

INSIDE THIS ISSUE

From the Board	2-3
Continuous Improvement	4-5
Enforcement Explains	6
Ambient Adjusted Ratings	7-8
The Seam	9
The Lighthouse	10-12
Regulatory Affairs	13
Standards	14-15
Watt's Up	16
Outreach	17
Misoperations Milestone	18
Calendar	19
RF Members	20



ReliabilityFirst Corporation
3 Summit Park Drive, Suite 600
Cleveland, OH 44131
Main Phone: (216) 503-0600
Website: www.rfirst.org

Follow us on:



Note from the President

Dear Stakeholders,

I hope you enjoyed sharing in our history with our anniversary issue, and as we close the first quarter of our 16th year, this issue highlights our proactive efforts. This wasn't difficult to do, as the work occurring across our industry to be more proactive about the complex challenges we face is evident from a glance at almost any news outlet.

FERC, the ERO Enterprise, and industry are working to position us to be stronger than ever from improving adequacy and resilience, securing the supply chain, and as Lew Folkert explores in the *Lighthouse*, continuing to protect cyber assets in the cloud. PJM shares a great example of their proactive work around global fuel assurance in the *Seam* and Sam Ciccone focuses on subsector interdependencies in the *Continuous Improvement Column*. Greg Sorensen dives into Order 881 and Ambient Adjust Ratings and its potential impacts

on you; be sure to mark your calendars for our coming webinar to explore this further.

I'm excited to announce our efforts are underway on our third strategic plan, and we have a committee working to ensure we're getting a comprehensive and diverse set of inputs and considerations to ensure we continue our progress. I always love receiving feedback from our stakeholders and am glad to hear many of you are appreciating our outreach efforts and recognize our work with you on facility ratings.. You will see read about our enforcement team's efforts to proactively be more transparent by breaking down considerations in penalty determinations. We also recognize a lot of proactive efforts in our Region that resulted in a misoperation milestone. There has been significant progress in reducing the number of relay misoperations across the RF footprint and that is a result of a lot of hard work on your

part. Reducing misoperations is important because of the risks they pose and I am very pleased and grateful with your response in this area.

I have to mention my sadness at the passing of two important people: Michehl Gent, the former NERC CEO, a true visionary and advocate who paved the way for many of the proactive initiatives we are building on today (E-ISAC for instance), and former RF employee Bob Berglund, who we are recognizing on our about RF page.

Finally, it's been my pleasure to begin working with the two newest RF Board members, Ken Seiler and Nelson Peeler, and I hope you enjoy learning more about Ken with his Spotlight..

Be safe and be well.

Forward Together,

Tim

From the Board

RF is excited to welcome Ken Seiler, Vice President of Planning and lead of PJM's System Planning Division, to our Board to represent the RTO Sector until 2024. We will feature our other new Member, Nelson Peeler, in an upcoming issue.



Please tell us a little more about your education background and professional experience.

I have an Electrical Engineering degree from the Pennsylvania State University and a MBA from Lebanon Valley College. I have completed two classes at Wharton's Executive Education Program and two classes in MIT's Sloan Executive Education program and Korn Ferry Executive Leadership Institute.

I began my career as a field engineer at Met-Ed/GPU in a rotational engineer program and experienced many different aspects of transmission and distribution, including emergency response from storm restoration activities, before moving into a corporate management role in transmission engineering and construction management and system operations.

At PJM, I have had the opportunity to work in various roles as well including Planning, Operations, the Advanced Control Center program and even a stint in IT. I have also chaired the Planning and Operating Committees and testified at a number of FERC technical conferences.

What sparked your interest in joining the RF Board?

I have a very strong interest in the various aspects of our industry and how we transition into and through the grid of the future in a reliable and resilient manner. I believe that the regional transmission organizations like PJM have a unique role as an independent voice of reason when it comes to reliability and resilience during this transition. This was an opportunity to contribute to a broader group outside of our footprint.

Also, I have had touchpoints with RF in various committees and operations and planning roles, but I wanted to see RF from a different level and be more directly involved in the work done here.

This issue is highlighting RF's continued work to become more proactive to better serve the industry. While a lot of our innovative, continuous improvement and maturity efforts are internal, we are also working to offer a wider range of proactive content and programs to serve our entities. From your position in the industry (in terms of RF's interaction with your organization) or as a part of our Board (even though we recognize that you've only been on the Board for a few months), have you observed any of these proactive efforts?

We have seen additional outreach from RF in a number of areas, including input from PJM on an RF state outreach strategy. Other examples include:

- Cold Weather Readiness: RF reached out proactively to discuss cold-weather readiness beyond what is required in the currently enforceable NERC standards.
- Best Management Practices: The Management Practices Evaluation Tool that RF developed as an assessment tool for evaluating internal controls for management practices provided PJM the ability to perform a self-assessment of our practices related to our TO/TOP audits. RF will also complete their own independent evaluation of these practices using this tool.
- Compliance: The Registered Entity Engagement where RF continues to organize and facilitate sessions among its members about the real world practices being implemented to ensure compliance with standards. Recent discussions have focused on awareness and potential impact.

From the Board

With the way the grid is transforming as well as all of the changes in how people accomplish their work that we see taking place, is there a particular area or issue you think we as an organization should prioritize in the coming years?

Talent attraction and retention is key for all of us in this industry, not just RF. Getting our message out to the universities and trade schools, and encouraging young students to explore our field will help attract talent. These are exciting times and many changes are occurring at an unprecedented level for our industry. We need to convince talented, energetic and technical people that they have a golden opportunity to be part of planning and executing the way electricity is produced and consumed in the future.

What is happening in the industry today that you are most excited about?

There are so many changes and topics to be excited about right now in our industry – state and federal decarbonization policies that impact our region, planning for the grid of the future, new grid enhancing technologies, the potential for advanced probabilistic and risk-based planning, modernizing operational tools and techniques, and the development of off-shore wind generation are just a few examples and it's hard to pick just one.

I think for me it's how all of these changes and drivers will come together as part of a highly decarbonized and decentralized reliable and resilient grid that looks very different than the grid we have built over the last century; and our transition to this new grid is the most exciting part.

What professional organizations and activities are you involved with?

I serve on the board of PJM Environmental Information Services Inc. PJM EIS provides consulting services as they relate to energy and the environment including the Generation Attribute Tracking System (GATS), which is a trading platform designed to meet the needs of buyers and sellers involved in the renewable energy certificate (REC) market - from homeowners and aggregators to states and other market participants.

Are you involved in any other activities outside of work?

I love to fly fish and take every opportunity I can to get into the water. I also serve as an instructor and mentor for the Mayfly Project, which is a national organization that uses fly fishing as a catalyst to mentor and support children in foster care and introduce them to their local water ecosystems.

2022 Q1-2

ReliabilityFirst

Board of Directors

and Committee

Meetings

will be held

April 27-28, 2022 at

the RF offices.

[Click Here](#)



Continuous Improvement

By Sam Ciccone, Principal Reliability Consultant



Critical Infrastructure Interdependencies The Journey to Security, Resiliency and Reliability

"Life doesn't make any sense without interdependence. We need each other, and the sooner we learn that the better for all of us." – Erik Erikson

The focus of this article is on Subsector Interdependence, which was identified in the recent NERC ERO Reliability Report as one of four areas of risk priorities.¹ As the report states, "[s]ubsector interdependence continues to increase and has reached an inflection point with the natural gas subsector."

As defined in the Modelling Interdependencies between the Electricity and Information Infrastructures² whitepaper, an interdependency is "a bidirectional relationship between two infrastructures through which the state of each infrastructure influences or is correlated to the state of the other."

This article provides additional information and resources on Critical Infrastructure Interdependencies, as well as some suggestions on how to lower the risk of these interdependencies. Awareness and mitigation contribute to continuously improving electric system security, resiliency and reliability.

The 2003 Blackout

Before we start discussing natural gas and electric interdependencies, it is important to learn from the past. Analysis of the 2003 blackout determined that there was a lack of understanding of the interdependencies with other infrastructures supporting the electric grid. The planning studies did not take into consideration these interdependencies. The blackout report highlights the complex work involved in operating and planning a system, and all the studies that must be performed for proper planning and operations. The blackout report states "the findings of the ESWG (Electric System Working Group) and SWG (Security Working Group) suggest that if multiple contingencies occur in a single area, they are likely to be interdependent rather than random, and

should have been anticipated in planning studies."³ Planning studies should take into account all the critical infrastructure interdependencies with the electric grid, and how those contingencies effect the reliable operation of the grid.

Electric and Gas Interdependencies

Electric power is essential, and interdependencies with other industries can have a significant impact on reliability. In recent years, the energy mix of fuel for generating electricity has evolved to have more dependency on natural gas. The electric power sector uses natural gas to generate electricity and produce useful thermal output. In 2020, the electric power sector accounted for about 38% of total U.S. natural gas consumption, and natural gas was the source of about 33% of the U.S. electric power sector's primary energy consumption.⁴ The challenge with reducing this interdependency is that the electric transmission system and natural gas pipelines appear linear in isolation but become much more complex when interdependencies are introduced. This is due the number of "system of systems", where each infrastructure's subsystems create the complexity (for example the introduction of more solar, wind, and other factors in the electric sector). The bi-directional nature of interdependencies, specifically electric grid reliance on natural gas, creates a complex relationship that depends on working together as a system rather than working in isolation.⁵

To help with this interdependency, an organization should effectively identify its external interdependencies by examining all its assets and services to determine: 1) a list of its assets that are controlled or affected by outside

¹ [NERC | RISC ERO Reliability Risk Priorities Report | July 2021](#)

² [Modelling Interdependencies between the Electricity and Information Infrastructures](#)

³ [Final Report on the August 14, 2003 Blackout in the United States and Canada: Causes and Recommendations](#)

⁴ [Natural gas explained - Use of natural gas](#)

⁵ Rinaldi, S.M. & Peerenboom, James & Kelly, T.K.. (2002). Identifying, understanding, and analyzing critical infrastructure interdependencies. Control Systems, IEEE. 21. 11 - 25. 10.1109/37.969131.

Continuous Improvement

Continued from Page 4

entities and 2) a list of its services that are directly or indirectly affected by outside entities. These lists should also identify the outside entity that controls or affects each asset or service, a point of contact, and any contracts, or agreements in place with the outside entity. In addition, the organization should be aware of the reliability and resilience requirements of the external entity. This includes implementing a clear process in place for identifying external interdependencies.

There are several critical infrastructure interdependencies in the electric, transportation, natural gas, water, and communications/IT industries. Figure 1 illustrates the bi-directional relationships electricity has with other infrastructures.

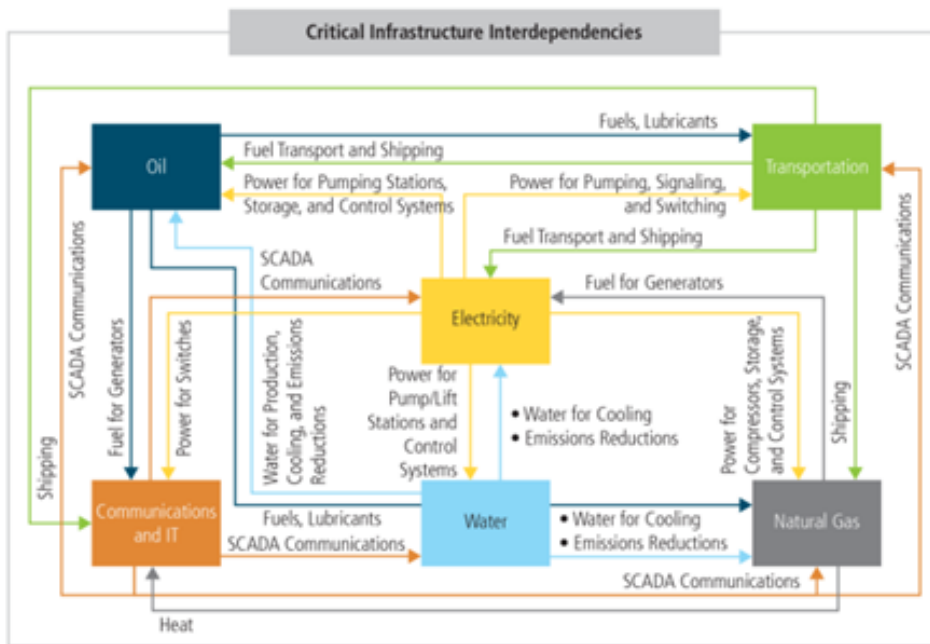


Figure 1: Critical Infrastructure Interdependencies⁶

⁶ [Transforming the Nation's Electricity System: The Second Installment of the Quadrennial Energy Review](#)

⁷ [Grid reliability and the role of natural gas](#)

⁸ [NERC Guideline Natural Gas and Electrical Operational Coordination Considerations](#)

Natural Gas Storage Interdependency and Mitigation

One specific interdependency between electric power and natural gas is storage capability. While coal, for example, can be stored onsite, natural gas relies on pipelines for fuel delivery. "Pipeline constraints can cause dispatch difficulty and, in some cases, even outages in systems heavily reliant on natural gas," says Francis O'Sullivan, from MITEI (MIT Energy Initiative) and a main author of the MIT Energy Initiative (MITEI) analysis report. "Natural gas is a just-in-time fuel, exacerbating the challenges between it and the electricity sector. But there are steps that can be taken to add in resiliency and reduce the risks that power will not be available when it is needed most."⁷ One suggestion is to specify incentives for multiple fuel capabilities with different supply chains to reduce single points of failure. Also, ensuring the two infrastructures are coordinating and communicating these challenges helps with planning and mitigation as well.

Conclusion

Interdependencies are increasing and it is becoming particularly important for our industry to work to mitigate them. More recommendations on the Electric-Natural Gas interdependency are found in "NERC Guideline Natural Gas and Electrical Operational Coordination Considerations."⁸ In addition to the RISC report, this guideline is a must-read and includes additional recommendations and suggestions.

Please contact the manager of Entity Engagement, Michelle Cross with any questions on this subject and to learn more about our maturity model assessment tool that can help you assess several risks, including your external interdependencies. You can also visit our [website](#) and request an assist visit to discuss your interest in a self-assessment.

Thanks for reading!

Enforcement Explained

By Mike Hattery, Counsel

Considerations in Applying Credit in Penalty Assessments for an Entity's Cooperation

The purpose of this column is to provide transparency into the factors considered by RF enforcement staff when determining an appropriate penalty in the context of a Settlement Agreement.



Registered Entities often ask questions about the nature and application of penalty adjustment factors. This article addresses one such adjustment factor, entity **cooperation**, which can either mitigate

(reduce) or aggravate (increase) an initial penalty determination.

As background, the Regions follow the NERC Sanction Guidelines, which are found in [Appendix 4B](#) of the NERC Rules of Procedure, when determining monetary and non-monetary penalties. The Sanctions Guidelines were revised in 2021 to provide more transparency as to how Regions determine and utilize penalties, adjustment factors, and non-monetary sanctions. While the Sanction Guidelines provide a consistent, repeatable method for determining penalties, they also give the Regions discretion to consider the facts surrounding each violation, use professional judgment, and deviate, when appropriate, from the recommended ranges for each factor described in the Sanction Guidelines to achieve penalties that bear a reasonable relationship to the seriousness of the violation.

As a general overview, the Sanction Guidelines call for establishing a Base Monetary Penalty Amount, and then evaluating the applicability of various adjustment factors. One such adjustment factor is cooperation.

Cooperation plays an essential part in allowing the Region to work with entities to identify and analyze the full scope of violations, any potential risk posed by the violations, and effective mitigation. The importance of this cooperation cannot be understated, and for this reason, RF may, and often does, grant proactive, cooperative entities mitigating credit against penalties. On the other hand, a lack of cooperation hinders RF's ability to effectively identify and mitigate the extent of the risk and may, therefore, serve as a basis to aggravate a penalty.

Mitigating Factor

Section 3.3.7 of the NERC Sanctions Guidelines provides the basis for granting mitigating credit for an entity's cooperation:

To qualify for a reduction in the monetary penalty, cooperation must be both timely and thorough, starting at essentially the same time as the entity reports or otherwise becomes aware of a violation, and should include the disclosure of all pertinent information known by the entity.

RF generally considers entities to be cooperative when they communicate promptly, thoroughly, and openly with RF in connection with the enforcement process. Opportunities for this type of communication and transparency occur throughout the process, including, as examples: (a) in connection with responses to requests for information and/or evidence, (b) by reaching out and voluntarily offering additional information without specific requests, or (c) in response to mitigation requests. Entities that are cooperative often provide information in an organized manner that allows for a more effective and efficient review by the Region and have management who encourage personnel to provide complete and accurate information with the full support of the company.

Additionally, although mitigation is required in all cases, entities that voluntarily undertake comprehensive mitigation with appropriately aggressive timelines may be awarded cooperation credit where appropriate. An entity that conducts mitigation more broadly than RF might require, or that provides updates in a way that allows RF to more quickly and effectively analyze the full scope of the issue, may be awarded credit.

As an example of where cooperation credit may be appropriate, where extent of condition reviews may take six months to multiple years (e.g., some FAC-008 or PRC-005 cases), an entity that aims to be cooperative will conduct the mitigation in a reasonable timeframe or more quickly than expected and will be prompt about updating data submissions where information has changed or new instances have been identified.

In terms of monetary impact, the rate or percentage is provided in Appendix A to the NERC Sanctions Guidelines. The range provided for penalty reduction via cooperation is 0% to 20% of the Base Monetary Penalty Amount.

Aggravating Factor

In rare cases, Regions may increase a penalty based on an entity's lack of cooperation. Lack of a cooperation is a subject of Section 3.3.4, Concealment or Impediment, in the NERC Sanction Guidelines. Section 3.3.4 of the NERC Sanction Guidelines provides the basis for penalty aggravation based on a lack of cooperation:

Additionally, NERC or the Regional Entity shall consider an increase to the monetary penalty if NERC or the Regional Entity determines, based on its review of the facts, that the entity resisted, impeded, was non-responsive, or otherwise exhibited a lack of cooperation during the discovery and review of a violation.

RF's experiences have generally included working with entities in a collaborative and cooperative manner to reach an appropriate resolution that results in a more sustainable and secure grid.

However, the Sanction Guidelines allow for increases in penalties where an entity's lack of cooperation is such that it interferes with or impedes the enforcement process. Examples could include unreasonable delays in providing information or mitigation solutions, burying key information, providing misleading information, refusing to provide relevant information, or otherwise interfering with the Region's ability to carry out the analyses necessary to resolve violations and reduce risk to the grid.

As to the monetary impact, the rate or percentage pursuant to Section 3.3.4 is an increase to the Base Monetary Penalty amount of 0% up to 800%.

For additional questions about how a Registered Entity can perform cooperatively in the Settlement Agreement space, please reach out to your enforcement case manager.

Ambient Adjusted Ratings

By Greg Sorenson, Senior Technical Auditor

The Impact of FERC Order 881 on Facility Ratings

The purpose of this article is to highlight upcoming changes to facility ratings practices.

On December 16, 2021, FERC issued Order 881. FERC Order 881¹ makes several changes to the expectations for facility ratings for transmission lines and power transformers under Section 206 of the Federal Power Act, which establishes the Commission's powers to fix rates and charges.² FAC-008-5³ requires a methodology for Transmission Owners. As the implementation period proceeds, Transmission Owners under FERC jurisdiction should modify their methodology as required by the Order and their Transmission Provider. Transmission Owners are also encouraged to review and update their internal controls to ensure accurate ratings at all times.

Facility Ratings are important inputs into real-time operations, peak hour planning, numerous operational and transmission planning studies, the market dispatch system, protection system settings, and the sale of transmission service. Overly conservative transmission ratings can lead operators to make well-intentioned but incorrect decisions due to the near-term transfer capability not accurately portraying the System, which can lead to restricted flows and increased congestion costs that are not valid. The physical capabilities of the transmission facility are affected by many factors that are different in real time from seasonal assumptions; Order 881 requires an Ambient Adjusted Rating be established for each clock hour on each transmission line, power transformer, and generator tie line. Entities may have to make modifications to their facility rating methodologies to reflect calculation of ambient ratings, separate day and night ratings, and unique normal and emergency ratings. Entities may have to make modifications to their processes to calculate⁴ ratings based on environmental conditions changing (updating these ratings at least hourly).

FERC Order 881 requires the use of Ambient Adjusted Ratings, which improve performance of the Bulk Electric System by more accurately reflecting the ability of transmission lines to transfer power under current conditions rather than seasonal assumptions. An Ambient Adjusted Rating in FERC Order 881 considers the ambient air temperature and the solar irradiance when developing ratings. Specifically, the Transmission Provider must file an updated tariff that describes how Transmission Owners will develop the ambient-adjusted ratings.

At a minimum, FERC Order 881 requires that the Transmission Owners under FERC jurisdiction develop ratings that account for a large range of operation, from 10 degrees below the historical low to 10 degrees above the historical high. The rating must change at intervals no larger than 5 degrees; for those Transmission Owners already using them, this may significantly increase the number of Ambient Adjusted Ratings calculated. To reflect the lack of solar irradiance at night that leads to an approximately 10 percent increase in ratings, nighttime calculations need to exclude the effect of heating. Entities are expected to update the sunrise and sunset times at least monthly.

Accurate temperature forecasts should be used to determine a temperature that the entity is sufficiently confident that the temperature will not exceed during the applicable interval. The calculated intervals cannot exceed one hour and the entity needs to calculate the next 240 hours; this calculation (or revalidation of the calculation) must be performed each hour.

Order 881 also requires that the Normal and Emergency Ratings be uniquely determined; different sets of assumptions will be used in order to develop ratings. Generally, equipment can withstand higher amounts of current for

¹RM-20-16-000, FERC Order 881 <https://www.ferc.gov/media/e-1-rm20-16-000>. This Order was a result of a Section 206 proceeding.

²Section 215 of the Federal Power Act relates to Electric Reliability.

³NERC Reliability Standards <https://www.nerc.com/pa/Stand/Reliability%20Standards%20Complete%20Set/RSCCompleteSet.pdf>

⁴Which can include consulting a look-up table, or validating that inputs remain the same once an hour.

Ambient Adjusted Ratings

Continued from page 7

short periods of time. The system is typically operated to not exceed the Normal Rating under continuous conditions. The Emergency Rating is mostly used to ensure the system will not exceed this after a contingency occurs. The system should not exceed the Normal Ratings under normal conditions. As a result, nearly all Facilities are expected to have different Emergency Ratings than Normal Ratings. Transmission owners will have the discretion to determine the procedure to calculate emergency ratings but they must align with good utility practice and other requirements in the *pro forma* OATT Attachment M.

FERC Order 881 includes additional changes for seasonal ratings too. In particular, the seasonal ratings must have different day and night ratings, as well as uniquely derived normal and emergency ratings. Seasons are limited to three months in duration and at least four seasons are required.

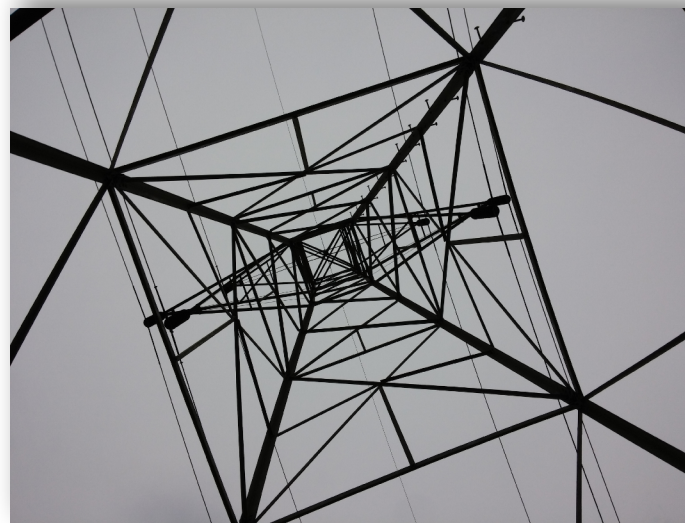
The Ambient Adjusted Ratings will be used for the sale of transmission service for periods ending within the next ten days. Additionally, the Ambient Adjusted Ratings will be used for transmission curtailment, interruption, and redispatch (including in market processes) within the next ten days. This will help ensure accurate information is used for operational decisions that affect a generator's ability to serve load. Seasonal ratings will be used for transmission service requests, including network service as well as transmission curtailment, interruption, and redispatch for requests that do not end within the next ten days.

Transmission Owners should review their existing internal controls around the facility rating process. Entities may also need to develop new detective and preventative controls to ensure accurate and consistent calculation of ratings at a variety of ambient air temperatures, day and night conditions, and in different seasons. In particular, new or improved controls may be needed to ensure calculations are performed correctly and on time, temperature data are

correct, forecasting tools are functioning properly, and results are communicated to the appropriate parties and integrated properly into operational and transmission service tools. Entities are encouraged to periodically sample circuits within these tools to ensure ratings are properly represented.

While entities have three years to become fully compliant with certain components of Order 881⁵, a number of factors need to be considered for a successful transition.

Transmission Owners will need to work with their Transmission Providers to understand implementation details and timelines. The RF Entity Engagement and Assist Visit programs can help with questions entities have on how their implementation of the Order's requirements will impact their compliance programs for FAC-008 and other NERC Reliability Standards impacted by Facility Ratings (SOLs/IROLs, OPA, Real-Time Assessment, Facility Interconnection Studies, Transmission Relay Loadability, etc.).



⁵Please note that this article is not a comprehensive summary of potential compliance responsibilities introduced by FERC Order 881, nor does it constitute legal advice. This article summarizes important concepts, changes, and potential impacts from FERC Order 881. Entities should consult the Order for the specifics of its compliance impacts.

The Seam

By PJM Interconnection, LLC



Faced with global fuel availability challenges heading into this winter, PIM Interconnection approached stakeholders in the fall with a potential solution – temporarily adjust the Maximum Emergency procedures to allow affected electricity generators to

replenish their fuel stockpiles when they were not needed to maintain the reliability of the grid.

PIM Members endorsed these temporary Manual changes effective Oct. 21, allowing generators whose fuel supplies of coal or oil fell below a specified level to offer their generators under the Maximum Emergency status. This offer status effectively removed the resources from the “economic stack” to stock up for the depths of winter.

The amendments to Emergency Operations procedures in Manual 13 provided additional reliability tools for generators in the event of any potential fuel supply shortages or extreme winter weather experienced by generators in the PJM footprint.

The changes helped PIM generators avoid major fuel supply concerns, with stockpiles gradually increasing from October through the end of December, before being used gradually over January and February.

The weather was also a positive factor: the PIM footprint was not subject to a polar vortex or other extended extreme cold weather pattern.

“Our top priority at PIM is ensuring a reliable electric grid,” PIM Senior Vice President of Operations Mike Bryson said. “We were especially concerned about coal supply chain issues and inventory levels heading into the winter, so we took action designed to give PIM and generator owners more flexibility and additional tools to manage their inventories, so they could be available when needed for reliability.”

The temporary Manual 13 changes state that PIM may request a generation owner to move steam units (generally coal-fired) into the Maximum Emergency category if the resource’s remaining run time falls below 240 hours (10 days), meaning the units could be restricted from operating during the time unless required to meet reliability needs.

The previous run-hour threshold for Maximum Emergency was 32 hours. The units in question could remain in Maximum Emergency status until their fuel inventory rise above 21 days (504 hours). This would only be implemented to address concerns with local or regional reliability as a result of fuel supply shortages.

In January, stakeholders endorsed a second temporary change to Manual 13 that would give greater flexibility to natural gas generators, increasing the minimum combined-cycle remaining run hours from 16 to 24, to better align with gas pipeline industry practices.

“We proposed the changes to be flexible in the face of any issues that may arise outside of our control,” Bryson added. “While the potential for fuel shortages and supply chain limitations exist throughout the world, we needed to stay as prepared as possible, and this was a powerful tool to help maintain fuel supplies.”

Some stakeholders raised concerns that the change could impact current market incentives or potentially unfairly exempt affected generators from performance requirements and penalties.

Chris Pilong, Senior Director of Operations Planning, said the Manual changes were short-term fixes, and that PIM was committed to discussing changes to market mechanisms to address performance and non-performance by generators that would make such temporary changes unnecessary.

The Manual changes endorsed last year were set to expire April 1, 2022. But with long-term solutions in mind, on March 23, stakeholders approved extending that deadline to allow for PJM and its stakeholders to work on more permanent solutions.

The Manual changes will expire at the completion of specific work activities toward this goal, Pilong said. The temporary Manual changes are in addition to PIM’s regular winter preparations and among the numerous additional measures PIM undertook last year arising out of lessons learned from the extreme weather and resulting blackouts in Texas in February.

In addition to pre-winter data requests from generators regarding fuel inventory, fuel supply and fuel delivery characteristics, PIM annually gathers information from generators on emissions limitations and minimum operating temperatures. Given low coal and oil stockpiles and supply chain issues across the country, PIM began collecting fuel inventory data weekly through the winter to provide a clearer picture of fuel availability.

PIM published an extensive fuel security study in 2018 that found that PJM’s generation fleet would remain reliable even in the face of major disruptions to its natural gas supply. PIM has continued this analysis with periodic updates to stakeholders.

PIM remains watchful for all types of fuel supply issues at all times. We continue to monitor the impacts to fuel prices and exports from Russia’s invasion of Ukraine, in addition to potential state-sponsored cyberattacks that could affect the fuel supply chain.



The Lighthouse

By Lew Folkerth, Principal Reliability Consultant

BCSI Revisions

On December 7, 2021, FERC issued a letter order approving CIP-004-7 (Cyber Security – Personnel & Training), CIP-011-3 (Cyber Security — Information Protection) and the associated Implementation Plan. The revised Standards implement changes in how BES Cyber System Information (BCSI) is protected. These changes were initiated by industry to address the growing need to be able to store BCSI in cloud environments. Vendor systems such as work management and trouble ticketing are migrating to cloud-only environments, and you need to use these systems to be able to fulfill other CIP requirements.

The revisions to CIP-004-7 move authorization for BCSI access from

Requirement R4 to a new Requirement, R6. R6 explains what is meant by the term “access” and introduces a new term, “provisioned access.”

The language in CIP-011-3 Requirement R1 has been simplified to provide greater clarity and flexibility in implementing information protection.

CIP-004-7 sets requirements for managing access to BCSI, and CIP-011-3 requires an information protection program (IPP) to protect the confidentiality of BCSI. You should design your programs for CIP-004-7 R4, R5 and R6 and for CIP-011-3 R1 to work in

In this recurring column, I explore various questions and concerns related to the NERC Critical Infrastructure Protection (CIP) Standards. I share my views and opinions with you, which are not binding. Rather, this information is intended to provoke discussion within your Entity. It may also help you and your Entity as you strive to improve your compliance posture and work toward continuous improvement in the reliability, security, resiliency and sustainability of your CIP compliance programs. There are times that I also may discuss areas of the Standards that other Entities may be struggling with and share my ideas to overcome their known issues. As with lighthouses, I can't steer your ship for you, but perhaps I can help shed light on the sometimes stormy waters of CIP compliance.



Crisp Point, MI – Photo: Lew Folkerth

concert to prevent compromising the confidentiality of BCSI.

“Obtain and Use”

One of the key concepts introduced in CIP-004-7 R6 is the clarification of the meaning of the word “access.” R6 states, “To be considered access to BCSI in the context of this requirement, an individual has both the ability to *obtain* and *use* BCSI.” [emphasis added] The “obtain and use” concept focuses our attention on the actual information being protected, rather than the storage locations for the information, and gives us the ability to store BCSI in cloud computing environments.

Think of BCSI as a car parked in your locked garage. Only you and your family may obtain (be able to touch) the car. However, this level of access is worthless without the ability to get into the car and drive away.

That requires that you can both *obtain* the car and have the keys to unlock and

The Lighthouse

Continued from page 10

drive (*use*) the car. You might park the car on a street (cloud environment) so that an unauthorized individual could *obtain* the car, but if you lock (encrypt) the car, no unauthorized individual can *use* the car.

The car might be towed away, denying you the ability to obtain the car, but whoever towed the car still cannot use the car without the keys.

“Provisioned Access”

CIP-004-7 R6 also introduces the concept of *provisioned access*. Based on the language in R6, *provisioned access* has these attributes:

- The access is for an individual (not a system);
- The access is granted as the result of “specific actions”;
- The access is authorized;
- The access is needed (“based on need, as determined by the Responsible Entity”);
- The access is either:
 - “Electronic access to electronic BCSI,” or
 - “Physical access to physical BCSI”.

Provisioned access must be authorized (Part 6.1), periodically reviewed (Part 6.2) and revoked as needed (Part 6.3). Access that is not provisioned access, such as unauthorized access, system access, etc. should be addressed by your CIP-011-3 IPP.

The use of the term *provisioned access* in R6 lets your BCSI access management program focus on the actions it is intended to perform – access by authorized individuals to BCSI within your control. All other forms of access should be addressed by your IPP.

Information Protection

CIP-011-3 R1 still requires an IPP, but the two Parts specifying the content of the IPP have been modified. Part 1.1 requires that your IPP have one or more methods to identify BCSI.

Part 1.2 requires one or more methods to mitigate the risks of the loss of confidentiality of BCSI. This new language makes CIP-011-3 R1 a limited risk-based Requirement, in that only confidentiality is addressed by R1. BCSI integrity and availability are not in scope for R1.

I recommend that you apply and document risk management techniques (see sidebar for references) to the tasks of protecting and securing your BCSI.

Consider IPP provisions based on risk that include:

- Prevention of unauthorized forms of access to BCSI;
- Loss of confidentiality of BCSI, perhaps to trigger an incident response and a compliance self-report; and
- Key management, for BCSI protected by encryption.

References

- [NIST SP800-209](#), Security Guidelines for Storage Infrastructure, October 2020
- Security Guideline for Electricity Sector, [Primer for Cloud Solutions and Encrypting BCSI](#), June 10, 2020
- ERO Enterprise CMEP Practice Guide: [BES Cyber System Information](#), April 26, 2019
- Lessons Learned from Commission-Led CIP Reliability Audits
 - [2019](#)
 - [2020](#)
 - [2021](#)
- [A Structure for CIP Risk Management Plans](#), The Lighthouse, Jan/Feb 2019
- [SERC/RF Online Risk Management Training](#)

NIST Publication SP800-209, Security Guidelines for Storage Infrastructure, lists various threats and risks to stored information that can be applied to BCSI. SP800-209 also provides insight into the attack surfaces that could be exploited by an attacker to compromise BCSI. The sidebar lists additional resources to help you in updating your IPP for the new Standards.

The Lighthouse

Continued from page 11

Authorization Paths

The revised Standards allow multiple paths for authorization of access to BCSI.

1. BCSI can and frequently does reside on the applicable BES Cyber Systems, EACMS and PACS themselves. When that is the case, provisioned access to that electronic and physical BCSI can be authorized by your CIP-004-7 R4 access management program and does not need to be repeated by your CIP-004-7 R6 BCSI access management program.
2. Other provisioned access to BCSI, such as document management systems, cloud storage, etc., is authorized by your CIP-004-7 R6 BCSI access management program.
3. Access not covered by CIP-004-7 R4 and R6 should be addressed by your CIP-011-3 IPP. The IPP should consider:
 - a. Authorized access to BCSI that is not in scope for CIP-004-7, such as BCSI pertaining to medium impact BES Cyber Systems, EACMS and PACS without External Routable Connectivity.
 - b. Authorized system (not individual) access to BCSI, if any.

Early Adoption

If you wish to take advantage of the increased flexibility afforded by CIP-004-7 and CIP-011-3, you may elect to adopt these Standards before their official (in the U.S.) effective date of January 1, 2024. If you choose to adopt them early these considerations will apply:

- Required:
 - You must notify all Regional Entities with which you are registered of the date you will begin compliance with CIP-004-7 and CIP-011-3.
 - You must continue to comply with CIP-004-6 and CIP-011-2 until that date.
 - Your new BCSI access management program should become

effective on or before the date you begin compliance with CIP-004-7.

- Your IPP should be reviewed for applicability with the new Standards, and any changes should become effective before the date you begin compliance with CIP-011-3.
- Recommended:
 - You are requested to notify your Regional Entities at least 90 days prior to the date you will adopt CIP-004-7 and CIP-011-3.
 - You are requested to adopt CIP-004-7 and CIP-011-3 on the first day of a calendar quarter.

Requests for Assistance

If you are an Entity registered within the RF Region and believe you need assistance in sorting your way through this or any compliance related issue, remember RF has the Assist Visit program. Submit an Assist Visit Request via the RF website [here](#). Back issues of The Lighthouse, expanded articles and supporting documents are available in the [RF CIP Knowledge Center](#).

Feedback

Please provide any feedback you may have on these articles. Suggestions for topics are always welcome and appreciated.

Lew Folkerth, Principal Reliability Consultant, can be reached [here](#).

Regulatory Affairs

FERC Issues NOPR on Internal Network Security Monitoring for High and Medium Impact BES Cyber Systems



FERC Technical Conference on Increasing Market and Planning Efficiency through Improved Software

On January 20th, FERC issued a Notice of Proposed Rulemaking (NOPR) for NERC to strengthen the CIP Standards by requiring internal network security monitoring (INSM) for high- and medium-impact BES cyber systems.

INSM is a subset of network security monitoring applied within a “trust zone,” such as an Electronic Security Perimeter (ESP). The NOPR proposal is intended to provide an additional layer of protection by requiring that communications and malicious activity within a trust zone be monitored when perimeter network defenses are breached. INSM tools include anti-malware; Intrusion Detection Systems; Intrusion Prevention Systems; and firewalls.

INSM can help entities detect attacks more

quickly, and more quickly mitigate and recover from them. It also helps guard against insider threat situations where individuals with access are considered secure and trustworthy, but could still pose a risk to a high or medium impact BES Cyber System.

FERC is seeking comments on the NOPR, and on the overall usefulness and practicality of implementing INSM for high- and medium-impact BES cyber systems. In the NOPR, FERC expressed concern about the threat of an attacker gaining access to a trust zone undetected and communicating freely between devices. Based on the comments received, FERC may consider expanding the proposed INSM requirement to low impact BES Cyber Systems as well.

FERC is holding a virtual [technical conference](#) on June 21-23 to consider improved software for increasing real-time and day-ahead market efficiency of the BPS. Discussion will include:

- Software that can better model storage technologies and distributed energy resources, and account for extreme weather events.
- Ways to better use existing system flexibility to improve BPS reliability and economic efficiency, including transmission constraint relaxation practices.
- Software related to grid-enhancing technologies, including optimal transmission switching and dynamic transmission line ratings.

FERC will also will accept comments following the conference, with a deadline of July 29, 2022.

FERC Issues Notice of Inquiry on Implementation of Dynamic Line Ratings

On February 17, 2022, FERC issued a [Notice of Inquiry](#) (NOI)¹ in the implementation of dynamic line ratings (DLR). A DLR is a transmission line rating that applies to a time period of up to one hour; and reflects up-to-date forecasts of inputs such as ambient air temperature, wind, solar heating intensity, transmission line tension, or transmission line sag.

The NOI builds on Order 881 (issued in December 2021), which requires transmission providers to use ambient-adjusted ratings (AARs) for evaluating near-term transmission service requests and to determine the necessity of certain curtailment, interruption or redispatch of near-term transmission service.

In Order 881, FERC noted that using DLRs could result in more accurate line ratings,² and could detect situations where power flows should be reduced to maintain safe and reliable operation and avoid unnecessary wear on

transmission equipment. However, FERC declined to mandate the use of DLRs in Order 881, as it needed additional information to evaluate the benefits and challenges of DLRs.

The NOI is seeking comments on:

- whether and how the required use of dynamic line ratings (DLR) is needed to ensure just and reasonable wholesale rates;
- whether the lack of DLR requirements renders current wholesale rates unjust and unreasonable;
- potential criteria for DLR requirements;
- the benefits, costs, and challenges of implementing DLRs;
- the nature of potential DLR requirements; and
- potential timeframes for implementing DLR requirements.

¹Notice of Inquiry On Implementation of Dynamic Line Ratings (NOI), 178 FERC ¶ 61,110 (2022).

²Unlike AARs, DLRs are based not only on forecasted ambient air temperatures and the presence or absence of solar heating, but also on other weather conditions, such as wind, cloud cover, solar heating intensity (instead of only daytime/nighttime distinctions used in AARs), and precipitation, and/or on transmission line conditions such as tension or sag. Order No. 881, 177 FERC ¶ 61,179 at P 7.

Standards Update

This recurring column provides our Registered Entities with relevant and recent updates to the Reliability Standards and Requirements.

General NERC Standards News

2021 NERC CMEP Annual Report

- On February 9, 2022, NERC filed the annual [NERC CMEP Report](#). The report includes analysis of the following topics: the impact of the COVID-19 Pandemic on CMEP activities, the CMEP Implementation Plan, Enforcement oversight, Compliance Monitoring oversight, and important ERO metrics.

CIP-013 Compliance Guidance

- On March 1, 2022, the ERO endorsed two NATF implementation guides addressing [risk management plans](#), and [independent assessments](#).

Notable NERC Filings

In January - March, NERC filed the following with FERC:

- On February 16, 2022, NERC submitted a [petition for modification](#) of the compliance section of CIP-014. Specifically, “[t]he modifications remove the provision from the Compliance section that requires all evidence demonstrating compliance with the standard to be retained at the Transmission Owner’s or Transmission Operator’s facility.”
- On February 18, 2022, NERC and RF submitted a [joint petition](#) for approval of changes to ReliabilityFirst’s Bylaws. The changes:
 - (1) update references to the Articles of Incorporation;
 - (2) remove inaccurate language stating that the RF Board may establish and impose penalties and sanctions for noncompliance; and
 - (3) incorporate edits to comport with Delaware Corporate Law Changes.

Notable FERC Orders

- On January 20, 2022, FERC issued a [Notice of Proposed Rulemaking](#) directing NERC to develop new or modified Reliability Standards that require internal network security monitoring within a CIP network environment for high and medium impact Bulk Electric System Cyber Systems.
- On March 4, 2022, FERC issued a [letter order](#) approving a suite of standards related to establishing and communicating System Operating Limits.

Standards Update

New Standards Projects

New Standards projects are described on the NERC [Standards](#) website, along with links to all drafts, voting results, and similar materials. Please take note that some Enforcement Dates relate to specific requirements and sub-requirements of the Standard and are detailed below. Recent additions include the following:

Project	Action	Start/End Date
Project 2016-02- Modifications to CIP Standards - Virtualization	Additional Ballots and Non-binding Polls	4/1/2022 - 4/11/2022
Project 2020-03 – Supply Chain Low Impact Revisions – CIP-003-x	Additional Ballots and Non-binding Polls	4/6/2022 - 4/15/2022
Recent and Upcoming Standards Enforcement Dates		
January 1, 2022	PRC-012-2 – Remedial Action Schemes (Requirement R9); TPL-007-4 – Transmission System Planned Performance for Geomagnetic Disturbance Events (Requirements R6, 6.1-6.4, R10, R10.1-10.4)	
July 1, 2022	PRC-002-2 – Disturbance Monitoring and Reporting Requirements (100% compliance for Requirements 2-4, 6-11) CIP-012-1 - Cyber Security - Communications between Control Centers	
October 1, 2022	CIP-005-7 -- Cyber Security -- Electronic Security Perimeter(s); CIP-010-4 – Cyber Security – Configuration Change Management and Vulnerability Assessments; CIP-013-2 – Cyber Security – Supply Chain Risk Management; PRC-024-3 – Frequency and Voltage Protection Settings for Generating Resources	
January 1, 2023	TPL-007-4 – Transmission System Planned Performance for Geomagnetic Disturbance Events (Requirements R3, R4, 4.1, 4.1.1-4.1.2, 4.2, 4.3, 4.3.1, R8, 8.1, 8.1.1-8.1.2, 8.2, 8.3, and 8.3.1)	
April 1, 2023	EOP-011-2 – Emergency Preparedness and Operations; IRO-010-4 – Reliability Coordinator Data Specification and Collection; TOP—003-5 – Operation Reliability Data	
July 1, 2023	TPL-001-5.1 – Transmission System Planning Performance Requirements	
January 1, 2024	TPL-007-4 – Transmission System Planned Performance for Geomagnetic Disturbance Events (Requirements R7, 7.1-7.3, 7.3.1-7.3.2, 7.4, 7.4.1-7.4.3, 7.5, 7.5.1, R11, 11.1-11.3, 11.3.1-11.3.2, 11.4, 11.4.1-11.4.3, 11.5, and 11.5.1); CIP-004-7 – Cyber Security - Personnel & Training; CIP-011-3 – Cyber Security – Information Protection	

These effective dates can be found [here](#).



In Memory BOB BERGLUND

Many of you may not have had the pleasure of knowing and working with Bob Berglund, but he was one of the original RF employees who worked passionately alongside us in compliance monitoring activities until his retirement about 6 years ago. Bob was always friendly and kind and had many years of industry experience. Bob passed away in early March.



Bob was born in Pittsburgh, Pennsylvania and graduated from the University of Pittsburgh with a degree in Electrical Engineering and went on to pursue his master's in Electrical Engineering. He lived in northeast Ohio and western Pennsylvania for over 74 years and worked in the field of Electrical Engineering for over 40 years.

Throughout Bob's life he had a love of computers, engineering, travel, cooking, animals, running, and cycling which he passed on to his children. He was a gourmet cook and loved to get crabcakes (and he would include us) shipped in dry ice to the office from the Chesapeake area. We will remember his kindness, generosity, and dedication.

Cyber Resilience Approaches for Energy Critical Infrastructure



Bhesh Krishnappa, Resilience Manager at RF, presented Cyber Resilience Approaches for Energy Critical Infrastructure at the CS4CA on March 29, 2022.

He discussed some of the approaches RF has taken to ensure cyber resilience across the entities in its footprint and facilitated conversations to bring awareness to measure and benchmark performance.

He also highlighted several tools that can allow industry to collaborate and learn from each other to mitigate risks, and foster an environment of sharing best practices and methods.

Tim Gallagher and Jim Robb Present to Indiana State Senate

In January, Tim Gallagher and Jim Robb presented on national and regional reliability topics to the Indiana State Senate Utilities Committee. They discussed NERC's 2021 Long-Term Reliability Assessment and 2021-2022 Winter Reliability Assessment, as well as resource adequacy and winter reliability information specific to the RF region and the state of Indiana.





Outreach Recap

RF is committed to providing timely and pertinent information to our entities and stakeholders. Our monthly, open webinars provide a forum to address topics and questions relevant to reliability, resilience, and security. During our Technical Talks with RF, we host a range of speakers and subject matter experts across the industry. The Technical Talks with RF are typically the third Monday of each month (but maybe be moved to avoid holidays). Our calendar of upcoming events, with agendas and the Webex link to join, can be found on our website rfirst.org.

We have been off to a great start in 2022, with engaging topics and speakers over the first quarter. Some of these speakers this year have included:

- Jeff Craigo, RF Vice President of Reliability and Risk, laying out his expectations for the upcoming year plus highlighting past collaborations that have enhanced reliability and security
- Tanya Hickey, Ontario Power Generation, presenting on Human Performance and the Impact on Reliability
- Kevin Doss, Level 4 Security, presenting on Security Lessons Learned and Best Practices
- Tony Freeman, RF Principal Analyst, sharing controls on CIP-006 and visitor access
- Tom Alrich, Independent Consultant, presenting on Software Bill of Materials and Supply Chain
- Ken Keels, Valerie Agnew, Ryan Stewart, North American Transmission Forum (NATF), presenting on supply change risk management and the Implementation Guidance.
- Tony Jablonski, RF Sr. Manager RAM, provides monthly Align updates

If you have missed any past Technical Talks with RF, the presentations can be found on our website under

["Upcoming Events"](#) and finding the event on our calendar.

Protection System Commissioning Practices Webinar Recap

In April 2020, the Federal Energy Regulatory Commission (FERC), NERC, and the Regional Entities initiated a joint review to assess certain Registered Entities' protection system testing and commissioning programs and procedures.

In November 2021, a report was released that identified best practices and opportunities for improvements to reduce the risk of future misoperations.

On January 24 2022, RF held a webinar to discuss the results of the FERC/NERC Joint Review of Protection System Commissioning Practices, (click [here](#) to read), published on Nov 2, 2021. This report summarized the results of a survey conducted on eight entities from across the ERO as to their practices for commissioning Protection System projects. These responses were benchmarked against the IEEE PSRC I25 WG report (click [here](#) to read) on Protection System commissioning best practices to determine how well the commissioning programs of these entities compared. The report also shared recommendations on areas where commissioning programs can make improvements.

Presentations included an overview of the recommendations from the Joint Review report, how commissioning errors are impacting the Misoperation performance of RF, reflections of a commissioning engineer, and how modeling of inverter-based resources plays a role in their commissioning processes.

Approximately 400 people attended this webinar.

Upcoming Events

April Technical Talk with RF

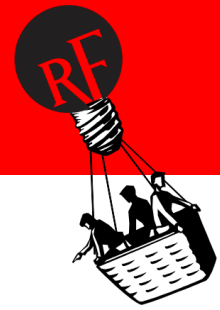
Join us for our upcoming Technical Talk with RF on Monday April 18th 2:00 – 3:30 pm ET. There will be a presentation on Enforcement Updates and Trends. We will take a deep dive into violations, disposition trends and considerations regarding settlement agreements and penalties. For more information, with agenda and WebEx link, visit our website calendar [here](#)

Facility Ratings Webinar

Want more information on ambient facility ratings? Join our upcoming Facility Ratings Webinar on April 4th 1:00-4:00 pm EST. The WebEx event will include several engaging speakers from FERC, PJM, MISO, AEP, Aurora Generation and PPL. For more event information, with agenda and WebEx link, visit our website at rfirst.org.

*Don't miss the Summary of FERC Order 881 in this issue on page 7.





RF Reaches Major Misoperations Milestone in 2021

RF and its stakeholder community achieved a major milestone in 2021. Through the hard work of our stakeholders, combined with the outreach and education provided by RF, the overall misoperation rate for RF and its stakeholders, using preliminary data, is at 9.53%.

We, RF and its stakeholders, began this journey back in the 2014-15 timeframe, when the rate was more than 13%. NERC and the Regional Entities made program changes, and tracking and trending of the data took place, with more targeted work beginning in 2016, when the rate was 11.34% as seen in graph below. Analysis of various risks took place in 2016 and resulted in RF targeting the misoperation risk to reduce its rate to assure Bulk Power System reliability is sustained. The risk was targeted by not only RF, but the entire ERO Community, when NERC set a goal for the ERO to attain an overall ERO misoperation rate of 8%.

RF reviewed all the available data to better understand the risk, the areas that needed to be focused on and identify our stakeholders that were struggling. Outreach was performed through numerous venues including, but not limited to, Educational Forums (i.e., workshops, monthly calls, newsletter articles, etc.), one on one sessions with stakeholders, reviewing and educating industry through targeted workshops (i.e., Annual Workshop, Annual Protection System Workshop, etc.), and working with our Protection Subcommittee to review and assess data and identify issue. Efforts also included participating on various industry groups, stakeholders volunteering to conduct an Appraisal and perform their own Self-Assessment using tools developed by RF,

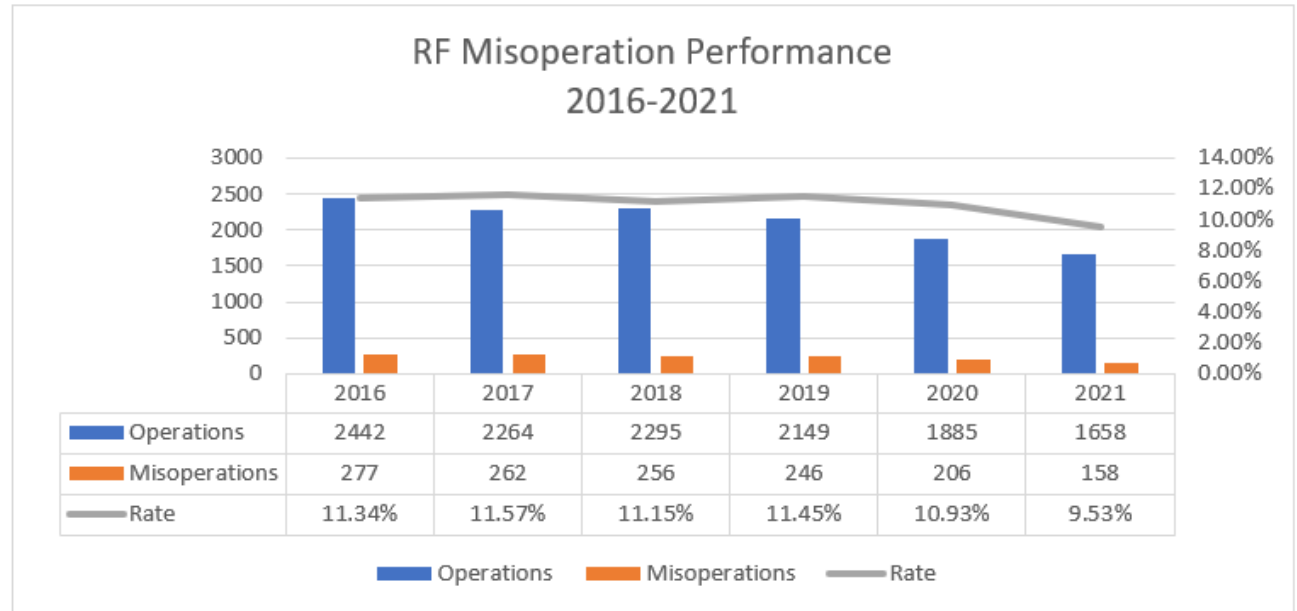
developing lessons learned through the Events Analysis Process (EAP), sharing Lessons Learned (LL) through all of our outreach efforts and performing regulatory oversight (i.e. audits, self-reports, and mitigation plans of PRC Standards).

An example of an earlier 2018 LL can be located at the link below. By sharing these with industry, it is anticipated that industry will take this information, review it, extract relevant information, and implement controls that can enhance reliability. Click [here](#) to review.

The graph illustrates our rate and the number of operations and misoperations all decreasing over

time. In 2016, as seen in the graph below, our operations and misoperations were 2442 and 277 respectively. Those same values in 2021 decreased to 1658 and 158 respectively, all due to the hard work and vigilance of our stakeholders. Although we have not yet attained the ERO target of 8%, which we together will continue to work towards, this major milestone is worth recognizing.

RF would like to thank our entire stakeholder community for all the work and energy spent on misoperations and asks for your continued support to sustain and improve this rate in the coming years.



Calendar of Events

The complete calendar of RF Upcoming Events is located on our website here.



Date	RF Upcoming Events - All 2021 Events will be conducted virtually
April 4	Facility Rating Webinar
April 18	Technical Talk with RF
April 27-28	Board of Directors and Committee Meetings
May 16	Technical Talk with RF
June 20	Technical Talk with RF

Industry Events

Date	Industry Upcoming Events
April 21	FERC Virtual Open Meeting
April 28	FERC, NERC, and Regional Entities Technical Conference: Improving Winter-readiness of Generating Units
May 6	Third Meeting of the Joint Federal-State Task Force on Electric Transmission
May 11-12	NERC Board of Trustees Meeting
June 21-23	FERC Technical Conference on Increasing Market and Planning Efficiency through Improved Software

ReliabilityFirst Members

AEP ENERGY PARTNERS
AES NORTH AMERICA GENERATION
ALLEGHENY ELECTRIC COOPERATIVE, INC
AMERICAN ELECTRIC POWER SERVICE CORP
AMERICAN TRANSMISSION CO, LLC
APPALACHIAN POWER COMPANY
BUCKEYE POWER INC
CALPINE ENERGY SERVICES, LP
CENTERPOINT ENERGY
CITY OF VINELAND, NJ
CLOVERLAND ELECTRIC COOPERATIVE
CMS ENTERPRISES COMPANY
CONSUMERS ENERGY COMPANY
DARBY ENERGY, LLP
DATACAPABLE, INC
THE DAYTON POWER & LIGHT CO
DOMINION ENERGY, INC
DTE ELECTRIC
DUKE ENERGY SHARED SERVICES INC
DUQUESNE LIGHT COMPANY
DYNEGY, INC
EXELON CORPORATION
FIRSTENERGY SERVICES COMPANY
HAZELTON GENERATION LLC
HOOSIER ENERGY RURAL ELECTRIC COOPERATIVE, INC
ILLINOIS CITIZENS UTILITY BOARD
ILLINOIS MUNICIPAL ELECTRIC AGENCY
INDIANAPOLIS POWER & LIGHT COMPANY
INTERNATIONAL TRANSMISSION COMPANY

Forward Together

ReliabilityFirst

LANSING BOARD OF WATER AND LIGHT
MICHIGAN ELECTRIC TRANSMISSION CO, LLC
MICHIGAN PUBLIC POWER AGENCY
MIDCONTINENT INDEPENDENT SYSTEM OPERATOR, INC
MORGAN STANLEY CAPITAL GROUP, INC
NEPTUNE REGIONAL TRANSMISSION SYSTEM, LLC
NEXTERA ENERGY RESOURCES, LLC
NORTHERN INDIANA PUBLIC SERVICE COMPANY
OFFICE OF PEOPLE'S COUNSEL, DISTRICT OF COLUMBIA
OHIO POWER COMPANY
OHIO VALLEY ELECTRIC CORPORATION
OLD DOMINION ELECTRIC COOPERATIVE
PENNSYLVANIA OFFICE OF CONSUMER ADVOCATE
PJM INTERCONNECTION, LLC
PPL ELECTRIC UTILITIES CORPORATION
PROVEN COMPLIANCE SOLUTIONS, INC
PUBLIC SERVICE ENTERPRISE GROUP, INC
ROCKLAND ELECTRIC COMPANY
SOUTHERN MARYLAND ELECTRIC COOPERATIVE, INC
TALEN ENERGY
TENASKA, INC
TENNESSEE VALLEY AUTHORITY
UTILITY SERVICES, INC
WABASH VALLEY POWER ASSOCIATION, INC
WISCONSIN ELECTRIC POWER COMPANY
WOLVERINE POWER SUPPLY COOPERATIVE, INC