Asset Mgmt	Low	Asset Mgmt	4	4.3	1	The ERO Enterprise, in coordination with industry, should improve data gathering for equipment failure modes and improve the dissemination among equipment owners, manufacturers, and associated vendors.
Asset Mgmt	Low	Asset Mgmt	4	4.4	1	Continue to evaluate performance trends using additional data collected by event analysis to extract insights, issues, and trends for dissemination across industry participants.
Asset Mgmt	Low	Asset Mgmt	4	4.5	1	Industry forums and trade groups should 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.
Asset Mgmt	Low	Asset Mgmt	4	4.6	1	The ERO Enterprise should work with industry experts to develop industry guidelines for protection and control system management to improve performance.
Asset Mgmt	Low	Asset Mgmt	4	4.8	2	Coordinate with the forums, research organizations, and technical committees to establish sharing of technologies or processes that aid in condition monitoring, failure prevention, spare parting, and recovery.
Asset Mgmt	Low	Asset Mgmt	4	4.11	3	The industry should implement best practices from the sharing of technologies or processes that aid in condition monitoring, failure prevention, spare parting, and recovery.
Asset Mgmt	Low	Asset Mgmt	4	4.7	1	Industry should perform a gap analysis to determine whether the current family of protection and control standards needs to be enhanced.
Asset Mgmt	Low	Asset Mgmt	4	4.9	1	Coordinate with the US, Canadian, and Mexican energy agencies and industry to support power transformer reserve programs.
HP	Low	HP/Skilled WF	5	5.1	1	The HP groups at the ERO Enterprise and industry forums should expand their communication of insights throughout the industry regarding best practices for increasing HP effectiveness (publishing lessons learned/best practices and supporting the NERC HP conference and other related workshops).
HP	Low	HP/Skilled WF	5	5.4	1	The ERO Enterprise and the industry should promote the use of NERC cause codes to establish a common understanding of HP triggers, collect and evaluate trends in data, and develop metrics as needed.
HP	Low	HP/Skilled WF	5	5.5	1	Explore the development and widespread use of a near-miss database which will leverage data sources such as event analysis, near miss databases, Transmission Availability Data System (TADS), Generating Availability Data System (GADS), Demand Response Availability Data System (DADS), relay misoperations, EOP-004/OE-417 Reports, and AC equipment failures to identify patterns and risk.
HP	Low	HP/Skilled WF	5	5.7	3	Industry should develop and implement a sustainable process to analyze and disseminate best practices for HP
Operations	Mod	Situational Awareness	6	6.5	1	Work with the forums on an approach for ongoing identification, cataloging, and sharing of good practices related to operating tools.

NATF Program	RISC Priority	Profile Desc	RISC Profile#	Action#	Timeframe (S=1,M=2,L=3)	Activity / Action
Operations	Mod	Situational Awareness	6	6.9	2	The ERO Enterprise should engage industry and trade organizations to develop a list of key tasks and learning objectives for wide-area monitoring as well as assessing status following system events.
Operations	Mod	Situational Awareness	6	6.3	1	The ERO Enterprise should continue to perform a root cause or mode failure analysis of partial and full loss of key EMS capability using events analysis information and provide lessons learned and recommendations to reduce the likelihood of failure.
Operations	High	Resource Mix	1	1.2	1	The ERO Enterprise should develop an effective means to gather data and insights into distributed energy resources (i.e., customer, distribution, or otherwise), and formulate plans to achieve an appropriate level of transparency and control such that implications to the BPS can be better understood.
Operations	High	Resource Mix	1	1.5	2	Policy makers should engage in high-level collaboration among market operators (RTOs/ISOs), balancing authorities in non-RTO/ISO market areas, and provinces and states to establish long-term strategies for designing policies with reliability needs.
Operations	High	Resource Mix	1		3	The ERO Enterprise should continue working with industry stakeholders and policy makers on reliability attributes essential to support the long-term reliability of the BPS including equipment control that enable system support from variable energy resources, accommodating distributed energy resources such as small end-use customer resources, distributed energy resource performance, and synchronous generation retirements.
Operations	High	System Planning	2	2.2	1	The ERO Enterprise should continue to work with industry and manufacturers and developers of asynchronous resources to develop accurate dynamic models and make them available.
Operations	High	System Planning	2	2.2	1	The ERO Enterprise should identify the type and frequency of information needed from distributed energy resources.
Operations	High	System Planning	2	2.8	3	Encourage vendors to power system simulation software to develop programs to enhance dynamic load modeling capabilities.
Operations	High	Resource Adequacy	3	3.1	1	The ERO Enterprise and the industry should continue to develop improved modeling and probabilistic methods to evaluate resource adequacy. This includes continued sharing of emerging trends and insights from assessments for effective resource planning and operating models. Adequacy and capacity may include augmenting the measurements of ERS, coordination of controls, balancing load with generation regardless of the location of resources, and energy adequacy in light of installed and available capacity from variable generation.
Operations	High	Resource Adequacy	3	3.8	1	Analyze data requirements necessary to ensure there is sufficient detail on the capability and performance of the BPS as it is impacted by distributed energy resources. The industry should gather data beyond simple demand forecasts and expand to identify resource capacity, location, and ERS capability.
Operations	Mod	Situational Awareness	6	6.1	1	The ERO Enterprise should develop new measures of reliability beyond reserve margins, including sufficiency of ERS.
Operations	Mod	Situational Awareness	6	6.4	1	The ERO Enterprise should evaluate whether certain important applications are over reliant on a single service provider and identify mitigating actions to reduce the risk.

NATF Program	RISCPriority	Profile Desc	RISCPriority#	Action#	Timeframe (S=1,M=2,L=3)	Activity / Action
Operations	Mod	Situational Awareness	6	6.7	1	The ERO Enterprise should identify the type and frequency of information from distributed energy resources for real-time situational awareness.
Operations	Mod	Extreme Natural Events	7	7.16	3	Develop a plan to review and improve the trend of SRI as indicative of system resilience and restoration performance for loss of generation, transmission, and load.
Operations	Mod	Physical Security	8	8.16	2	Expand participation in security exercises other than drills in order to respond to extreme physical events.
Resiliency	Mod	Extreme Natural Events	7	7.1	2	10. Identify and promote specific resiliency best practices to plan for extreme events.
Resiliency	Mod	Physical Security	8	8.7	1	a. Identify and promote specific resiliency vulnerability assessment best practices with planning for extreme events, including good physical security assessment practices.
Resiliency	Mod	Physical Security	8	8.7	1	b. Develop an event response plan outlining prevention, mitigation, and event response and recovery protocols for sabotage scenarios.
Resiliency	Mod	Physical Security	8	8.8	1	In collaboration with the Critical Infrastructure Protection Committee and industry stakeholders, develop a risk process to address the potential impacts of physical security threats and vulnerabilities.
Resiliency	Mod	Physical Security	8	8.9	1	The industry should review and update restoration plans while accounting for physical security scenarios.
Resiliency	Mod	Physical Security	8	8.10	2	Industry should work with the task force committees and forums to develop mitigation strategies and physical security assessment best practices.
Resiliency	Mod	Physical Security	8	8.11	2	Facilitate planning collaborations to reduce the number/exposure of critical facilities.
Resiliency	Mod	Cyber Security	9	9.3	1	In collaboration with the Critical Infrastructure Protection Committee (CIPC) and industry stakeholders, develop a risk process to address the potential impacts of cyber security threats and vulnerabilities.
Resiliency	Mod	Cyber Security	9	9.8	1	Facilitate planning collaborations to reduce the number/exposure of critical facilities.
Resiliency	Mod	Cyber Security	9	9.9	1	The industry should encourage the development of a <b>peer review</b> process for emerging risks.
Resiliency	Mod	Cyber Security	9	9.10	1	10. The industry should create and foster an internal culture of cyber awareness and safety.
Resiliency	Mod	Cyber Security	9	9.15	2	The ERO Enterprise with industry should develop agreed-upon levels of cyber-resilience suitable for BPS planning and operations.
Resiliency	Mod	Cyber Security	9	9.17	3	The ERO Enterprise and industry should develop industry operating guidelines that incorporate an agreed-upon level of cyber resilience.
Resiliency	High	Resource Adequacy	3	3.2	1	The ERO Enterprise should assess and develop mitigation recommendations as necessary to address single points of disruption, such as fuel contingencies, that will result in large resource outages.
Resiliency	Mod	Situational Awareness	6	6.11	3	The ERO Enterprise should engage industry and trade organization and the North American Synchrophasor Initiative (NASPI) to develop a suite of supplemental and back-up tools that use synchrophasor data.
Resiliency	Mod	Situational Awareness	6	6.12	3	Establish a forum with EMS vendors to leverage the near-term and mid-term suggestions for improvement of situational awareness tools.

NATF Program	RISCPriority	Profile Desc	RISCPriority#	Action#	Timeframe (S=1,M=2,L=3)	Activity / Action
Resiliency	Mod	Extreme Natural Events	7	7.2	1	E-ISAC and industry should expand communications among ISACs, including the Telecommunications, Water, and Natural Gas ISACs.
Resiliency	Mod	Extreme Natural Events	7	7.4	1	Participate in exercises that incorporate extreme physical events and implement recommendations from exercise or drills such as GridEx.
Resiliency	Mod	Extreme Natural Events	7	7.6	1	The industry, trades, and forums should evaluate inventories of critical spare transmission equipment and increase as required.
Resiliency	Mod	Extreme Natural Events	7	7.7	1	The Department of Energy, the industry, trades, and forums should identify appropriate mitigations to prevent spare equipment gaps and improve transportation logistics.
Resiliency	Mod	Extreme Natural Events	7	7.8	1	The ERO Enterprise and the industry should encourage best practices and the sharing of lessons learned to expand coordination during extreme weather events among Reliability Coordinators, Balancing Authorities, and Transmission Operators.
Resiliency	Mod	Extreme Natural Events	7	7.9	1	NERC and industry should plan a workshop to coordinate with U.S. federal agencies, Canadian, and Mexican governmental authorities to address high-impact low-frequency event response, recovery, and communications vulnerabilities.
Resiliency	Mod	Extreme Natural Events	7	7.15	1	Institutionalize relationships among ESCC, government, and industry partners to enhance the culture of recognizing and addressing extreme physical event preparedness across industry.
Resiliency	Mod	Physical Security	8	8.1	1	The ERO Enterprise should develop a metric formulated to understand the trend of physical attacks and potential threats.
Resiliency	Mod	Physical Security	8	8.2	1	Promote existing and new programs to create a spare equipment strategy and prioritization.
Resiliency	Mod	Physical Security	8	8.6	1	Develop a catalog of regional/national exercises that incorporate extreme physical events and share with industry, thus supporting increased participation across industry. Wherever possible, expand exercises to include more facilities and industries.
Resiliency	Mod	Physical Security	8	8.12	1	The Department of Energy, the industry, trades, and forums should identify appropriate mitigations to spare equipment gaps and transportation logistics.
Resiliency	Mod	Physical Security	8	8.13	1	The ERO Enterprise, the industry, trades, and forums should evaluate inventories of critical spare transmission equipment as necessary based on a spare equipment strategy and prioritization.
Resiliency	Mod	Physical Security	8	8.18	3	Institutionalize relationships among ESCC, government, and industry partners to enhance the culture of recognizing and addressing extreme physical event preparedness across industry.
Resiliency	Mod	Physical Security	8	8.19	3	Foster the development of methods, models, and tools to simulate system reliability impacts for the planning and operational planning time horizons.
Resiliency	Mod	Cyber Security	9	9.13.a	2	The ESCC should operationalize the cyber mutual assistance framework to address issues with recovery after a cyber-attack: Cross-industry sharing of best practice incident response plans.

NATF Program	RISCPriority	Profile Desc	RISCPriority#	Action#	Timeframe (S=1,M=2,L=3)	Activity / Action
Resiliency	Mod	Cyber Security	9	9.13.b	2	The ESCC should operationalize the cyber mutual assistance framework to address issues with recovery after a cyber-attack: Creation and/or expansion of security operations centers that incorporate the BPS (IT/OT convergence areas).
Resiliency	Mod	Cyber Security	9	9.14	2	Assist industry efforts to address supply chain vulnerability.
Resiliency	Mod	Extreme Natural Events	7	7.12	2	The ERO Enterprise should apply the severity risk index (SRI), on a more granular regional level to measure system resilience and restoration performance for loss of generation, transmission, and load. These efforts should include the development of new comparative and descriptive metrics.
Resiliency	Mod	Cyber Security	9	9.7	1	NERC and the CIPC should prioritize lessons learned from regional and national exercises (e.g., GridEx) and publish lessons learned and guidelines as needed.
Resiliency	Mod	Cyber Security	9	9.12	1	The ERO Enterprise should develop a feedback mechanism from CIP standards implementation to evaluate the standard and lessons learned from technology deployment.
Resiliency	Mod	Cyber Security	9	9.16	3	The ERO Enterprise and industry should develop methods, models, and tools to simulate cyber impacts on system reliability, enabling BPS planning to withstand an agreed-upon level of cyber resiliency.
Training	Low	HP/Skilled WF	5	5.2	1	NERC should encourage industry, key trade associations to determine the extent of projected skill gaps and develop recommendations to address the skill gaps (e.g., curricula, programs, industry support).
Training	Low	HP/Skilled WF	5	5.3	1	The ERO Enterprise, trade associations, and industry should promote expanding training and education programs to include HP and recruitment of the next generation of skilled workers.
Training	Low	HP/Skilled WF	5	5.6	1	Consider and implement high-value recommendations developed to address skills gaps identified in the short-term mitigation mentioned in the 1–2 year time frame.

## *NATF External Newsletter*

March 2017

This publication, which is an adaptation of the North American Transmission Forum (NATF) quarterly member newsletter, is a pilot offering to inform those outside the membership about some of the reliability and resilience work underway at the NATF and within the industry. For more information about the NATF, please visit [www.natf.net](http://www.natf.net).

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## Joint 2017 NATF/EPRI Transmission Resiliency Summit Highlights

In January 2017, the NATF and EPRI co-hosted the latest Transmission Resiliency Summit at the EPRI office in Charlotte, North Carolina. We had an excellent turnout, including 145 people from 56 NATF member companies as well as invited speakers and guests from a number of agencies (e.g., NERC, DOE, AGA, and DHS).

The summit topics and discussions included:

- Keynote addresses by Gerry Cauley of NERC and Patricia Hoffman of the DOE
- An update on EPRI's EMP Research Project work
- Panel sessions on
  - Cross-sector dependency during high-impact, low-frequency (HILF) events
  - Structure, processes, and frameworks for system restoration for HILF events
  - Member approaches to dealing with system restoration during earthquakes, firestorms, and severe weather events
  - NATF Resiliency "Spare Tire" Project report out and related member activities
- Emergency restoration practices and procedures tutorial

Feedback from attendees included:

"Great topics and worthwhile presentations."

"There was an excellent turnout of utility people engaged in transmission resiliency, and the networking opportunities were very good."

"Excellent Summit; I appreciated the time the Keynote Speakers and others time they spent sharing ideas and observations. The link between recovery and resiliency was truly nailed down by all and that is something that specifically stuck in my mind as a highlight."

The NATF and EPRI will be hosting the next Transmission Resiliency Summit in October 2017.

## 2017 Workshops and Summits

The NATF hosts member workshops and summits in key topic areas. Our 2017 list includes:

- |   |  |    |                                   |
|---|--|----|-----------------------------------|
| 1 | Resiliency Summit – Spring                               | 10 | Vegetation Management             |
| 2 | Control Center Practices                                 | 11 | Resiliency Summit – Fall          |
| 3 | Human Performance (Joint with NERC; NATF-Only on Mar 27) | 12 | Security – Fall                   |
| 4 | Compliance/Security                                      | 13 | Transmission-NPP – Fall           |
| 5 | System Protection  | 14 | EPM – Substations (Tentative)     |
| 6 | Transmission-NPP – Spring                                | 15 | EPM – Lines (Tentative)           |
| 7 | Modeling (Joint with NERC)                               | 16 | System Operations (Tentative)     |
| 8 | Operator Training  | 17 | HP NATF-Only Workshop (Tentative) |
| 9 | EPM – Asset Management                                   | 18 | OE Group Workshop – Fall          |
|   |  | 19 | Metrics Working Group Meeting     |



## *Resiliency “Spare Tire” Operations Deliverables*

How would we operate the Bulk Electric System (BES) if both primary and backup control center capabilities were lost? The Electric Subsector Coordinating Council (ESCC) posed this question to the industry in the summer of 2016. Similar questions have been raised by various officials from government agencies and regulatory bodies.

Given these questions, starting in July 2016, a team with representation from NATF member companies has been working to address three specific deliverables:

1. Review of the existing tools, capabilities, and processes the industry has in place to deal with loss of primary control center capabilities, and loss of both primary and backup control center capabilities
2. Statement of the tools, processes, relationships and players (both utility and non-utility) needed to operate during a continuum of events that would impact traditional BES operating philosophies and tools, including EMS, beyond the ‘normal backup’ capabilities and processes
3. Gap analysis (identifying potential focus areas for future research)

Status on the three deliverables as of late January 2017 is as follows:

- Deliverable one document addressing existing tools, capabilities, and processes has been completed. A [public version](#) is available on the NATF site.
- Deliverables 2 and 3 are underway and will include recommendations in the following areas:
  - a. Potential tool and technology development by entities such as DOE, National Labs, and EPRI
  - b. Actions for individual NATF member companies to take
  - c. Further work by the NATF

## *Environmental Conditions Adversely Affecting Tree Health*

In July 2016, the NATF surveyed members in order to determine the impact on transmission vegetation-management programs from environmental conditions that are adversely affecting tree health.

The impacts vary from utility to utility, but those areas that are experiencing adverse environmental conditions are definitely seeing an increase in clearing and removal workload as well as frequency and scope of inspections in order to mitigate dead and dying trees.

Some details from the survey:

- 78% of survey respondents indicated that environmental conditions are adversely affecting tree health on their systems

- Leading causes of tree mortality are emerald ash borer, oak wilt, and bark beetle infestation due to drought
- Other causes noted were Asian long-horned beetle and fire damage
- Due to the increase in tree mortality, regularly scheduled maintenance work has been impacted in some areas
- Both short- and long-term plans have been developed to mitigate the risk at many utilities

One utility reported that 90% of the ash trees on its system are severely declining or dead. (Oak wilt has been reported in Minnesota, North Dakota, South Dakota, Wisconsin, and Michigan; and significant bark beetle infestations have been reported in California and Colorado.)

Drought conditions in some areas have also resulted in additional hazard trees being present along rights-of-way, many of which have declined from various diseases.

Mitigation efforts include more frequent inspections, expanded scope of inspections, increased hazard tree program budgets, and additional training for utility and contract personnel to identify impacted trees. Others have modified their aerial patrols to occur during leaf-on season in order to better identify and mitigate areas containing dead or declining trees.

Although the long-term prognosis is difficult to determine, many of these diseases are cyclical in nature and will run their course, or in the case of emerald ash borer, until all the ash trees in a geographic area have died.

Drought and the resulting bark beetle infestation are cyclical as well. Bark beetles typically attack trees that are under stress from drought. Once normal rainfall returns, trees regain strength and the bark beetle population dies out. With that said, this does take a number of years to resolve itself.

## *NATF Surveys (2016)*

The NATF surveys program continues to be a popular tool for members to get information on practices and experiences, especially on topics related to equipment performance and maintenance. During 2016, the NATF conducted 48 surveys, with 19 addressing equipment performance and maintenance topics.

## *Human Performance Roadmap*

The recently approved "NATF Human Performance Roadmap" is a great example of the NATF guiding principles of "community" and "commitment." Recognizing a need to help the membership as a whole, the Human Performance Practices Group Core Team developed this guiding document to help members move along a maturity model for their human performance programs.

### *Purpose*

The Human Performance Roadmap takes you on a path toward improved operation of the bulk electric system through the prevention, detection, and correction of human errors and latent organizational weaknesses that can lead to events that impact system reliability. The journey to human performance improvement will complement the existing technology, equipment, and programs you already rely on for system reliability by removing error traps, by reducing the impact of human error, and by increasing the reliability of the humans who operate the system.

### *Evolution and Design*

The effort started when a practice group member took the human performance principles of excellence (POEs) and began breaking them into stages. Based on practice group discussions, the core team realized members wanted to better understand not just “what” was important, which is the basis of the POEs, but “why” these elements were important and “how” they can be accomplished.

The core team incorporated these aspects into roadmap milestones so members can move further along the maturity model and garner management support for the steps. The roadmap is a set of two documents: the first is a visual aid (graphic) that lists and previews the milestones, while the second explains the what, why, and how. As a practical step, the roadmap also includes some tips on what not to do.

The concepts of the roadmap will be shared at the upcoming NATF-NERC Human Performance Conference.

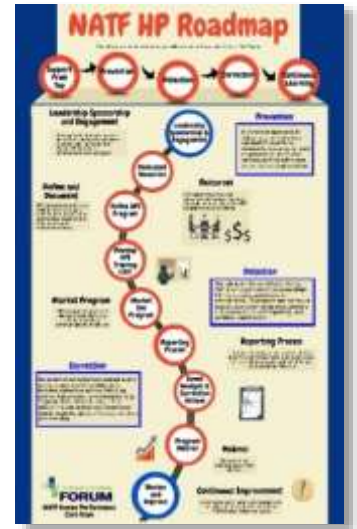
### *Next Steps*

As a future progression, the NATF Human Performance Practices Group plans to collect examples of how members are implementing the various stages/steps of the roadmap so other members can use the ideas in their programs.

## *NATF Operating Experience Reports*

NATF members share “operating experience” to help other members. The NATF describes operating experience as positive or negative transmission (reliability or resiliency) experiences worth sharing for learning opportunities or potential trending. Since November, members have shared operating experience reports in the following topic areas:

- Substation Equipment
- Transmission Equipment
- System Protection
- System Operations
- Vegetation



## Operating Experience Program Development Roadmap

The Operating Experience (OE) Group Core Team, working with NATF staff, created an “OE Roadmap” to assist members in the development of their OE programs. The goal of the roadmap is to provide condensed content for quick references and to group steps and attributes of an effective OE program. This one-page document provides a graphical representation and guide to three steps of developing an OE program.

1. First Things First
2. Build on It
3. Continuous Improvement

In the future, this one-pager will have “hot” buttons that will take members to the various OE libraries that have information and tools already posted on the OE Group site. This information will be invaluable to members as they develop their OE programs.

The roadmap has been a common topic on OE Group calls. We have discussed and edited the document during the calls, and members with mature programs provided previous presentations and materials. Focused discussions involving members who are just starting their OE program development will be held in 2017.

