

# Meeting Agenda

Reliability Advisory Council (RAC)

**May 19, 2022**

**8:00 a.m. – 2:00 p.m. Central**

*InterContinental Kansas City at the Plaza*

*Kansas City, Missouri*



**MIDWEST  
RELIABILITY  
ORGANIZATION**

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Saint Paul, MN 55102

651-855-1760

[www.MRO.net](http://www.MRO.net)

## VIDEO AND AUDIO RECORDING

Please note that Midwest Reliability Organization (MRO) may make a video and/or an audio recording of this organizational group meeting for the purposes of making this information available to board members, members, stakeholders and the general public who are unable to attend the meeting in person.

By attending this meeting, I grant MRO:

1. Permission to video and/or audio record the meeting including me;
2. The right to edit, use, and publish the video and/or audio recording.
3. I understand that neither I nor my employer has any right to be compensated in connection with the video and/or audio recording or the granting of this consent.

## MRO ORGANIZATIONAL GROUP GUIDING PRINCIPLES

These MRO Organizational Group Guiding Principles complement charters. When the Principles are employed by members, they will support the overall purpose of the organizational groups.

### Organizational Group Members should:

1. Make every attempt to attend all meetings in person or via webinar.
2. Be responsive to requests, action items, and deadlines.
3. Be active and involved in all organizational group meetings by reviewing all pre-meeting materials and being focused and engaged during the meeting.
4. Be self-motivating, focusing on outcomes during meetings and implementing work plans to benefit MRO and MRO's registered entities.
5. Ensure that the organizational group supports MRO strategic initiatives in current and planned tasks.
6. Be supportive of Highly Effective Reliability Organization (HERO™) principles.
7. Be supportive of proactive initiatives that improve effectiveness and efficiency for MRO and MRO's registered entities.

## MEETING AGENDA

Agenda Item	
<b>1</b>	<b>Call to Order and Determination of Quorum</b> <i>Dick Pursley, Reliability Advisory Council Chair</i> <ol style="list-style-type: none"> <li>a. Determination of Quorum <i>Reliability Analysis Administrator</i></li> <li>b. Robert's Rules of Order</li> </ol>
<b>2</b>	<b>Standards of Conduct and Antitrust Guidelines</b> <i>Bryan Clark, Director, Reliability Analysis</i>
<b>3</b>	<b>Chair's Remarks</b> <i>Dick Pursley, Reliability Advisory Council Chair</i>
<b>4</b>	<b>Consent Agenda</b> <i>Dick Pursley, Reliability Advisory Council Chair</i> <ol style="list-style-type: none"> <li>a. Approve April 6, 2022 RAC meeting minutes</li> </ol>
<b>5</b>	<b>MRO Board of Directors OGOC and General Update</b> <i>Bryan Clark, Director, Reliability Analysis</i>
<b>6</b>	<b>MRO Representatives on NERC Subgroups - Written Reports</b> <i>Bryan Clark, Director, Reliability Analysis</i> <ol style="list-style-type: none"> <li>a. NERC Electric Gas Working Group (EGWG) - <i>Jaimin Patel</i></li> <li>b. NERC Inverter Based Resource Performance Subcommittee (IRPS) - <i>David Brauch</i></li> <li>c. NERC System Planning Impacts from DER Working Group (SPIDERWG) – <i>Wayne Guttormson</i></li> <li>d. NERC System Protection and Control Working Group (SPCWG) - <i>Mark Gutzmann</i></li> <li>e. NERC Energy Reliability Assessment Task Force (ERATF) – <i>Tom Whynot</i></li> </ol>
<b>Break – 10:00 a.m.</b>	
<b>7</b>	<b>Update 2022 Work Plan</b> <i>Dick Pursley, Reliability Advisory Council Chair</i> <ol style="list-style-type: none"> <li>a. Review Action Items</li> <li>b. 2022 Reliability Conference Debrief <i>Derek Brown, Reliability Advisory Council Member</i></li> </ol>
<b>8</b>	<b>MISO 2022 Summer Capacity</b> <i>Durgesh Manjure, MISO</i>
<b>9</b>	<b>Assessment Review</b> <ol style="list-style-type: none"> <li>a. MRO Regional Summer Assessment (RSA) <i>Salva Andiappan, Principal Reliability Assessment Engineer, MRO</i></li> </ol>
<b>Lunch – 12:00 p.m.</b>	
<b>10</b>	<b>RAC Charter Review</b> <i>Bryan Clark, Director, Reliability Analysis</i>
<b>11</b>	<b>Recent Lessons Learned (NERC)</b> <i>John Grimm, Principal Systems Protection Engineer</i>

Agenda Item	
<b>12</b>	<b>Reliability Guideline Overview</b> <i>Bryan Clark, Director, Reliability Analysis</i>
<b>13</b>	<b>Protective Relay Subgroup (PRS) Update</b> <i>Jake Bernhagen, Senior Systems Protection Engineer, MRO</i>
<b>14</b>	<b>2022 Meeting Dates</b> <i>Dick Pursley, Reliability Advisory Council Chair</i>
<b>15</b>	<b>RAC Member Roundtable</b> <i>Reliability Advisory Council Members</i>
<b>16</b>	<b>Other Business and Adjourn</b> <i>Dick Pursley, Reliability Advisory Council Chair</i>

## AGENDA 1

### Call to Order and Determination of Quorum

- a. Determination of Quorum and Introductions - Roster  
**Dick Pursley, Reliability Advisory Council Chair**

Name	Role	Company	Term
Dick Pursley	Chair	Great River Energy	12/31/2022
Jason Weiers	Vice-Chair	Otter Tail Power Company	12/31/2024
Andy Witmeier	Member	MISO	12/31/2024
Binod Shrestha	Member	Saskatchewan Power Corporation	12/31/2022
CJ Brown	Member	Southwest Power Pool, Inc.	12/31/2024
Dallas Rowley	Member	Oklahoma Gas and Electric	12/31/2022
Derek Brown	Member	Evergy	12/31/2023
Durgesh Manjure	Member	MISO	12/31/2023
Dwayne Stradford	Member	American Electric Power	12/31/2024
Gayle Nansel	Member	Western Area Power Administration	12/31/2022
Jeremy Severson	Member	Basin Electric Power Cooperative	12/31/2024
John Stephens	Member	City Utilities of Springfield, Missouri	12/31/2023
Nandaka Jayasekara	Member	Manitoba Hydro	12/31/2022
Ron Gunderson	Member	Nebraska Public Power District	12/31/2023
W. Bryn Wilson	Member	Oklahoma Gas and Electric	12/31/2023

## AGENDA 1

### Call to Order and Determination of Quorum

a. Robert's Rules of Order  
Dick Pursley, Reliability Advisory Council Chair

**Parliamentary Procedures.** Based on Robert's Rules of Order, Newly Revised, Tenth Edition

**Establishing a Quorum.** In order to make efficient use of time at MRO organizational group meetings, once a quorum is established, the meeting will continue, however, no votes will be taken unless a quorum is present at the time any vote is taken.

**Motions.** Unless noted otherwise, all procedures require a "second" to enable discussion.

When you want to...	Procedure	Debatable	Comments
Raise an issue for discussion	Move	Yes	The main action that begins a debate.
Revise a Motion currently under discussion	Amend	Yes	Takes precedence over discussion of main motion. Motions to amend an amendment are allowed, but not any further. The amendment must be germane to the main motion, and cannot reverse the intent of the main motion.
Reconsider a Motion already resolved	Reconsider	Yes	Allowed only by member who voted on the prevailing side of the original motion. Second by anyone.
End debate	Call for the Question or End Debate	No	If the Chair senses that the committee is ready to vote, he may say "if there are no objections, we will now vote on the Motion." Otherwise, this motion is not debatable and subject to majority approval.
Record each member's vote on a Motion	Request a Roll Call Vote	No	Takes precedence over main motion. No debate allowed, but the members must approve by majority.
Postpone discussion until later in the meeting	Lay on the Table	Yes	Takes precedence over main motion. Used only to postpone discussion until later in the meeting.
Postpone discussion until a future date	Postpone until	Yes	Takes precedence over main motion. Debatable only regarding the date (and time) at which to bring the Motion back for further discussion.
Remove the motion for any further consideration	Postpone indefinitely	Yes	Takes precedence over main motion. Debate can extend to the discussion of the main motion. If approved, it effectively "kills" the motion. Useful for disposing of a badly chosen motion that cannot be adopted or rejected without undesirable consequences.

Request a review of procedure	Point of order	No	Second not required. The Chair or secretary shall review the parliamentary procedure used during the discussion of the Motion.
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### Notes on Motions

**Seconds.** A Motion must have a second to ensure that at least two members wish to discuss the issue. The “second” is not required to be recorded in the minutes. Neither are motions that do not receive a second.

**Announcement by the Chair.** The chair should announce the Motion before debate begins. This ensures that the wording is understood by the membership. Once the Motion is announced and seconded, the Committee “owns” the motion, and must deal with it according to parliamentary procedure.

### Voting

Voting Method	When Used	How Recorded in Minutes
	When the Chair senses that the Committee is substantially in agreement, and the Motion needed little or no debate. No actual vote is taken.	The minutes show “by unanimous consent.”
Vote by Voice	The standard practice.	The minutes show Approved or Not Approved (or Failed).
Vote by Show of Hands (tally)	To record the number of votes on each side when an issue has engendered substantial debate or appears to be divisive. Also used when a Voice Vote is inconclusive. (The Chair should ask for a Vote by Show of Hands when requested by a member).	The minutes show both vote totals, and then Approved or Not Approved (or Failed).
Vote by Roll Call	To record each member’s vote. Each member is called upon by the Secretary, and the member indicates either  “Yes,” “No,” or “Present” if abstaining.	The minutes will include the list of members, how each voted or abstained, and the vote totals. Those members for which a “Yes,” “No,” or “Present” is not shown are considered absent for the vote.

### Notes on Voting.

**Abstentions.** When a member abstains, he/she is not voting on the Motion, and his/her abstention is not counted in determining the results of the vote. The Chair should not ask for a tally of those who abstained.

**Determining the results.** A simple majority of the votes cast is required to approve an organizational group recommendations or decision.

**“Unanimous Approval.”** Can only be determined by a Roll Call vote because the other methods do not determine whether every member attending the meeting was actually present when the vote was taken, or whether there were abstentions.

**Electronic Votes** – For an e-mail vote to pass, the requirement is a simple majority of the votes cast during the time-period of the vote as established by the Committee Chair.

**Majorities.** Per Robert’s Rules, as well as MRO Policy and Procedure 3, a simple majority (one more than half) is required to pass motions.



## AGENDA 2

### **Standards of Conduct and Antitrust Guidelines** *Bryan Clark, Director, Reliability Analysis, MRO*

#### **Standards of Conduct Reminder:**

Standards of Conduct prohibit MRO staff, committee, subcommittee, and task force members from sharing non-public transmission sensitive information with anyone who is either an affiliate merchant or could be a conduit of information to an affiliate merchant.

#### **Antitrust Reminder:**

Participants in Midwest Reliability Organization meeting activities must refrain from the following when acting in their capacity as participants in Midwest Reliability Organization activities (i.e. meetings, conference calls, and informal discussions):

- Discussions involving pricing information; and
- Discussions of a participants marketing strategies; and
- Discussions regarding how customers and geographical areas are to be divided among competitors; and
- Discussions concerning the exclusion of competitors from markets; and
- Discussions concerning boycotting or group refusals to deal with competitors, vendors, or suppliers

## AGENDA 3

### Chair's Remarks

*Dick Pursley, Reliability Advisory Council Chair*

### Action

Information

### Report

Chair Pursley will provide an oral report during the meeting.

## AGENDA 4

### Consent Agenda

- a. Approve the April 6, 2022 RAC meeting minutes

***Dick Pursley, Reliability Advisory Council Chair***

### Action

Information

### Report

April 6, 2022 RAC meeting minutes are below.



## **Draft Minutes of the Reliability Advisory Council Meeting**

### **CLOSED Meeting**

#### **Webex**

*April 6, 2022, 8:04 a.m. to 8:37 a.m. Central*

#### **1. Call to Order and Determination of Quorum**

The Reliability Advisory Council (RAC) Chair, Dick Pursley called the meeting to order at 8:04 a.m. Rebecca Schneider, Reliability Analysis Administrator, advised the chair that a quorum of the RAC was present. A complete list of attendees is included as [Exhibit A](#).

#### **2. Standards of Conduct and Antitrust Guidelines**

Pursuant to Policy and Procedure 4, Bryan Clark, MRO Director of Reliability Analysis, highlighted MRO's Standards of Conduct, Conflict of Interest, and Antitrust Guidelines.

#### **3. Nomination Process**

Schneider provided the logistics of the nomination process.

#### **4. RAC and MRO Representatives on NERC Groups Nominees' Qualifications**

*RAC Nominees.* The nominees present on the call provided an overview of their qualifications. Discussion ensued.

*MRO Representatives on NERC Groups Nominee.* Thomas Whynot, Operations Coordinator, Manitoba Hydro provided an overview of his qualifications as the only candidate for the NERC Energy Reliability Assessment Task Force (ERATF). Discussion ensued.

#### **5. 2022 Member Nomination Review and Vote to Recommend to OGOC for Approval**

The advisory council members reviewed and discussed the RAC candidates' qualifications and the NERC Energy Reliability Assessment Task Force (ERATF) candidate's qualifications.

*Upon a motion duly made and seconded, the RAC agreed to recommend to the OGOC for approval the following RAC members: W. Bryn Wilson, Manager Transmission and Distribution Operations Engineering, Oklahoma Gas and Electric with a term ending December 31, 2023 and Andrew Witmeier, Director of Resource Utilization, MISO with a term ending December 31, 2024.*

*Upon a motion duly made and seconded, the RAC agreed to recommend Thomas Whynot, Operations Coordinator, Manitoba Hydro to the OGOC for approval as the MRO representative on the NERC ERATF with a term ending December 31, 2024.*

#### **6. Other Business and Adjourn**

Having no further business to discuss, the meeting was adjourned at 8:37 a.m.

**Prepared by:** Rebecca Schneider, Reliability Analysis Administrator.



**Reviewed and Submitted by:** Bryan Clark, Director, Reliability Analysis



## Exhibit A – Meeting Attendees

Reliability Advisory Council Members Present	
Name	Organization
Dick Pursley, Chair	Great River Energy
Jason Weiers, Vice Chair	Otter Tail Power Company
CJ Brown	Southwest Power Pool, Inc.
Dallas Rowley	Oklahoma Gas and Electric
Derek Brown	Evergy
Gayle Nansel	Western Area Power Administration
Jeremy Severson	Basin Electric Power Cooperative
John Stephens	City Utilities of Springfield Missouri
Nandaka Jayasekara	Manitoba Hydro
Ron Gunderson	Nebraska Public Power District
Members Not Present	
Binod Shrestha	Saskatchewan Power Corporation
Durgesh Manjure	MISO
Dwayne Stradford	American Electric Power
MRO Staff Present	
Name	Title
Bryan Clark	Director, Reliability Analysis
Rebecca Schneider	Reliability Analysis Administrator
Estee Nauer	Security Administrator
Salva Andiappan	Principal Reliability Assessment Engineer
John Grimm	Principal Systems Protection Engineer
John Seidel	Principal Technical Advisor
Russ Mountjoy	Principal Reliability Specialist



Guests	
Name	Organization
W. Bryn Wilson	Oklahoma Gas & Electric
Andrew Witmeier	MISO
Thomas Whynot	Manitoba Hydro



## **Draft Minutes of the Reliability Advisory Council Meeting**

### **Webex**

*April 6, 2022, 9:02 a.m. to 3:11 p.m. Central*

*Notice for this meeting was electronically posted to the MRO website [here](#) on March 9, 2022. A final agenda, including advanced reading materials, was also posted on March 30, 2022.*

#### **1. Call to Order and Determination of Quorum**

The Reliability Advisory Council (RAC) Chair, Dick Pursley called the meeting to order at 9:02 a.m. Reliability Analysis Administrator, Rebecca Schneider, advised the chair that a quorum of the RAC was present. A complete list of attendees is included as [Exhibit A](#).

#### **2. Standards of Conduct and Antitrust Guidelines**

Pursuant to Policy and Procedure 4, Bryan Clark, MRO Director of Reliability Analysis, highlighted MRO's Standards of Conduct, Conflict of Interest, and Antitrust Guidelines.

#### **3. Chair's Remarks**

Chair Pursley welcomed new advisory council member, Jeremy Severson and MRO staff member, Rebecca Schneider. Chair Pursley gave an overview of the 2021 RAC accomplishments, highlighting the Cold Weather Preparedness Workshop and the 2021 Reliability Conference. He noted the importance of remaining diligent in the current geopolitical climate in terms of defining and mitigating the risks within our industry. Chair Pursley also noted that unforeseen risks may threaten our efforts to maintain reliability focus and encouraged a collaborative, congenial, cooperative business approach throughout the region. Additionally, he mentioned the importance of promoting the industry as a career opportunity to ensure appropriate staffing levels in light of high impact retirements.

#### **4. New Members' Welcome Presentation**

Bryan Clark presented an overview to new members including the MRO organizational structure and an ongoing initiative of the Organizational Group Oversight Committee (OGOC) to increase diversity on MRO's organizational groups. Clark highlighted the OGOC roster and reviewed the guiding principles for council members.

#### **5. Consent Agenda**

The RAC reviewed the consent agenda, which included draft minutes from the November 9, 2021 meeting, membership recommendations from the Protective Relay Subgroup (PRS), and charter update recommendations from the PRS.

*[Upon a motion duly made and seconded, the RAC approved the consent agenda in its entirety.](#)*

#### **6. MRO Board of Directors, OGOC and General Update**

Bryan Clark provided an overview of the Board of Directors and OGOC activities, highlighting the agenda for the upcoming board meeting. Clark also provided an overview of the 2021 Organizational





Group Survey results for the RAC and PRS. The RAC received high scores for Overall Experience and Performance of MRO Staff.

## **7. Reliability and Security Technical Committee Meeting Update**

RAC member and Reliability and Security Technical Committee (RSTC) member John Stephens provided an update from the last RSTC meeting. Stephens noted changes to the Generating Availability Data Systems (GADS) reporting requirements to include event data for wind and solar facilities with respect to design and performance. He also noted the name change of the NERC Inverter-Based Resource Performance Subcommittee (IRPS). The February 2021 cold weather event remained a big topic at the meeting. FERC is holding a Technical Conference on Cold Weather Preparedness on April 27-28, 2022. RSTC reviewed a design basis document for natural gas coordination studies, assessing the impact of natural gas facility disruptions on the electric system or vice versa. Stephens mentioned the 6GHz task force, chaired by Jennifer Flandermeyer. There is a NERC survey in progress related to 6GHz usage due April 18, 2022. The Energy Reliability Assessment Task Force (ERATF) submitted a standard authorization request to NERC. RSTC approved a reliability guideline for forecasting practices for distributed energy resources (DER) related to modeling, near term and long-term assessment. The RSTC is reviewing a couple of white papers; one is related to reliability impacts of DER aggregators, and the other one is a reliability standard related to DERs. Discussion ensued.

## **8. MRO Representatives on NERC Subgroups**

NERC Electric Gas Working Group (EGWG) – Jaimin Patel  
NERC Inverter Based Resource Performance Subcommittee (IRPS) – David Brauch  
NERC System Planning Impacts from DER Working Group (SPIDERWG) – Wayne Guttormson  
NERC System Protection and Control Working Group (SPCWG) – Mark Gutzmann  
NERC Energy Reliability Assessment Task Force (ERATF) – Open

The NERC Representatives from each subgroup provided verbal reports to the advisory council. Discussion ensued.

## **9. Update 2022 Work Plan**

*Action Item Review.*

Chair Pursley provided a recap of the 2021 action items. He reviewed the top seven work plan items for 2022 and solicited two volunteers to help MRO develop the Regional Risk Assessment (RRA). The volunteers will be determined at the second quarter RAC meeting in May. The RAC reviewed various action items in the 2022 work plan. Updates were made accordingly. Discussion ensued.

*Reliability Risk Matrix Updates.*

Clark provided a brief overview of the Reliability Risk Matrix.

*2022 Reliability Conference.*

RAC member Derek Brown provided an overview of the Annual Reliability Conference that will take



place on May 18, 2022 in Kansas City, Missouri. The conference agenda was reviewed. Chair Pursley asked the members to promote the conference if they can. Discussion ensued.

## **10. Reliability Coordinator Updates**

### *Midcontinent Independent System Operator Update.*

RAC member Durgesh Manjure provided an overview of the Midcontinent Independent System Operator (MISO) 2021-22 Winter Operations Report. Manjure noted no major events like last winter and added that 2022 load is close to 2019 levels. He also noted that coal is down to 35 percent in the energy fuel mix. MISO hit a new wind peak of 23.6 GW in January 2022, and a new solar peak of 1.6 GW in February 2022. Manjure noted that energy prices are trending up. A member asked about the tornado that damaged a 500 kV line connecting MISO Midwest to MISO South in December 2021. Manjure had no information regarding the event. Andy Witmeier commented on the Regional Directional Transfer (RDT) that MISO has not changed its operating limits to date on the RDT. The line is out until June 30, 2022, and the joint parties will need to discuss the firm limits available to MISO along the interface. Discussion ensued.

*Due to technical difficulties, Chair Pursley adjourned the meeting for lunch at 12:10 p.m. The meeting resumed at 1:07 p.m.*

## **11. RAC Discussion with Organizational Group Oversight Committee**

The RAC met with the OGOC in a joint session for one hour. The Annual Reliability Conference agenda was reviewed as well as the top ten 2022 Regional Risks. MRO Sr. Vice President and Chief Operating Office, Richard Burt gave a brief overview of his conference presentation. An OGOC member suggested more focus on regional risks as conference agenda topics. An OGOC member asked about planning ops coordination. An OGOC member asked how the RAC interacts with other entities in the Region. RAC Chair Pursley reviewed the five NERC Groups MRO follows and noted the new ERATF member. An OGOC member suggested reaching out to the NERC reps prior to the RAC meetings for better engagement. Discussion ensued.

*To accommodate scheduling conflicts, Chair Pursley resumed the Reliability Coordinator Updates (Agenda Items 10b. and 10c.) after the joint meeting with the OGOC. These minutes reflect the order in which the reports were provided.*

*Vice Chair Jason Weiers departed the meeting.*

## **12. Reliability Coordinator Updates**

### *Saskatchewan Power Corporation Update.*

RAC member Binod Shrestha provided an update during the meeting. Shrestha noted that Saskatchewan Power forecasted a cold winter and reached a new winter peak of 3,910 MW. There were no major operations issues to report. Summer loads are expected to be between 3,250–3,750 MW for May through October. There are some planned generation outages in the off-peak times of the summer. Shrestha reported there were no concerns with fuel level capacities. Wind is only 10 percent of fuel capacity. Transmission line outages are planned between Saskatchewan Power and Alberta for



two weeks in June. Saskatchewan Power expects to be able to serve load and maintain operating margin this summer. Shrestha also provided a few planning related project updates.

#### *Southwest Power Pool Update.*

RAC member C.J. Brown provided an update during the meeting. Brown noted that Southwest Power Pool (SPP) reached its winter peak in January 2022 of 41,000 MW. There were no big events this winter. However, he noted concerns regarding limitations on resources. Brown mentioned that SPP set new renewable records, having reached 88.5 percent of load with wind, and 90.2 percent of load with renewables (solar, hydro). There was discussion around generation minimums. Brown also noted that SPP has returned to the office in a hybrid model. Discussion ensued.

### **13. Assessment Review**

#### *MRO Regional Summer Assessment.*

MRO Principal Reliability Assessment Engineer, Salva Andiappan, provided an overview of the Regional Summer Assessment (RSA). Chair Pursley solicited four volunteers to form a subgroup to review the RSA before it is released to the public on June 8, 2022. RAC Members Ron Gunderson, Gayle Nansel, Dick Pursley and Nandaka Jayasekara volunteered. Discussion ensued.

#### *MRO 2022 Regional Risk Assessment Update.*

MRO Principal Technical Advisor, John Seidel, provided an overview of the MRO Regional Risk Assessment (RRA). Seidel highlighted the top ten operations and planning risks on the Reliability Risk Matrix. Seidel noted a calm winter with no serious events. He mentioned that Ride Through Capabilities of Inverter Based Resources is a hot topic with NERC, and there was an event in Texas recently related to wind. Discussion ensued.

### **14. Debrief from OGOC Discussion**

The RAC Members had a debrief discussion after the joint meeting with the OGOC.

### **15. NERC Standards Review Forum Update**

Nansel provided an overview of the weekly NERC Standards Review Forum (NSRF) meetings. Nansel solicited the members for feedback regarding the type of engagement the group would like going forward.

### **16. Protective Relay Subgroup Update**

MRO Senior Systems Protection Engineer, Jake Bernhagen, provided an update of the Protective Relay Subgroup (PRS). Bernhagen provided an update from the February 22, 2022 meeting, noting a new chair and vice chair and two new members on the PRS. He highlighted the technical presentations and the upcoming FERC/NERC Protection System Commissioning Program Review webinar.

### **17. 2022 Meeting Dates**

Chair Pursley reviewed the 2022 meeting dates for the RAC as well as the other councils and subgroups.



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*RAC Members Derek Brown, Dwayne Stradford and Ron Gunderson departed the meeting.*

**18. RAC Member Roundtable**

Chair Pursley invited member participants to share other relevant industry observations.

**19. Other Business and Adjourn**

The RAC was informed that the OGOC had approved the RAC 2022 Work Plan, RAC and NERC new members, and the PRS new members and charter update during their meeting earlier in the day.

Having no further business, the meeting was adjourned at 3:11 p.m.

**Prepared by:** Rebecca Schneider, Reliability Analysis Administrator.

**Reviewed and Submitted by:** Bryan Clark, Director, Reliability Analysis



## Exhibit A – Meeting Attendees

Reliability Advisory Council Members Present	
Name	Organization
Dick Pursley, Chair	Great River Energy
Jason Weiers, Vice Chair	Otter Tail Power Company
Binod Shrestha	Saskatchewan Power Corporation
CJ Brown	Southwest Power Pool, Inc.
Dallas Rowley	Oklahoma Gas and Electric
Derek Brown	Evergy, Inc.
Durgesh Manjure	MISO
Dwayne Stradford	American Electric Power
Gayle Nansel	Western Area Power Administration
Jeremy Severson	Basin Electric Power Cooperative
John Stephens	City Utilities of Springfield Missouri
Nandaka Jayasekara	Manitoba Hydro
Ron Gunderson	Nebraska Public Power District
MRO Staff Present	
Name	Title
Bryan Clark	Director, Reliability Analysis
Rebecca Schneider	Reliability Analysis Administrator
Estee Nauer	Security Administrator
John Seidel	Principal Technical Advisor
Salva Andiappan	Principal, Reliability Assessment Engineer
Jake Bernhagen	Sr. Systems Protection Engineer
John Grimm	Principal Systems Protection Engineer
Jeff Norman	Director, Compliance Monitoring



Max Desruisseaux	Sr. Power Systems Engineer
Michelle Olson	Compliance Monitoring Administrator
Jeremy Mattke	Principal Compliance Engineer
Ryan McNamara	RAM Engineer III CIP
Steen Fjalstad	Director of Security
Richard Burt	Sr. Vice President and COO
<b>Guests</b>	
<b>Name</b>	<b>Organization</b>
W. Bryn Wilson	Oklahoma Gas & Electric
Andy Witmeier	MISO
Tom Whynot	Manitoba Hydro
Jaimin Patel	Sask Power Corp.
David Brauch	MISO
Mark Gutzmann	Xcel Energy
Wayne Guttormson	Sask Power Corp.
Ricardo Rodriguez	City of Ames
Gail Elliott	ITC Holdings
Mary Agnes Nimis	FERC
Omar Elabbady	Xcel Energy
Terry Harbour	MidAmerican Energy Company
Fred Meyer	Algonquin Power & Utilities Corp.
Justin Fuith	Pro-Tech Power
Michael Ayotte	ITC Holdings
Mark Eastwood	City Utilities of Springfield Missouri
Chris Bellefy	Minnesota Power



Organizational Group Oversight Committee Members Present	
Name	Organization
Paul Crist	Lincoln Electric System
JoAnn Thompson	Otter Tail Power Company
Aaron Bloom	NextEra Energy Resources
Iqbal Dhani	Saskatchewan Power Corporation
Jennifer Flandermeyer	Evergy
Charles Marshall	ITC Holdings
Daryl Maxwell	Manitoba Hydro
Ben Porath	Dairyland Power Cooperative
Eric Schmitt	Independent Director
Dehn Stevens	MidAmerican Energy Company
Jeanne Tisinger	Independent Director

## AGENDA 5

### **MRO Board of Directors OGOC and General Update** *Bryan Clark, Director, Reliability Analysis, MRO*

#### **Action**

Information

#### **Report**

Bryan Clark will provide an oral report during the meeting.



## AGENDA 6

### MRO Representatives on NERC Subgroups - Written Reports

- a. NERC Electric Gas Working Group (EGWG)  
*Jaimin Patel, EGWG Representative*

#### Action

Information

#### Report

The EGWG has not met since the last RAC meeting/report. The next meeting is scheduled for May 12, 2022.

## AGENDA 6

### MRO Representatives on NERC Subgroups - Written Reports

b. NERC Inverter Based Resource Performance Task Force (IRPS)

*David Brauch, IRPS Representative*

#### Action

Information

#### Report

**1. EMT Standard Authorization Request Development:**

IRPS has endorsed a SAR that seeks to enhance NERC Standards FAC-002, MOD-032, and TPL-001 to include specific requirement related to EMT modeling and EMT studies. The two primary drivers are to ensure that the TP and PC conduct EMT studies when necessary and to ensure accurate models are provided and verified prior to commercial operation. The next step is for the RSTC to endorse the SAR in the June meeting.

**2. Gap Analysis of Any IBR-Related Issues Not Addressed by NERC Standards:**

IRPS is kicking off an item in the workplace to perform a gap analysis on Inverter based resources issues that currently are unaddressed by NERC standards. The team is currently seeking volunteers to aid in this effort.

#### Accomplishments

1. IRPS held an informational webinar on utilizing excess capability of IBRs for frequency support on April 19th.

#### Challenges

1. The new underway work item is broad in scope in that it will be a wide-ranging review of issues that are specific to IBRs that are not currently covered by NERC standards. Until this point, the primary focus of IRPS has been on MOD, TPL, and FAC standards that are related to the planning of interconnection and modeling of IBRs. This next effort will delve into other NERC standards such as PRC or EOP standards significantly expanding the scope of experts needed to review these gaps.

## AGENDA 6

### MRO Representatives on NERC Subgroups - Written Reports

- c. NERC System Planning Impacts from DER Working Group (SPIDERWG)  
*Wayne Guttormson, SPIDERWG Representative*

#### Action

Information

#### Report

Last SPIDERWG meeting was on April 26<sup>th</sup> and 27<sup>th</sup>. The meeting covered the following topics coordination and analysis activities. A review of its work plan was also held.

- RSTC Reliability Guideline Review
- NERC Standards Review and DERs
- White Paper: BPS Perspectives on the DER Aggregator
- Standards Committee Engagement
- Distributed Battery Energy Storage Modeling Guideline
- White Paper: DER Impacts to UVLS Programs
- Guideline: BPS Planning under Increasing DER
- White Paper and Outreach: Simulation Improvements and Techniques
- Technical Report: Beyond Positive Sequence RMS Simulations for High Penetration Conditions

Next meetings are scheduled for August 2<sup>nd</sup> and 3<sup>rd</sup>, and November 1<sup>st</sup> and 2<sup>nd</sup>. Agendas to be released. All meetings are currently planned as virtual meetings.

#### Areas of Focus

Following workplan deliverables are being submitted for RSTC action at the June 2022 meeting.

- White Paper: Recommendations for Simulation Improvement and Techniques Related to DER Planning – for **Approval**
- White Paper: BPS Reliability Perspectives for Distributed Energy Resource Aggregators – for **Approval**
- White Paper: DER Impacts to Under Voltage Load Shedding Program Design – **Request for RSTC Reviewers**
- Technical Report: Beyond Positive Sequence RMS Simulations for High DER Penetration Conditions – **Request for RSTC Reviewers**

#### Accomplishments

- None identified for this report.

#### Challenges

- None identified for this report.

## AGENDA 6

### MRO Representatives on NERC Subgroups - Written Reports

d. NERC System Protection and Control Working Group (SPCWG)

*Mark Gutzmann, SPCWG Representative*

#### Action

Information

#### Report

The NERC SPCWG conducted one virtual meeting on April 14, 2022. The SPCWG activity has been associated with the Inter-Entity Short Circuit Model recommendations.

#### Areas of Focus

1. Inter-Entity Short Circuit Model

An SPCWG sub-team has been diligently working on an industry recommendation for distributing short circuit model information between peer utilities. This paper intends to provide recommendations and best practices for sharing short circuit models. A first draft of this white paper has been posted for internal review.

2. FERC 881

The SPCWG discussed possible impacts of FERC Order 881 and relay loadability compliance associated with PRC-023-4. There is ambiguity in the Order with respect to the need to modify relay loadability.

3. The SPCWG is reviewing a proposed Standards Authorization Request (SAR) to modify PRC-004-6 include Inverter Based Resource (IBR) reductions of a specific threshold as equivalent to a breaker operation. This is to cover a reliability gap of IBR generation ceasing injection after system faults.

#### Accomplishments

1. Continued development on the Inter-Entity Short Circuit Model white paper

#### Challenges

Potential ambiguity associated with FERC Order 881 and relay loadability (PRC-023-4).

## AGENDA 6

### MRO Representatives on NERC Subgroups - Written Reports

e. NERC Energy Reliability Assessment Task Force (ERATF)

*Tom Whynot, ERATF Representative*

#### Action

Information

#### Report

Since the last RAC meeting, the ERATF had WebEx meeting on April 12, 2022. The recent [meeting agenda](#) is posted on the [NERC website](#). The next meeting is scheduled for May 13, 2022.

Following is a summary of ERATF activity.

#### Areas of Focus

##### 1. Updated Rollout Plan for the revised Standard Authorization Request (SAR)

- The enhanced SAR will be presented to the Member Representatives Committee (MRC) on May 11<sup>th</sup>.
- The SAR will be provided to the Reliability and Security Technical Committee (RSTC) in June for technical endorsement.
- The SAR will be sent to the Standards Committee (SC) for Acceptance and commencement of the standards development process after the endorsement.

##### 2. SAR expansion - The SAR has been expanded into two separate SARs

- Energy Assessments with Energy – Constrained Resources in the Operations and Operations Planning Time Horizons.
- Energy Assessments with Energy – Constrained in the Planning Time Horizon.

##### 3. SAR informational webinar

- An informational webinar is scheduled on May 19<sup>th</sup> to discuss the detail of the two new SARs and answer questions that industry has concerning the revisions.

#### Accomplishments

1. The ERATF held an industry workshop to discuss the key findings and recommendations from a technical paper written by the members of the ERATF.
2. The Standard Authorization Requests (SARs) have been revised, and will be presented to the RSTC in June for endorsement.

#### Challenges

1. There are some concerns about the new SARs that mainly focuses on three areas - regional/market issues, jurisdictional parameters and the need for more technical support and specificity.

## AGENDA 7

### Update 2022 Work Plan

a. Review Action Items

*Dick Pursley, Reliability Advisory Council Chair*

#### Action

Discussion

#### Report

Chair Pursley will lead the discussion during the meeting.

## AGENDA 7

### Update 2022 Work Plan

- b. 2022 Reliability Conference Debrief  
*Derek Brown, Evergy, RAC Member*

#### Action

Discussion

#### Report

Derek Brown will lead the discussion during the meeting.

## AGENDA 8

### **MISO 2022 Summer Capacity** *Durgesh Manjure, MISO, RAC Member*

#### **Action**

Information

#### **Report**

Durgesh Manjure will provide an overview at the meeting.





# MISO Summer 2022 Update

MRO RAC Meeting

May 19, 2022

# 2022-23 PRA demonstrated capacity shortfalls in MISO North/Central resulting in capacity prices equal to CONE

## MISO's North/Central sub-region

Capacity Shortage: 1200 MW

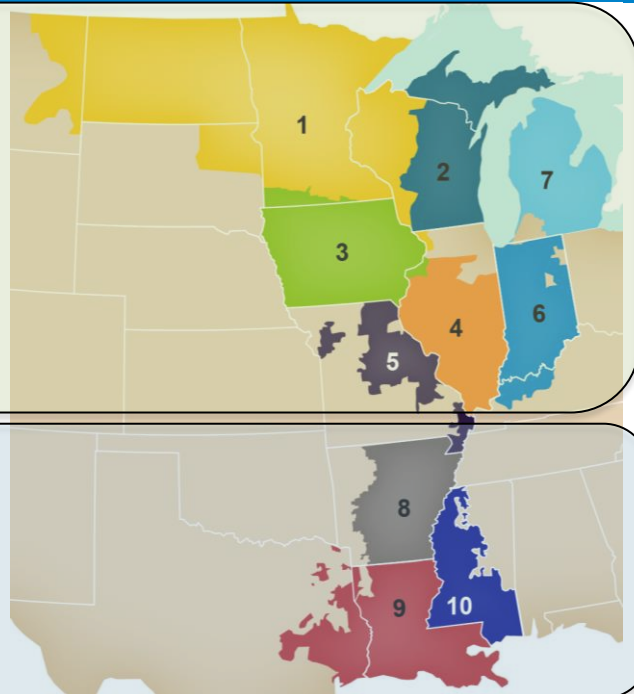
Auction clearing price: \$236.66 (CONE)

Load exposed to CONE: 8,000 MW

## MISO's South sub-region

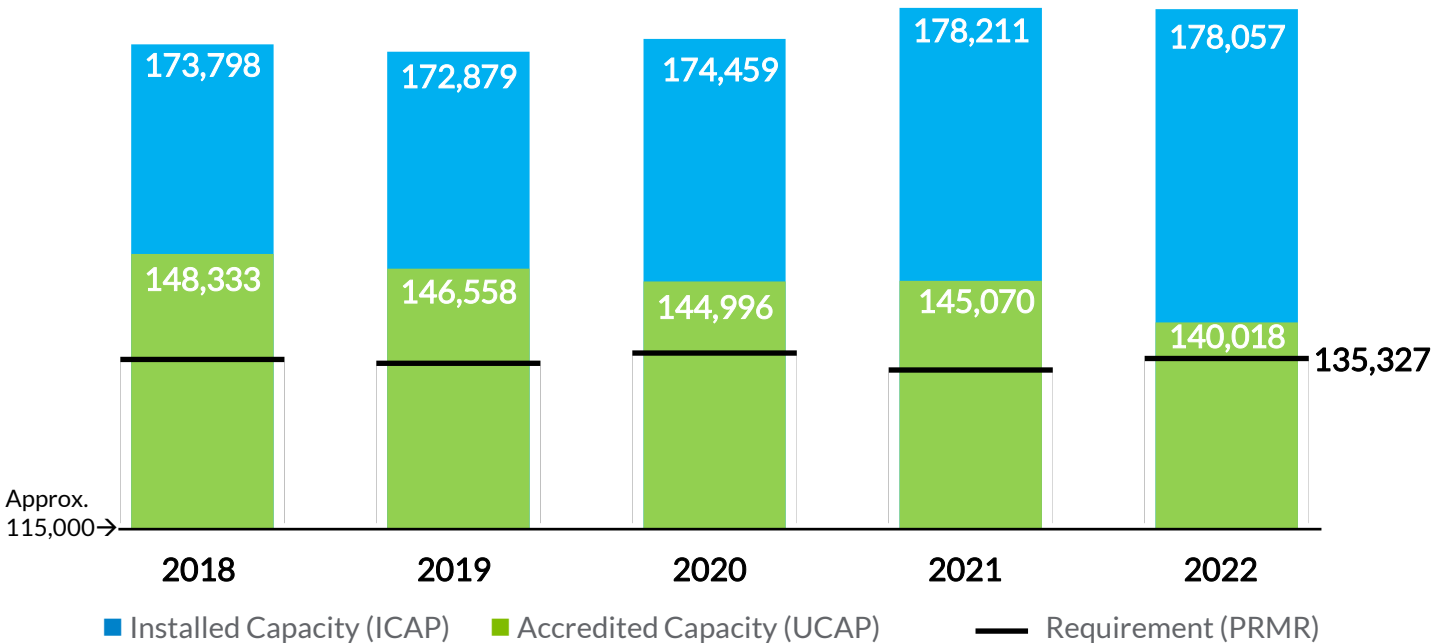
Capacity surplus: 2800 MW

Auction clearing price: \$2.88

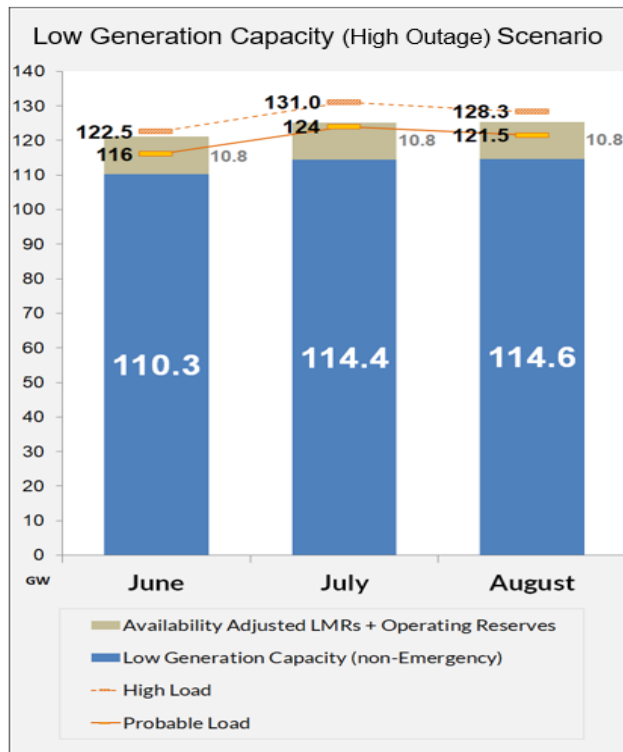
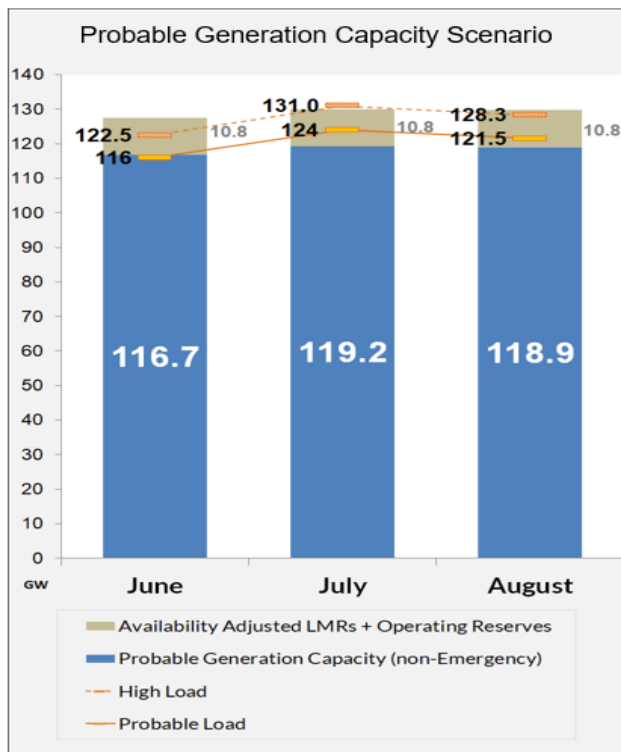


# Capacity shortfall is due to decrease in accredited capacity driven by thermal retirements and the increasing transition to renewables

Yearly Installed Capacity – Unforced Capacity Trends (MW)



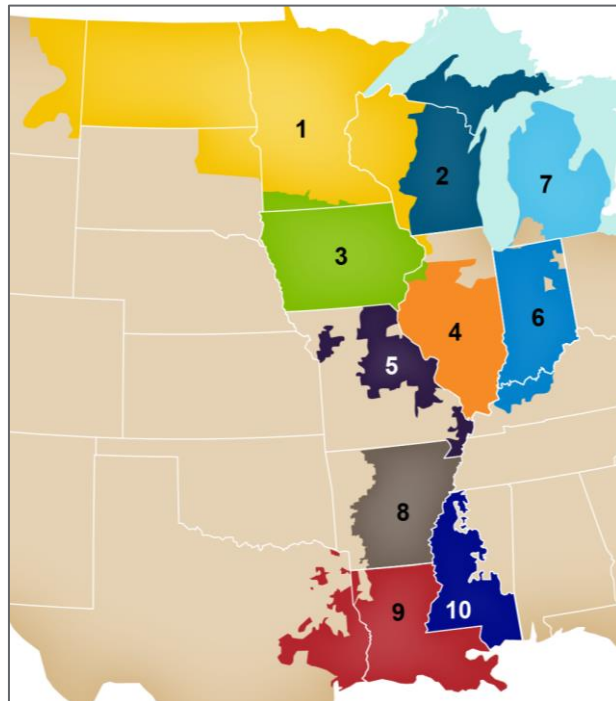
# Summer assessment aligns with the PRA outcomes indicating need for emergency resources and non-firm energy imports to maintain system reliability



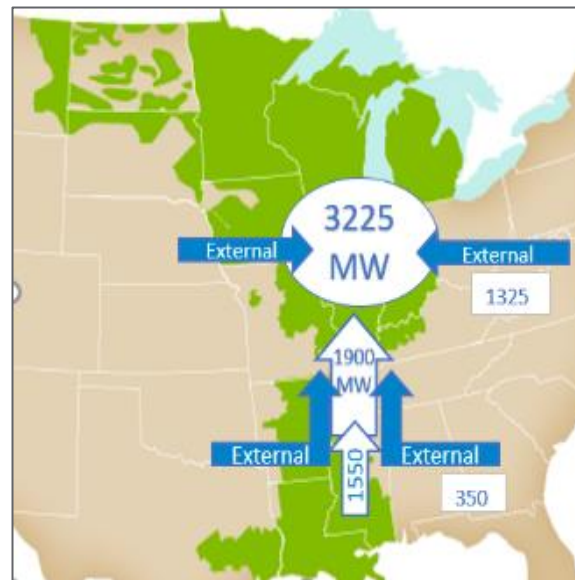
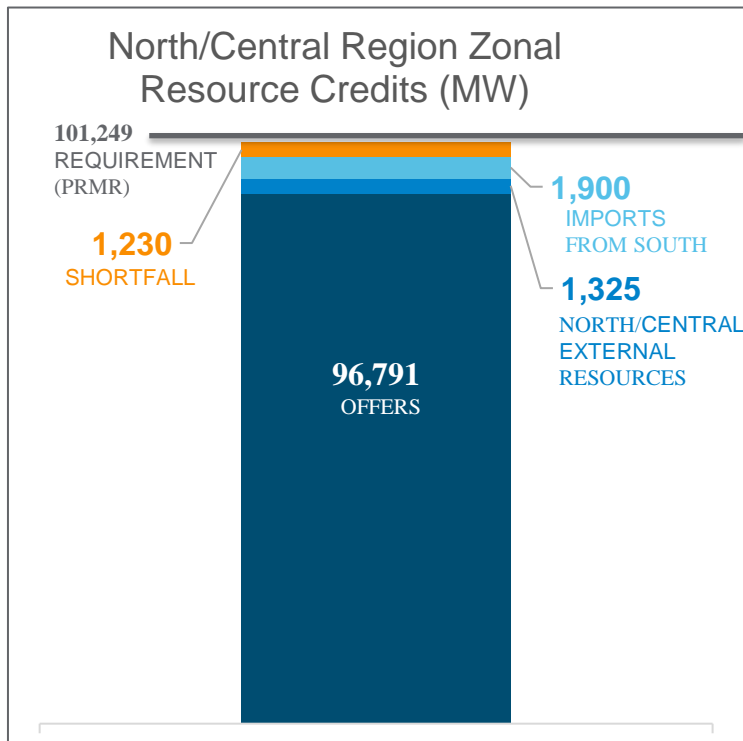
# Appendix

# Clearing prices from MISO's 2022-2023 PRA reflect capacity shortfalls in four zones, exposing nearly 8 GW in MISO North/Central to the Cost of New Entry

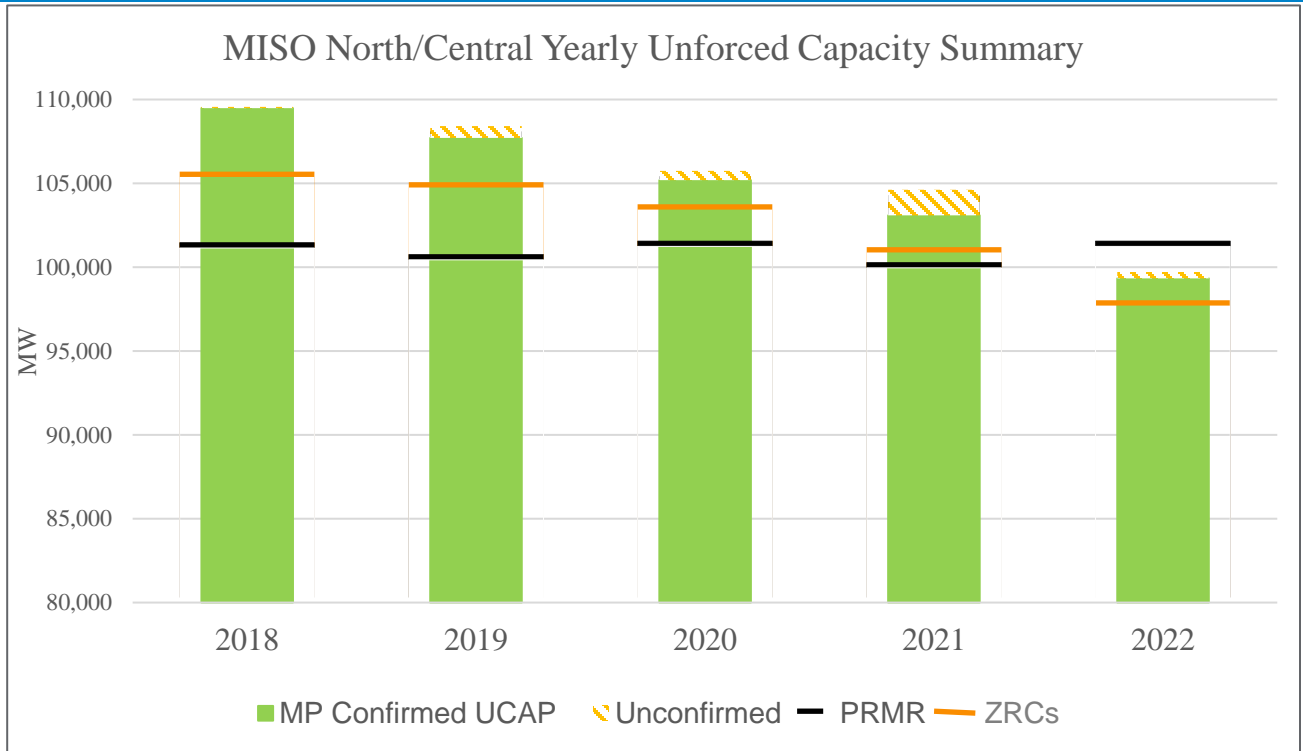
Zone	Local Balancing Authorities	Price \$/MW-Day
1	DPC, GRE, MDU, MP, NSP, OTP, SMP	\$236.66
2	ALTE, MGE, UPPC, WEC, WPS, MIUP	\$236.66
3	ALTW, MEC, MPW	\$236.66
4	AMIL, CWLP, SIPC, GLH	\$236.66
5	AMMO, CWLD	\$236.66
6	BREC, CIN, HE, IPL, NIPS, SIGE	\$236.66
7	CONS, DECO	\$236.66
8	EAI	\$2.88
9	CLEC, EES, LAFA, LAGN, LEPA	\$2.88
10	EMBA, SME	\$2.88
ERZ	KCPL, OPPD, WAUE (SPP), PJM, OVEC, LGEE, AECl, SPA, TVA	\$133.70-236.66



# Despite importing over of 3,000 MW, MISO's North/Central zones still experienced a shortfall against the requirement

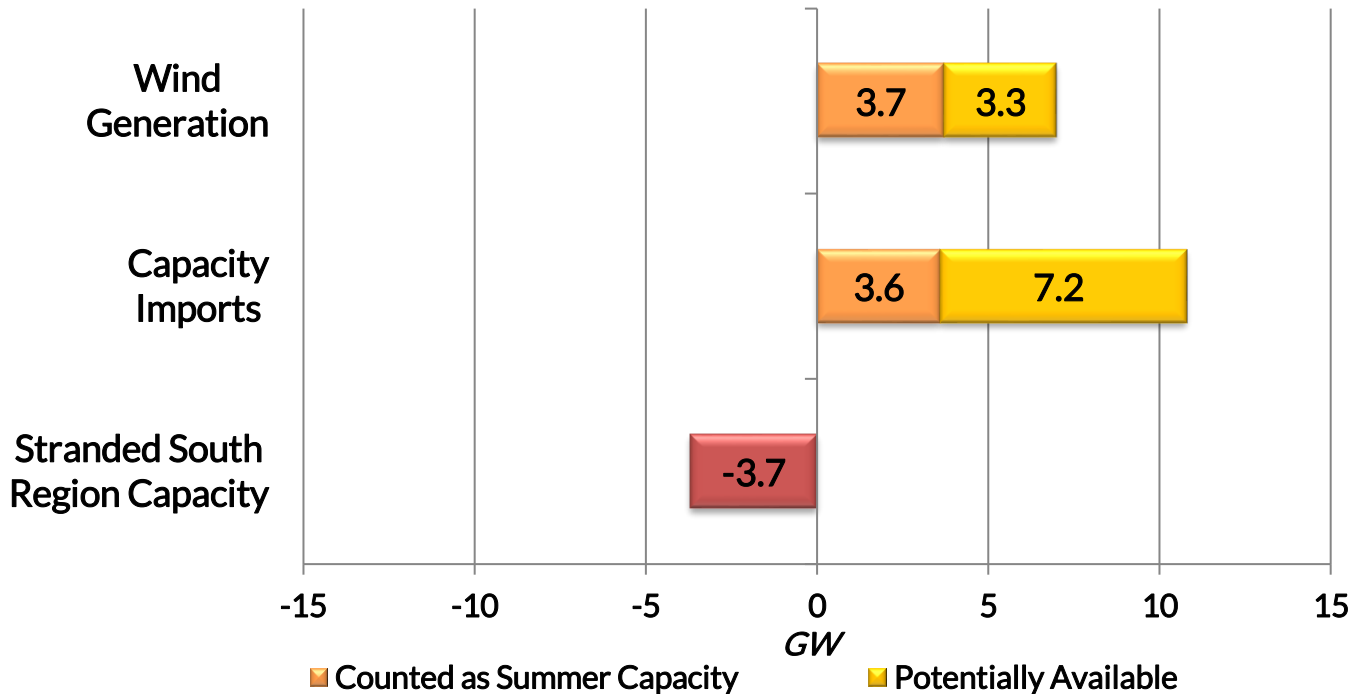


# Capacity in MISO North/Central fell by 3.2 GW since the last auction





# The need for emergency procedures will be impacted by the availability of non-firm resources





# Market Capacity Emergency Procedure Steps

## Capacity Advisory

- Advance notice of forecasted capacity shortage, requests Stakeholders update offer data

## Maximum Generation...

### Alert

- Define boundaries/suspend maintenance, set Emergency Pricing Tier 0 Offer Floor

### Warning

- Schedule in External Resources, Curtail export transactions, Reconfiguration, and set Emergency Pricing Tier 1 Offer Floor

### Event - Step 1

- Commit Emergency Resources, Declare NERC Energy Emergency Alert (EEA) 1, Activate Emergency Limits

### Event - Step 2

- Declare NERC EEA 2, Implement Load Modifying Resources, Load Modifying Measures (LMM) Stage 1, Commit Emergency Demand Response Resources, Emergency Energy Purchases, Public Appeals, and set Emergency Pricing Tier 2 Offer Floor

### Event - Step 3

- Utilize Operating Reserves, and LMMs Stage 2

### Event - Step 4

- Reserve Call and Emergency Reserve Purchases

### Event - Step 5

- Declare NERC EEA 3, Firm Load Shed, and set Locational Marginal Prices (LMP) and Market Clearing Prices to the Value of Lost Load (VOLL)

## ...Termination

- Max Gen and, possibly, Capacity Advisory Termination

## AGENDA 9

### Assessment Review

- a. MRO Regional Summer Assessment (RSA)

*Salva Andiappan, Principal Reliability Assessment Engineer, MRO*

### Action

Information

### Report

Salva Andiappan will provide an oral report at the meeting.



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# OVERVIEW OF MRO 2022 REGIONAL SUMMER ASSESSMENT

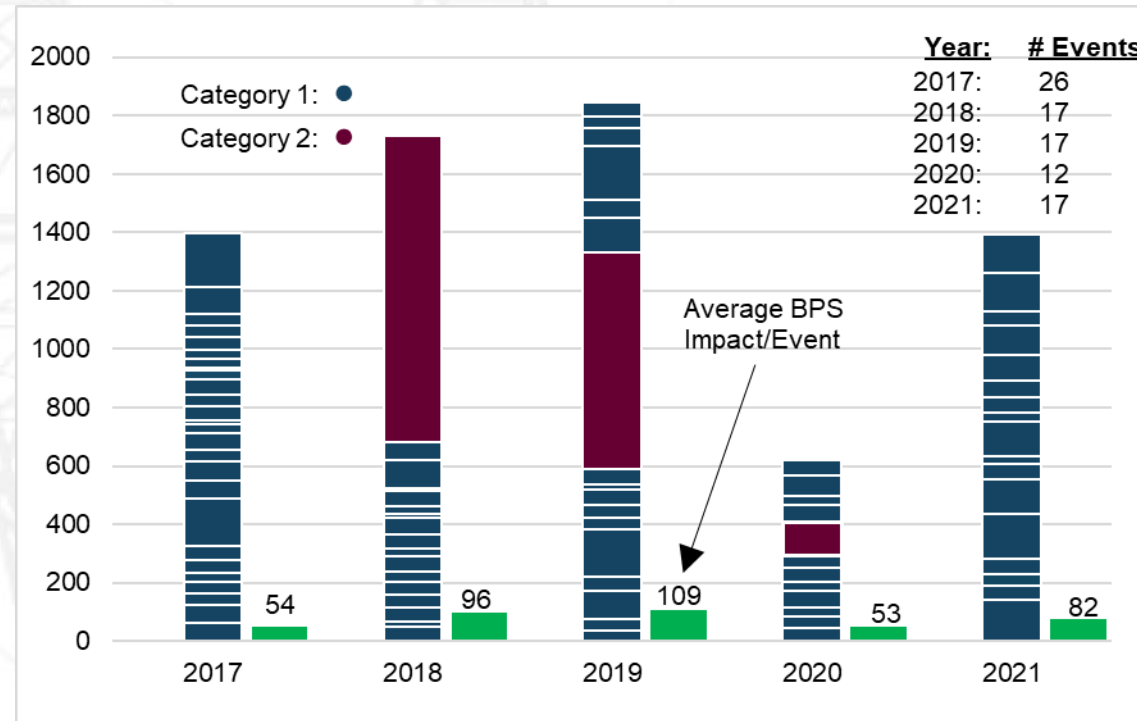
Presented by: Salva Andiappan  
RA Department

# What's New

- **2022 Summer Seasonal Review**
  - GADS Weighted Equivalent Forced Outage Rate (WEFOR)
  - TADS Total Transmission Outages per 100 Circuit Miles

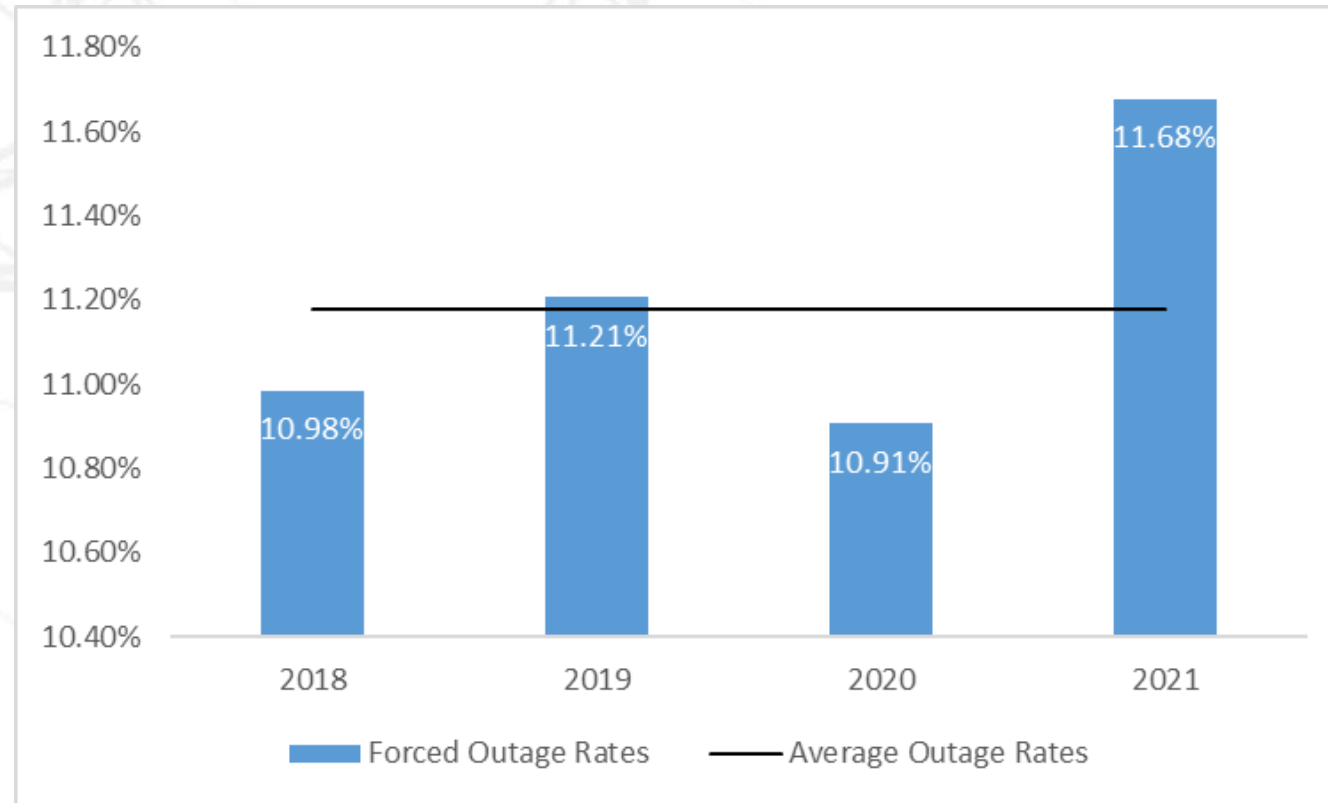


# MRO Event Severity Index as of January 2022



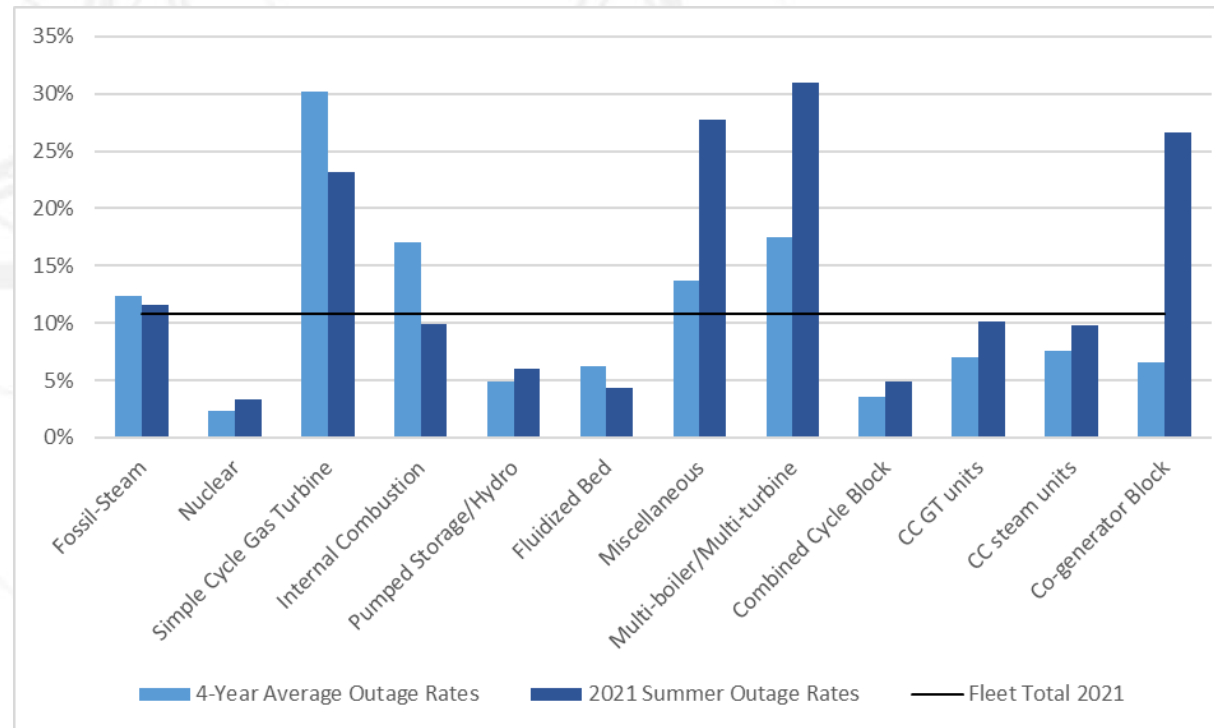
- Total 17 transmission events in 2021.
- 6 occurred in 2021 summer from protection system misoperations.
- Average impact is lower in 2020 than in previous years.
- Average impact of reported events on BES in 2021 increased.

# MRO 4-Year Generator MW-Weighted EFOR



- Annual conventional generator forced outage rates.
- 2020 lower due to a reduction in total demand and forced outages and derates in simple cycle and internal combustion engines.
- Long term trends continue to indicate increasing EFOR rates.

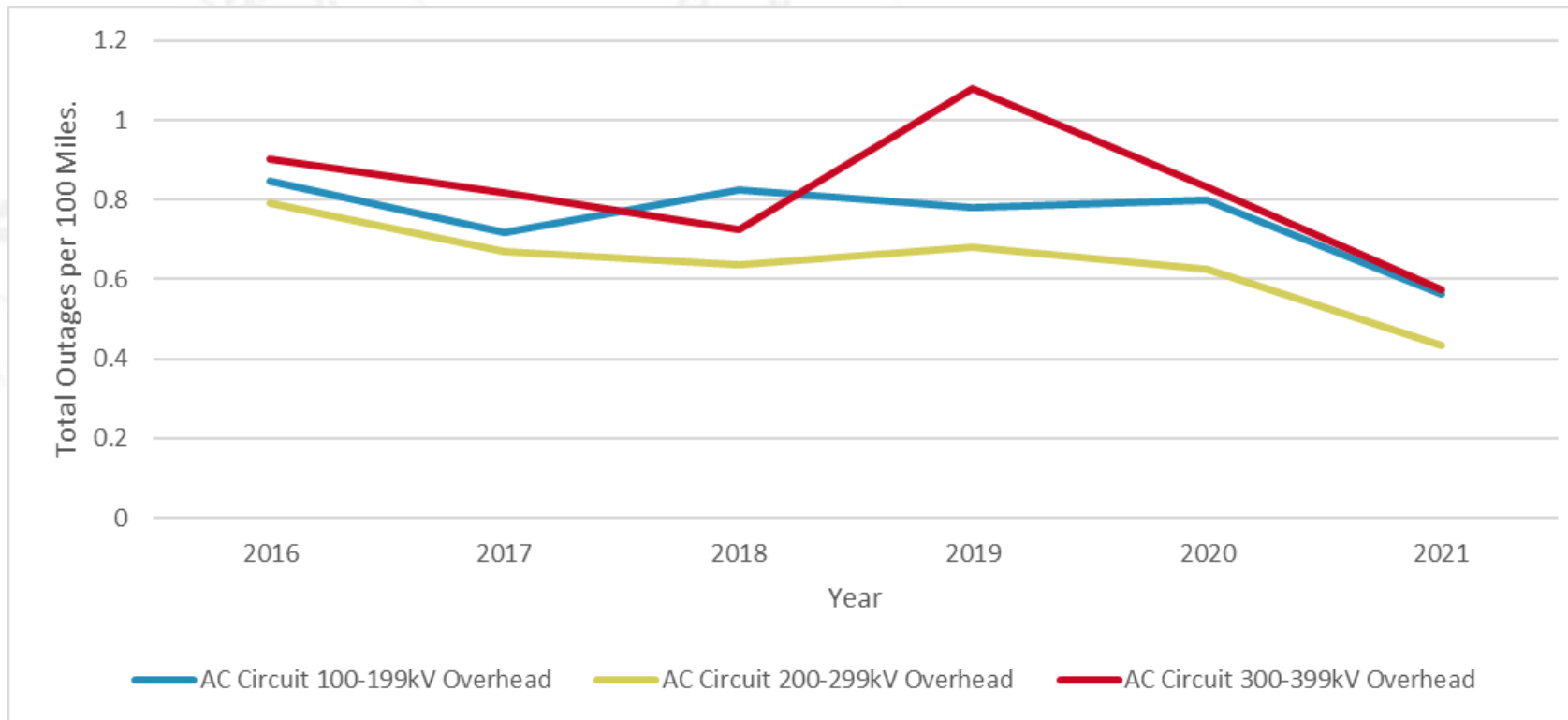
# MRO 2021 Summer MW-Weighted EFOR by Unit Types



- Comparison of the summer 2021 performance against average 4-year summer performance.
- Simple cycle gas turbines have a larger than average forced outage rate followed by multi-boiler/turbine and internal combustion.
- Reduction in forced outage rates for simple cycle gas turbines over the 4 year average.

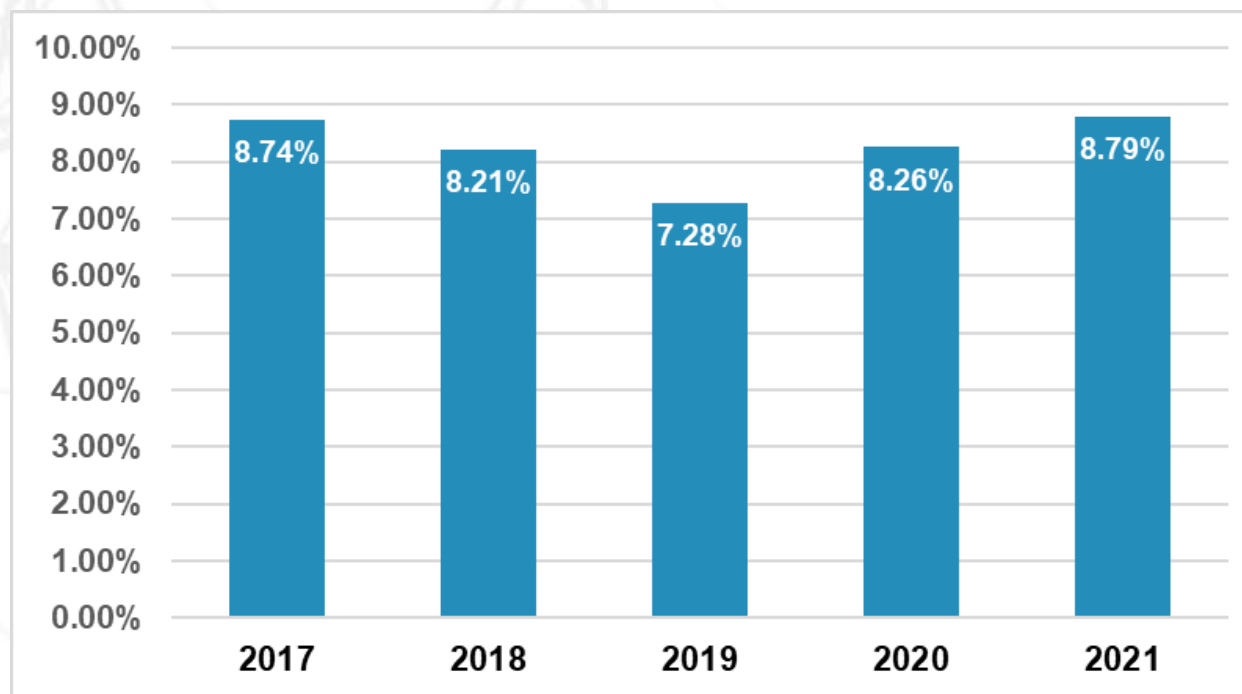


# Transmission Outages per 100 Circuit Miles



- Yearly summer total outage per 100 circuit miles for 100-399 kV circuits.
- Decrease in the yearly outages from 2020-2021.
- High number of outages for 300-399 kV circuits in 2019 caused by momentary outages.

# MRO Misoperation Rates by Year

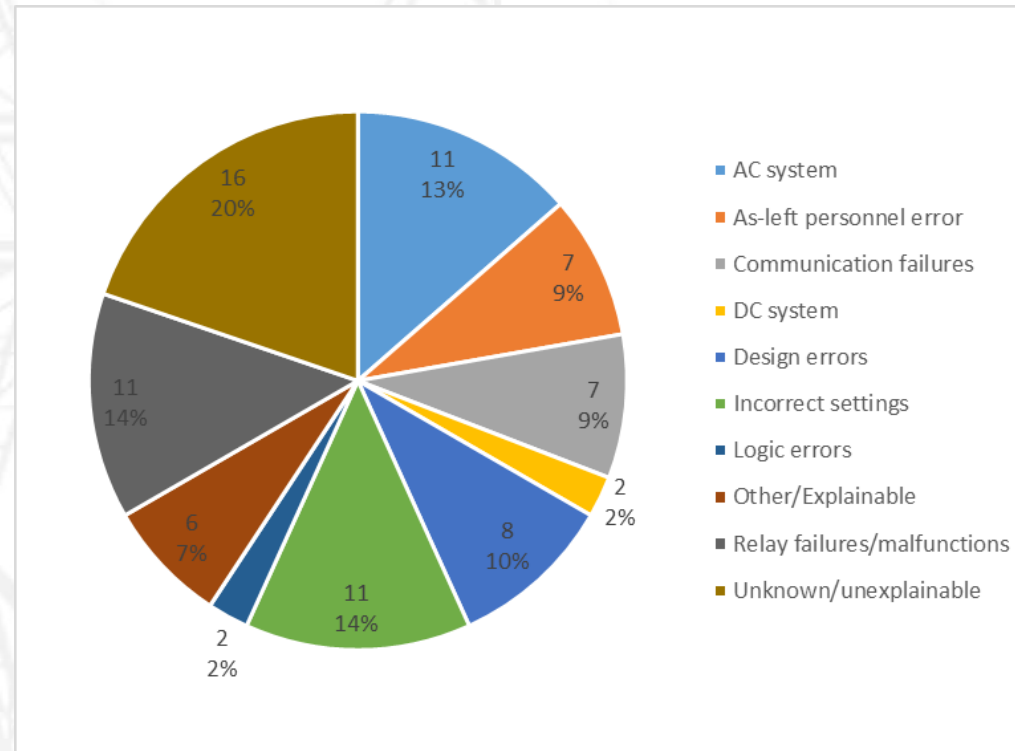


- Misoperation rate trending downward until 2020.
- 2,628 operations and 231 misoperations reported in 2021.
- Total protection system operations were down but total misoperations did not proportionally decrease resulting in higher misoperation rate in 2021.

**Misoperation Rate = (No. of Misoperations / No. of Total Operations) X 100%**



# Summer 2021 Misoperations by Cause



- Total 81 misoperations between June 1st, 2021 and September 30th, 2021.
- One-third were attributable to Human Errors.
- MRO will be conducting an outreach on protection system commissioning sometime in July 2022.

# 2022 Summer Seasonal Forecast

- **MISO projects a capacity shortfall of 1,230 MW in North and Central areas based on the 2022-2023 PRA results. Under typical demand and outage scenarios, MISO is projecting 5 GW shortfall in firm generation to meet projected peak load this summer.**
- **SPC's anticipated reserve margin is forecasted at 12 percent based on normal demand scenario, which is slightly above its reference margin level of 11 percent.**
- **MH and SPP anticipated resources are sufficient to meet reserve margin requirements under normal demand scenarios for this summer.**

# Reserve Margin Percentage under Extreme Conditions

Assessment Area	Extreme Low Generation + Operational Mitigations	Extreme Peak Load	Reserve Margin Under Extreme Conditions	Likelihood to issue EEAs
MH	3,646	3,381	+7.8%	Low
MISO	114,794	125,192	-8.3%	High
SPC	3,535	3,734	-5.3%	High
SPP	51,419	53,952	-4.7%	High

- Under extreme peak demand and outage scenario studied, MISO, SPC and SPP would likely need to issue EEAs and short-term load interruption.

# Key Findings

- **MISO faces a capacity shortfall for this summer resulting in high risk of energy emergencies and increased risk of needing to implement temporary controlled load sheds.**
- **Anticipated resource capacity in SPC will be strained to meet projected peak demand as a result from pandemic economic recovery and load growth activities.**
- **SPP could experience drought conditions impacting the Missouri River and implementing emergency procedures to meet peak demand during periods of high generator unavailability.**
- **Extreme summer peak load coupled with unplanned generation outages will likely require MISO, SPC and SPP to issue EEAs and short-term load interruption.**
- **Long-term trends indicate increasing generation forced outage rates.**

# Questions



## AGENDA 10

### RAC Charter Review

*Bryan Clark, Director, Reliability Analysis, MRO*

#### Action

Discussion

#### Report

Bryan Clark will lead the discussion during the meeting.





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## Reliability Advisory Council Charter

*January 1, 2022*

### I. Purpose

The MRO Reliability Advisory Council (MRO RAC) provides advice and counsel to MRO's Board of Directors (board), the board's Organizational Group Oversight Committee (OGOC), staff, members and registered entities on topics such as transmission adequacy and availability, resource adequacy, integration of renewables, essential reliability services, event analysis, system protection, and reliability assessments. The MRO RAC seeks to increase outreach and awareness in these key areas.

### II. Membership

The MRO RAC is comprised of 15 members which will include a member from each Reliability Coordinator (RC) and Planning Coordinator (PC) in the MRO Region. If an entity is registered as both an RC and a PC, one member may represent both the RC and the PC. All Council members will have a three-year term. Nominations for open positions on the MRO RAC will be submitted to the MRO RAC for review. The MRO RAC, with input from MRO staff, will recommend the candidate(s) best suited for the open position(s) based on experience, expertise and geographic diversity to the board's OGOC, which will appoint the members of the MRO RAC.

Pursuant to [Policy and Procedure 3 – Establishment, Responsibilities, and Procedures of Organizational Groups and MRO Sponsored Representatives on NERC Organizational Groups](#), membership on councils is based on experience and expertise. No more than two members of the council may be an employee of a single entity or affiliated entities. At least three sectors will be represented on the council. To the extent practicable, membership will reflect geographic diversity and balanced sector representation. MRO staff will solicit volunteers from MRO Members.

Individuals with expertise and experience in the areas of transmission planning, resource planning, power systems engineering, system operations, as well as control and protection systems serve on the MRO RAC.

The MRO RAC will annually elect its chair and vice chair pursuant to the process and terms outlined in Policy and Procedure 3.

### III. Key Objectives and Responsibilities

Key objectives and responsibilities of the MRO RAC include:

- Annually develop a work plan in coordination with MRO staff to support the MRO Strategic Plan and Metrics for approval by the OGOC and report performance progress.
- Review performance against established metrics and suggest additional metrics to identify areas of risk or reliability improvement.
- Serve as subject matter experts for MRO registered entities, members, other organizational groups, staff, as well as the board and its committees.
- Maintain awareness of work by industry, NERC and other Regional Entity organizational



groups to avoid or minimize duplicative efforts and to partner and coordinate where appropriate.

- Recommend the establishment of subgroups to support the RAC work plan as appropriate. Oversee and provide direction to any subgroups.
- Support the preparation of special assessments and seasonal readiness plans by regional Reliability Coordinators and as may be directed by NERC or the MRO Board of Directors from time to time.
- Review and assess the overall reliability of the MRO region and interregional bulk electric system for long-term planning horizons based on reports from regional Planning Coordinators as may be directed by NERC or the MRO Board of Directors from time to time.
- Support the development of the annual MRO Regional Risk Assessment by identifying risks, trends, and mitigating activities.
- Review significant BES events (generally, Category 2 or higher) which occurred in the MRO Region and the resulting reports and approve larger scale event reports (Category 3 and higher) to assure the appropriate analysis is performed and that any lessons learned are identified and shared with the industry.
- Provide input and guidance on system protection and control matters, including Reliability Standards development, misoperation reviews, and reviews of remedial action schemes.
- Conduct outreach and awareness to increase reliability and decrease risk to the reliable and secure operations of the bulk power system:
  - Facilitate and lead the design of the Annual MRO Reliability Conference(s). Present at conference(s) as appropriate.
  - Support Midwest Reliability Matters by writing articles.
  - Share best practices via webinars.
  - Collaborate with the Transmission and Generator Forums, the Eastern Interconnection Planning Collaborative and others to share information
- Develop a Highly Effective Reliability Organization® (HERO) outreach effort to help registered entities assess and improve their own reliability practices.
- Recommend individuals to represent MRO as representatives on NERC organizational groups to the OGOC.
- Provide guidance and communicate expectations to MRO NERC representatives, receive reports from MRO NERC representatives, and disseminate the information as directed by the board's OGOC.
- Support the applicable NERC program areas.
- Annually review the charter and propose changes as needed to the OGOC.

## **IV. Meetings**

The MRO RAC will meet quarterly or as necessary, in person or via conference call and/or web meeting. The MRO RAC will meet annually, preferably in person, the day before a regularly scheduled board meeting with the OGOC.

All MRO council chairs and vice chairs will meet with the OGOC the day before the fourth quarter regularly scheduled board meeting to review the council's accomplishments during the past year and to develop work plans for the following year.



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Meetings of the MRO RAC are open to public attendance; however, the meeting may be called into closed session by the chair or vice chair. Additional meeting requirements related to agendas and minutes, voting and proxy, and rules of conduct are outlined in MRO Policy and Procedure 3.

## **V. Costs**

Meeting costs incurred by MRO RAC members are reimbursable by MRO according to MRO Policy and Procedure 2–Expense Reimbursement.

## **VI. Reporting Requirements**

The chair or vice chair of the MRO RAC will provide an oral report to the OGOC regarding the council's work as well as any emerging issues during the annual in person meeting. During the other quarterly meetings, the chair or vice chair of the MRO RAC will provide a written report to the OGOC. The chair or vice chair of the MRO RAC will provide a report to the OGOC during their fourth quarter meeting reviewing past accomplishments and highlighting work for the coming year.

## AGENDA 11

### Recent Lessons Learned (NERC)

*John Grimm, Principal Systems Protection Engineer, MRO*

#### Action

Discussion

#### Report

John Grimm will lead the discussion during the meeting.



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# Recent Lessons Learned (NERC)

MRO RAC Meeting

5/19/2022

John Grimm

# NERC Lessons Learned

- **What are They?**
- **Where to Find Them**
- **Recent Activity**
  - Working On
  - Recently Posted
  - MRO Involvement
- **Closing**



# What are They?

Lessons learned are a resource enabling industry to identify problems, find what works, document the process, and share with industry. The creation of a lessons learned document is a collaborative effort between NERC, the Regional Entities, and the registered entities. A successful lessons learned document clearly identifies the lessons, contains sufficient information to understand the issues, visibly identifies the difference between the actual outcome and the desired outcome, and includes an accurate sequence of events, when it provides clarity.



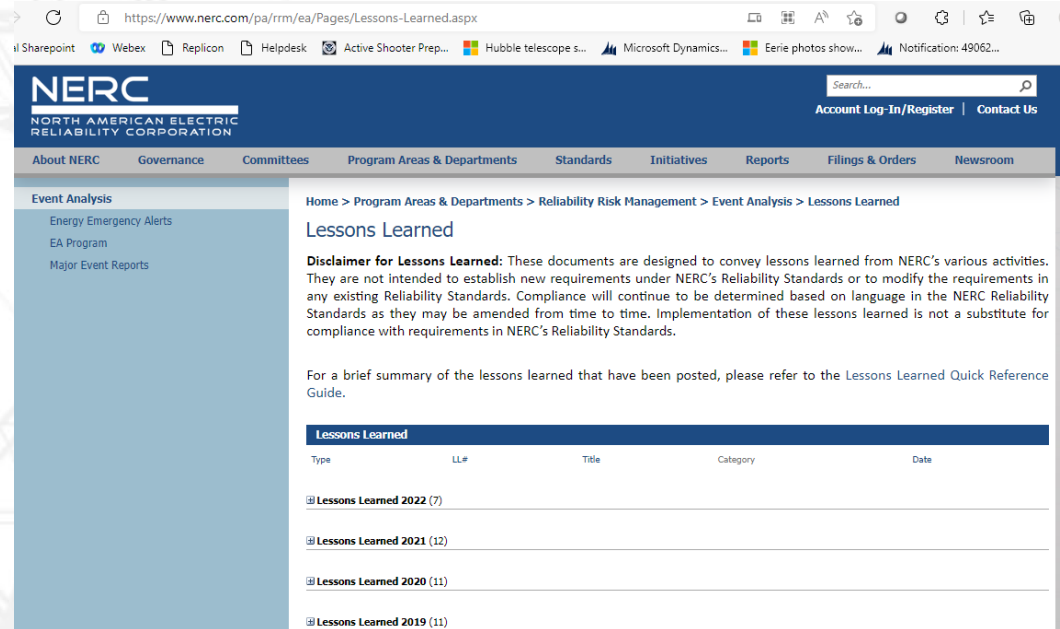
# Where to Find Them

EA Program Page

[Event Analysis \(nerc.com\)](https://www.nerc.com/pa/rmm/ea/Pages/Lessons-Learned.aspx)

Or Directly

[Lessons Learned \(nerc.com\)](https://www.nerc.com/pa/rmm/ea/Pages/Lessons-Learned.aspx)



The screenshot shows the NERC (North American Electric Reliability Corporation) website. The browser address bar displays the URL: <https://www.nerc.com/pa/rmm/ea/Pages/Lessons-Learned.aspx>. The website header includes the NERC logo and navigation links: About NERC, Governance, Committees, Program Areas & Departments, Standards, Initiatives, Reports, Filings & Orders, and Newsroom. A search bar is located in the top right corner. The main content area is titled "Lessons Learned" and includes a disclaimer: "Disclaimer for Lessons Learned: These documents are designed to convey lessons learned from NERC's various activities. They are not intended to establish new requirements under NERC's Reliability Standards or to modify the requirements in any existing Reliability Standards. Compliance will continue to be determined based on language in the NERC Reliability Standards as they may be amended from time to time. Implementation of these lessons learned is not a substitute for compliance with requirements in NERC's Reliability Standards." Below the disclaimer, there is a section for "Lessons Learned" with a table listing lessons learned by year. The table has columns for Type, LL#, Title, Category, and Date. The lessons learned are listed by year: 2022 (7), 2021 (12), 2020 (11), and 2019 (11).

Home > Program Areas & Departments > Reliability Risk Management > Event Analysis > Lessons Learned

**Lessons Learned**

**Disclaimer for Lessons Learned:** These documents are designed to convey lessons learned from NERC's various activities. They are not intended to establish new requirements under NERC's Reliability Standards or to modify the requirements in any existing Reliability Standards. Compliance will continue to be determined based on language in the NERC Reliability Standards as they may be amended from time to time. Implementation of these lessons learned is not a substitute for compliance with requirements in NERC's Reliability Standards.

For a brief summary of the lessons learned that have been posted, please refer to the [Lessons Learned Quick Reference Guide](#).

Type	LL#	Title	Category	Date
<b>Lessons Learned 2022 (7)</b>				
<b>Lessons Learned 2021 (12)</b>				
<b>Lessons Learned 2020 (11)</b>				
<b>Lessons Learned 2019 (11)</b>				



CLARITY

ASSURANCE

RESULTS



# Where to Find Them

## Another Useful Page

### [Lessons Learned Quick Reference Guide \(nerc.com\)](#)



#### Lessons Learned Quick Reference Guide

Lessons learned are a resource enabling industry to identify problems, find what works, document the process, and share with industry. The creation of a lessons learned document is a collaborative effort between NERC, the Regional Entities, and the registered entities. A successful lessons learned document clearly identifies the lessons, contains sufficient information to understand the issues, visibly identifies the difference between the actual outcome and the desired outcome, and includes an accurate sequence of events, when it provides clarity. This document provides a brief summary of the lessons learned published since 2015 and will be regularly updated as more are published. All lessons learned published since 2010 are currently available on the [Event Analysis](#) web page.

2022 Lessons Learned				
Date	LL #	Category	Title	Summary
3/9/2022	LL20220301	Bulk Power System Operations	<a href="#">Managing UFLS Obligations and Service to Critical Loads during an Energy Emergency</a>	Due to the amount of load shed during Winter Storm Uri, entities found it difficult to rotate customer outages while maintaining service to critical loads and underfrequency load shed (UFLS) feeders. Simultaneously, the percent of system load connected to UFLS feeders created a risk of frequency overshoot and instability in the event of UFLS activation.  This LL is of primary interest to Transmission Owners, Transmission Operators, Distribution Providers, Reliability Coordinators, Balancing Authorities, Planning Coordinators

2021 Lessons Learned				
Date	LL #	Category	Title	Summary
10/25/2021	LL20211001	General Processes	<a href="#">Pandemic Response</a>	By the early 2000's, most entities had created business continuity plans (BCP) for various disaster scenarios, including a major pandemic, and had periodic scenario drills to practice these plans. The COVID-19 pandemic resulted in actual use of these plans early in 2020. The first time a plan is executed with a real-life situation, it can be expected that adjustments will need to be made, and



# Recent Activity - Working On

## **“System / Storm Hardening”**

The Review Team met 4/4. Additional info is being gathered.

## **“High Wind Speed Preparation”**

The Review Team met 4/7. Comments are being incorporated prior to sending to the Tech Writer for polishing.

## **EMS Database Deployment Glitches**

Review Team met 3/30. Now awaiting more info.

## **Air Blast Circuit Breakers in Cold Weather**

Review Team met 4/26, questions were sent to the entity.

## **Tower Climber Incident**

Review Team met 4/25, questions were sent to the entity.

# Recent Activity - Recently Posted



## Category of Lessons Learned Published to Date

- **7 NERC Lessons Learned have been published to date in 2022**
  - 3 - Bulk Power System Operations
  - 2 - Transmission Facilities
  - 2 – Communications
- **12 NERC Lessons Learned were published in 2021**
  - 3 - General Processes
  - 3 - Relaying and Protection Systems
  - 3 - Transmission Facilities
  - 2 - Bulk Power System Operations
  - 1 – Communications



# Recent Activity - Recently Posted



## Lessons Learned Posted

April 13, 2022

Six new lessons learned have been posted on the NERC website on the [Lessons Learned](#) page.

The new lessons address the following topics:

- [DER Performance During a Disturbance](#)
- [Islanding and Insufficient Primary Frequency Response Resulted in Unintended UFLS](#)
- [Model Data Error Impacts SE and RTCA](#)
- [Substation Flooding Events Highlight Potential Design Deficiencies](#)
- [Unintended Consequences of Altering Protection System Wiring to Accommodate Failing Equipment](#)
- [Intermittent Network Connection Causes EMS Disruption](#)

For more information or assistance, please contact [Sandy Shiflett](#) (via email).

3353 Peachtree Road NE  
Suite 600, North Tower  
Atlanta, GA 30326  
404-446-2560 | [www.nerc.com](http://www.nerc.com)

**RELIABILITY | RESILIENCE | SECURITY**



# Recent Activity - MRO Involvement

- [LL20220405 Consequences of Altering Protection System Wiring for Failing CCVT.pdf \(nerc.com\)](#)
- [LL20201101 SF6 CB Operation during Cold Weather.pdf \(nerc.com\)](#)
- [LL20200703 Lockout Relay Component Failure Causes Misoperation.pdf \(nerc.com\)](#)
- [LL20200701 Mixing Relay Technologies in DCB Schemes.pdf \(nerc.com\)](#)
- [LL20200601 Unanticipated Wind Generation Cutoffs during a Cold Weather Event.pdf \(nerc.com\)](#)



# Closing

- **The goal with publishing lessons learned is to provide industry with technical and understandable information that assists them with maintaining the reliability of the bulk power system.**
- **Entities should have technical/operations staff review all Lessons Learned and comment on the applicability to their systems and/or operations.**

## AGENDA 12

### Reliability Guideline Overview

*Bryan Clark, Director, Reliability Analysis, MRO*

#### Action

Discussion

#### Report

Bryan Clark will lead the discussion during the meeting.



MIDWEST  
RELIABILITY  
ORGANIZATION

# NERC Reliability Guidelines

Bryan Clark, P.E.  
Director of Reliability Analysis  
May 19, 2022





## Reliability Guideline

Suggested approaches or behavior in a given technical area for the purpose of improving reliability. Guidelines are not enforceable, but may be adopted by a responsible entity in accordance with its own policies, practices, and conditions.



## NERC Alert: Level 2-3

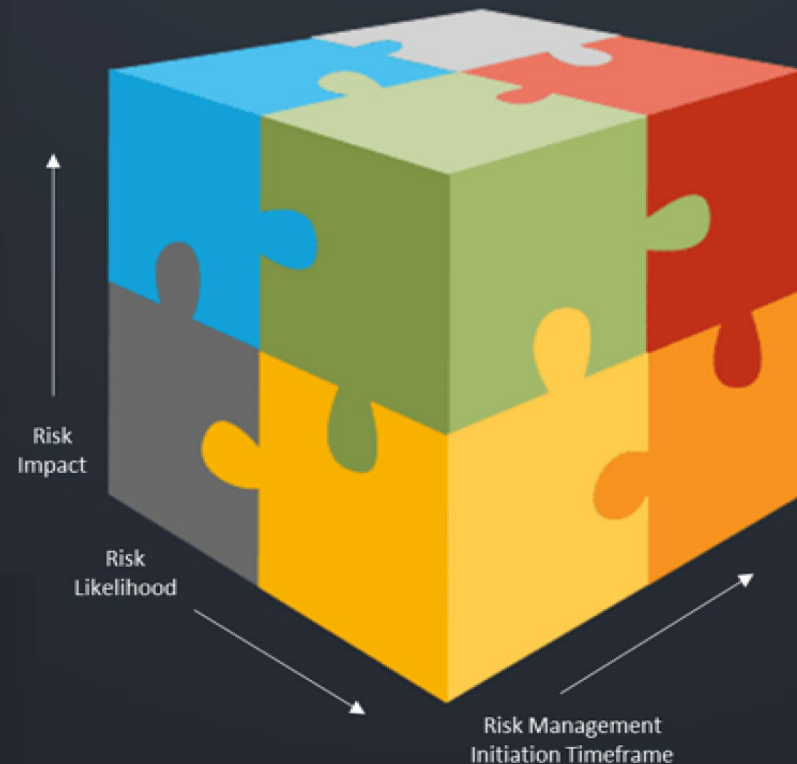
NERC alerts are divided into three distinct levels, 1) Industry Advisory, 2) Recommendation to Industry, and 3) Essential Action, which identifies actions to be taken and require the industry to respond to the ERO.



## Technical Engagement

Technical Engagement is a catch-all for a variety of technical activity that is conducted between the ERO and entities. This includes, technical committee activities, technical reference documents, workshops and conferences, assist visits, joint and special studies, etc.

# Electric Reliability Organization: Reliability Risk Mitigation Toolkit



## Reliability Standards



NERC Reliability Standards define the mandatory reliability requirements for planning and operating the North American BPS and are developed using a results-based approach focusing on performance, risk management, and entity capabilities.

## Reliability Assessment



NERC independently assesses and reports on the overall reliability, adequacy, and associated risks that could impact BPS reliability. Long-term assessments identify emerging reliability issues that support public policy input, improved planning and operations, and general public awareness.

## NERC Alert: Level 1



NERC Alerts are divided into three distinct levels, 1) Industry Advisory, 2) Recommendation to Industry, and 3) Essential Action, which identifies actions to be taken and require the industry to respond to the ERO.





The vision for the Electric Reliability Organization Enterprise, which is comprised of NERC and the six Regional Entities, is a highly reliable and secure North American bulk power system. Our mission is to assure the effective and efficient reduction of risks to the reliability and security of the grid.

RELIABILITY | RESILIENCE | SECURITY

#### Headlines & News

- ▶ Robb to Participate in CAMPUT Annual Conference  
April 28, 2022
- ▶ Joint Technical Conference Focuses on Follow-up to February 2021 Cold Weather Outage Report  
April 25, 2022
- ▶ Noess Named WECC Vice President of Oversight  
April 12, 2022
- ▶ Industry Experts Author Paper on Climate Change Impacts to the Grid  
April 08, 2022
- ▶ Operational Communication, Collaboration and Coordination Key to Industry Success during an Event  
April 07, 2022
- ▶ Report Highlights Criticality of Ensuring Reliable Operation of Inverter-Based Resources; Provides Recommendations  
April 06, 2022

Newsroom Archives | [Follow on Twitter @NERC\\_Official](#) | [Follow on LinkedIn](#)

#### Calendar

Standards	Board of Trustees
Technical Committees, Conferences, and Workshops	Compliance
Performance Analysis	System Operator Certification and Continuing Education
View All Events	

#### Standards



NERC's Standards program ensures the reliability of the bulk power system by developing quality reliability standards in a timely manner that are effective, clear, consistent and technically sound.

▶ Standards News

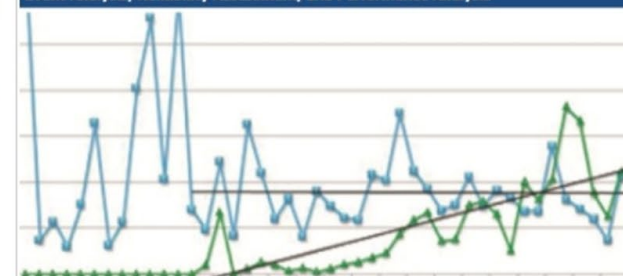
#### Electricity ISAC



E-ISAC gathers security information, coordinates incident management, and communicates mitigation strategies with stakeholders within the electricity industry, across interdependent sectors, and with government partners.

▶ E-ISAC

#### Event Analysis, Reliability Assessment, and Performance Analysis



The Event Analysis, Reliability Assessment, and Performance Analysis program assesses, measures and investigates historic trends and future projections to improve bulk power system reliability.

▶ Event Analysis, Reliability Assessment, and Performance Analysis News

Home > Committees > Reliability and Security Technical Committee (RSTC)

## Reliability and Security Technical Committee (RSTC)

The Reliability and Security Technical Committee (RSTC) is a standing committee that strives to advance the reliability and security of the interconnected bulk power system (BPS) of North America by:

- Creating a forum for aggregating ideas and interests, drawing from diverse industry stakeholder expertise, to support the ERO Enterprise's mission.
- Leveraging such expertise to identify solutions to study, mitigate, and/or eliminate emerging risks to the BPS for the benefit of industry stakeholders, the NERC Board of Trustees (Board) and ERO Enterprise staff and leadership.
- Coordinating and overseeing implementation of RSTC subgroup work plans.

### RSTC Approved Documents Page

- Reliability Guidelines
- Security Guideline
- Technical Reference Documents
- White Papers

### Committee Resources

RSTC Agendas, Highlights, and Minutes

RSTC Charter

RSTC Roster

RSTC Organization

Operating Reliability Data Confidentiality Agreement

### Nomination and Election Information

2022 RSTC Special Election - Sector 10

2022 RSTC Special Election - Sector 3

2021 RSTC Sector Nominations and Elections

2021 RSTC At-Large Nominations

### RSTC Work Plan Related Documents

RSTC Work Plan Notional Process

RSTC Work Plan

### Disbanded Standing Committees

Critical Infrastructure Protection Committee

Operating Committee

Planning Committee



[Compliance and Certification Committee \(CCC\)](#)  
[Personnel Certification Governance Committee \(PCGC\)](#)  
[Reliability Issues Steering Committee \(RISC\)](#)  
[Reliability and Security Technical Committee \(RSTC\)](#)  
[Standards Committee \(SC\)](#)

[Home](#) > [Committees](#) > [Reliability Guidelines, Security Guidelines, Technical Reference Documents, and White Papers](#)

## Reliability Guidelines, Security Guidelines, Technical Reference Documents, and White Papers

The NERC Reliability and Security Technical Committee (RSTC) subcommittees develop Reliability (Operating and Planning), Security Guidelines, and technical reference documents, which include the collective experience, expertise and judgment of the industry. The objective of the reliability guidelines is to distribute key practices and information on specific issues critical to promote and maintain a highly reliable and secure bulk power system (BPS). Reliability guidelines are not binding norms or parameters to the level that compliance to NERC's Reliability Standards is monitored or enforced. Rather, their incorporation into industry practices is strictly voluntary. Reviewing, revising, or developing a program using these practices is highly encouraged. All current and draft guidelines can be found at the links below.

### Reliability Guidelines

Type	Doc ID	Description	Approval Date	Subgroup
------	--------	-------------	---------------	----------

#### **Draft Reliability Guidelines (3)**

 Modeling and Verification (1)

 Operations (2)

#### **Approved Reliability Guidelines (24)**

 Balancing (3)

 Energy Assurance (3)

 Modeling and Verification (1)

 Operations (3)

 Resource Performance (4)

 Transmission Planning (10)

Compliance and Certification Committee (CCC)

Personnel Certification Governance Committee (PCGC)

Reliability Issues Steering Committee (RISC)

Reliability and Security Technical Committee (RSTC)

Standards Committee (SC)

Home > Committees > Reliability Guidelines, Security Guidelines, Technical Reference Documents, and White Papers

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<b>Approved Reliability Guidelines (24)</b>				
		Balancing (3)		
		Energy Assurance (3)		
		Modeling and Verification (1)		
		Operations (3)		
		Resource Performance (4)		
	RG-CYB-0320-1	Reliability Guideline: BPS Reliability Perspectives on the Adoption of IEEE 1547-2018	3/16/2020	SPIDERWG
	RG-PLS-0321-1	Reliability Guideline: Performance, Modeling, and Simulations of BPS-Connected Battery Energy Storage Systems and Hybrid Power Plants	3/4/2021	IRPWG
	RG-SPC-0118-1	Reliability Guideline: Integrating Inverter-based Resources into Low Short Circuit Strength Power Systems	1/16/2018	IRPWG
	RG-SPC-0918-1	Reliability Guideline: BPS-Connected Inverter-Based Resource Performance	9/12/2018	IRPWG





# Questions

## AGENDA 13

### Protective Relay Subgroup (PRS) Update *Jake Bernhagen, Senior Systems Protection Engineer, MRO*

#### **Action**

Information

#### **Report**

Jake Bernhagen will provide an overview at the meeting.

## AGENDA 14

### 2022 Meeting Dates *Dick Pursley, Reliability Advisory Council Chair*

#### Action

Information

#### Report

Chair Pursley will provide an overview at the meeting.

	Q1 2022	Q2 2022	Q3 2022	Q4 2022
<b>RAC</b>	4/6*	5/19	8/17	11/16
<b>PRS</b>	2/22	5/3	8/16	12/6
<b>SAC</b>	2/16	6/22*	10/5-10/6	11/9
<b>SACTF</b>	2/9	6/15	10/6	11/2
<b>CMEPAC</b>	2/15	6/7	9/21*	11/10
<b>OGOC</b>	4/6	6/22	9/21	11/30
<b>BOD</b>	4/7	6/23	9/22	12/1

\*Joint with OGOC

MRO CONFERENCE DATES 2022	
<b>Q1</b>	<b>RAM/CIP Conference: March 23, 2022 *virtual</b>
<b>Q2</b>	<b>Reliability Conference: May 17-18, 2022 networking reception and conference Kansas City</b>
<b>Q3</b>	<b>CMEP: July 25-26, 2022 networking reception and conference</b>
<b>Q4</b>	<b>Security Conference: October 4-6, 2022 SAC meeting, training, networking and conference</b>



## AGENDA 15

### **RAC Member Roundtable** *Reliability Advisory Council Members*

#### **Action**

Discussion

#### **Report**

Chair Pursley will lead the discussion during the meeting.

## AGENDA 16

### Other Business and Adjourn *Dick Pursley, Reliability Advisory Council Chair*

#### **Action**

Discussion

#### **Report**

Chair Pursley will lead the discussion during the meeting.