



MIDWEST
RELIABILITY
ORGANIZATION

Meeting Agenda

Reliability Advisory Council (RAC)

August 17, 2022

9:00 am to 3:00 pm central

*MRO Corporate Offices, King Conference Center
St. Paul, MN 55102*

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; and
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.

MRO RELIABILITY ADVISORY COUNCIL Q3 MEETING AGENDA

Agenda Item

- 1 Call to Order and Determination of Quorum**
Dick Pursley, Reliability Advisory Council Chair
 - a. Determination of Quorum
Reliability Analysis Administrator
 - b. Robert's Rules of Order
- 2 Standards of Conduct and Antitrust Guidelines**
Bryan Clark, Director, Reliability Analysis, MRO
- 3 Chair's Remarks**
Dick Pursley, Reliability Advisory Council Chair
- 4 Diversity Initiative**
Julie Peterson, Assistant Corporate Secretary and Senior Counsel, MRO
- 5 Consent Agenda**
Dick Pursley, Reliability Advisory Council Chair
 - a. Approve May 19, 2022 meeting minutes
 - b. Approve RAC Charter Update
- 6 Improving Outreach and Stakeholder Communications**
Jessie Mitchell, Director of Communications, MRO
- 7 MRO Board of Directors OGOC and General Update**
Bryan Clark, Director, Reliability Analysis, MRO
- 8 Reliability and Security Technical Committee (RSTC) Overview and Highlights**
Stephen Crutchfield, Principal Technical Advisor & Coordinator for the RSTC, NERC
- 9 MRO Representatives on NERC Subgroups – Written Reports**
Bryan Clark, Director, Reliability Analysis, MRO
 - a. NERC Electric Gas Working Group (EGWG) – Jaimin Patel
 - b. NERC Inverter-Based Resource Performance Subcommittee (IRPS) – David Brauch
 - c. NERC System Planning Impacts from DER Working Group (SPIDERWG) – Wayne Guttormson
 - d. NERC System Protection and Control Working Group (SPCWG) – Mark Gutzmann
 - e. NERC Energy Reliability Assessment Task Force (ERATF) – Tom Whynot
- 10 NERC Rep Assignments**
Bryan Clark, Director, Reliability Analysis, MRO

Break – 10:00 a.m.

- 11 2022 Work Plan Update**
Dick Pursley, Reliability Advisory Council Chair
 - a. Review Action Items
 - b. Reliability Risk Matrix Updates
Bryan Clark, Director, Reliability Analysis, MRO
- 12 Reliability Coordinator Updates**
 - a. MISO – Durgesh Manjure, RAC Member
 - b. SPC – Binod Shrestha, RAC Member
 - c. SPP – CJ Brown, RAC Member

Lunch 12:00 p.m.

MEETING AGENDA – Reliability Advisory Council (RAC) – August 17, 2022

- 13 Western Area Power Administration – Upper Great Plains Region Oahe Event Review**
Bob Soper, Lead Electrical Engineer, WAPA – UGPR
- 14 2022 MRO Regional Risk Assessment – Operational and Planning Risks**
Bryan Clark, Director, Reliability Analysis, MRO
- 15 NERC Standards Review Forum (NSRF) Update**
Gayle Nansel, Reliability Advisory Council Member
- 16 Protective Relay Subgroup (PRS) – Update**
Jake Bernhagen, Senior Systems Protection Engineer, MRO
- 17 2022 Meeting Dates**
Dick Pursley, Reliability Advisory Council Chair
- 18 RAC Member Roundtable**
Reliability Advisory Council Members
- 19 Other Business and Adjourn**
Dick Pursley, Reliability Advisory Council Chair

AGENDA 1

Call to Order and Determination of Quorum

- a. Determination of Quorum
Reliability Analysis Administrator

Name	Role	Company	Term
Dick Pursley	Chair	Great River Energy	12/31/22
Jason Weiers	Vice Chair	Otter Tail Power Company	12/31/24
Andy Witmeier	Member	MISO	12/31/24
Binod Shrestha	Member	Saskatchewan Power Corporation	12/31/22
CJ Brown	Member	Southwest Power Pool	12/31/24
Dallas Rowley	Member	Oklahoma Gas and Electric	12/31/22
Derek Brown	Member	Evergy	12/31/23
Durgesh Manjure	Member	MISO	12/31/23
Dwayne Stradford	Member	American Electric Power	12/31/24
Gayle Nansel	Member	Western Area Power Administration	12/31/22
Jeremy Severson	Member	Basin Electric Power Cooperative	12/31/24
John Stephens	Member	City Utilities of Springfield Missouri	12/31/23
Nandaka Jayasekara	Member	Manitoba Hydro	12/31/22
Ron Gunderson	Member	Nebraska Public Power District	12/31/23
W. Bryn Wilson	Member	Oklahoma Gas & Electric	12/31/23

AGENDA 1

Call to Order and Determination of Quorum

b. 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.

MEETING AGENDA – Reliability Advisory Council (RAC) – August 17, 2022

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.

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“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.

MEETING AGENDA – Reliability Advisory Council (RAC) – August 17, 2022

AGENDA 3

Chair's Remarks

Dick Pursley, Reliability Advisory Council Chair

Action

Information

Report

Chair Pursley will lead this discussion during the meeting.

AGENDA 4

Diversity Initiative

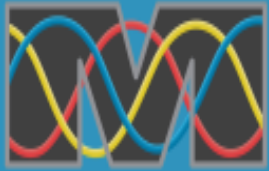
Julie Peterson, Assistant Corporate Secretary and Senior Counsel

Action

Information

Report

Julie Peterson will lead this discussion during the meeting.



MIDWEST
RELIABILITY
ORGANIZATION

MRO Organizational Groups

Diversity Initiative

CLARITY

ASSURANCE

RESULTS

Types of Diversity

Inherent Diversity

- Race
- Ethnicity
- Age
- National origin
- Sexual orientation
- Cultural identity
- Assigned sex
- Gender identity

Acquired Diversity

- Expertise (e.g., engineering, operations, security)
- Experience (e.g., executive, technical)
- Geography (e.g., US, Canada, north, south)
- Company (e.g., no more than two members from the same company per group)



The Value of Diverse Teams

- **More focused on facts**
 - More likely to constantly reexamine facts and remain objective
 - Can lead to improved and more accurate group thinking
- **Facts are processed more carefully**
 - Considering the perspective of an outsider can result in improved decision-making and results
- **More innovative**
 - Diversity boosts intellectual potential
 - Conformity discourages innovative thinking

SOURCE: <https://hbr.org/2016/11/why-diverse-teams-are-smarter>



Be an MRO Diversity Ambassador

- **Help us reach a wider pool of applicants**
 - Share MRO LinkedIn posts with your network
 - Discuss and share the request for nominations within your organizations
- **Participation is a developmental opportunity**
- **Nominate and elect diverse candidates**



Nominations & Elections

- **Nominations period will open September 12, 2022**
- **Organizational Group Membership Recommendations made during Q4 Meetings**



Thank you!

Questions?

Contact

Julie Peterson

MRO Assistant Corporate Secretary and Senior Counsel

julie.peterson@mro.net



MEETING AGENDA – Reliability Advisory Council (RAC) – August 17, 2022

AGENDA 5

Consent Agenda

- a. Approve May 19, 2022 Meeting Minutes
 - b. Approve RAC Charter Update
- Dick Pursley, Reliability Advisory Council Chair*

Action

Discussion

Report

Chair Pursley will lead this discussion during the meeting.



Draft Minutes of the Reliability Advisory Council Meeting

InterContinental Kansas City at the Plaza

May 19, 2022, 8:01 a.m. to 11:56 a.m. Central

Notice for this meeting was electronically posted to the MRO website [here](#) on April 21, 2022. A final agenda, including advanced reading materials, was also posted on May 12, 2022.

1. Call to Order and Determination of Quorum

The Reliability Advisory Council (RAC) Chair, Dick Pursley called the meeting to order at 8:01 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 thanked the Reliability Conference planning committee for their work on this year's conference and RAC member Dallas Rowley for his efforts as the conference emcee. He also congratulated Principal Technical Advisor, John Seidel on his upcoming retirement from MRO.

4. Consent Agenda

The RAC reviewed the consent agenda, which included draft minutes from the April 6, 2022 meeting.

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

5. MRO Board of Directors, OGOC and General Update

Clark provided an overview of the Board of Directors and OGOC meetings on April 6-7, 2022. He noted that the OGOC approved the RAC work plan, the new RAC and PRS members, NERC representatives recommended by the RAC, and the change to the PRS charter. The annual meeting requirement with the councils and the OGOC was discussed. A member suggested that the length and timing of the meeting with the OGOC could be improved. Discussion ensued.

6. MRO Representatives on NERC Subgroups

NERC Electric Gas Working Group (EGWG) – Jaimin Patel **No report**
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) – Tom Whynot

The NERC Representatives from each subgroup provided written reports to the RAC if the subgroup had met since the April 6, 2022 RAC meeting. Discussion ensued.



7. Update 2022 Work Plan

Action Item Review.

Chair Pursley reviewed the action items in the 2022 work plan. Updates were made accordingly. He noted that deadlines should be assigned to newsletter articles to keep them on track. A sub team was formed to start planning for the Cold Weather Preparedness Workshop, tentatively scheduled for October 2022. A RAC member suggested inviting a meteorologist or climatologist to participate in the workshop. Discussion ensued.

2022 Reliability Conference Debrief.

RAC member Derek Brown lead the discussion at the meeting. He thanked the planning committee, MRO staff, and the conference emcee. He noted the importance of face-to-face networking. Various presentations and themes were highlighted. Discussion ensued.

8. MISO 2022 Summer Capacity

RAC member Durgesh Manjure provided an overview of the MISO 2022 Summer Capacity. He outlined the 2022-23 Planning Resource Auction (PRA) demonstrated capacity shortfalls in MISO North and Central regions and the effect on capacity prices. The capacity shortfall was due to a decrease in accredited capacity driven by thermal retirements and the increasing transition to renewables. Discussion ensued.

9. Assessment Review

MRO Regional Summer Assessment.

MRO Principal Reliability Assessment Engineer, Salva Andiappan, provided a brief overview of the Regional Summer Assessment (RSA). He highlighted two additions to the 2022 RSA: GADS Weighted Equivalent Forced Outage Rate (WEFOR) and TADS Total Transmission Outages per 100 Circuit Miles. Andiappan will schedule a call with the RAC on June 28, 2022 to review the 2022 Long-Term Reliability Assessment (LTRA). Discussion ensued.

10. RAC Charter Review

Clark lead the discussion during the meeting. Chair Pursley recommended changing the verbiage on the RAC charter under item I. Purpose to add clarification. A redlined version will be submitted to the OGOC for approval at the next meeting in June 2022.

11. Recent Lessons Learned (NERC)

Principal Systems Protection Engineer, John Grimm lead the discussion during the meeting. Chair Pursley solicited feedback from the RAC on whether the NERC lessons learned could be highlighted as a webinar. Discussion ensued.

12. Reliability Guideline Overview

Clark lead the discussion during the meeting. He provided an overview of the NERC website showing where the Reliability Guidelines are located and asked that the RAC review them. Discussion ensued.



13. Protective Relay Subgroup Update

MRO Senior Systems Protection Engineer, Jake Bernhagen, provided an update of the Protective Relay Subgroup (PRS). He noted that a white paper on Instantaneous Ground Overcurrent is in-progress. There is a FERC/NERC PSC Program Review webinar scheduled for July 14, 2022. Bernhagen also mentioned a format change to the Q4 meeting in December to incorporate a real-time misoperations review by the PRS. Chair Pursley asked about the subgroup's interface with the Reliability and Security Technical Committee (RSTC).

14. 2022 Meeting Dates

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

15. RAC Member Roundtable

Chair Pursley invited member participants to share other relevant industry observations. Topics discussed included:

- Deferments of resources
- Personnel resources (higher on the risk matrix)
- Aging workforce in the industry
- Need to promote industry at the college level
- How do you interest people in the industry?
- One-third of misoperations caused by human error
- Use of contractors for capital improvements (risk)
- Formal documentation for onboarding new employees
- Automation of manual functions to address HR shortages

16. Other Business and Adjourn

Having no further business to discuss, the meeting was adjourned at 11:56 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
Andy Witmeier	MISO
Binod Shrestha	Saskatchewan Power Corporation
C.J. 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
W. Bryn Wilson	Oklahoma Gas & Electric
MRO Staff Present	
Name	Title
Bryan Clark	Director, Reliability Analysis
Rebecca Schneider	Reliability Analysis Administrator
Lisa Stellmaker	Executive Administrator
John Seidel	Principal Technical Advisor
Salva Andiappan	Principal Reliability Assessment Engineer
Jake Bernhagen	Senior Systems Protection Engineer



John Grimm	Principal Systems Protection Engineer
Dianlong Wang	Senior Power Systems Engineer
Max Desruisseaux	Senior Power Systems Engineer
Steen Fjalstad	Director of Security
Estee Nauer	Security Administrator
Guests	
Name	Organization
Jaimin Patel	Saskatchewan Power Corporation
Mark Gutzmann	Xcel Energy
Wayne Guttormson	Saskatchewan Power Corporation
Tom Whynot	Manitoba Hydro
Mark Eastwood	City Utilities of Springfield, MO
Russell Moore	City Utilities of Springfield, MO
Maison Bleam	Iowa Utilities Board
Mary Agnes Nimis	FERC
Terry Harbour	MidAmerican Energy Company



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, energy and 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

Approved by the MRO OGOC: June 22, 2022



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.

Approved by the MRO OGOC: June 22, 2022



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.

Approved by the MRO OGOC: June 22, 2022

AGENDA 6

Improving Outreach and Stakeholder Communications

Jessie Mitchell, Director of Communications, MRO

Action

Information

Report

Jessie Mitchell will lead this discussion during the meeting.



MIDWEST
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ORGANIZATION

Improving Outreach and Stakeholder Communications

New website is now live!

CLARITY

ASSURANCE

RESULTS

Website Vision

- **Provide a site that streamlines the end user experience through:**
 - Improved functionality, design and organization
 - Better search capabilities; new resource library
 - Enhanced event and news pages
 - Clearer messaging on what MRO does and brand recognition





Library

Search Library

Filter by Category

- ☐ Enforcement >
- ☐ Members >
- ☐ About MRO >
- ☐ Board of Directors >
- ☐ Reliability Standards >
- ☒ Reliability Analysis >
 - ☒ Announcements
 - ☒ Presentations
 - ☒ Guidance Documents
- ☐ Organizational Groups >
- ☐ Security >
- ☐ Risk Assessment >
- ☐ Registration & Certification

Protective Relay Subcommittee Misoperations Phase II Whitepaper

Protective Relay Subgroup, Reliability Analysis | July 7, 2022

PRC-004-5(i) Self-Cert Webinar Event Announcement

Reliability Analysis | July 6, 2022

CIP-012 Readiness Assessment Webinar

Reliability Analysis | July 6, 2022

MRO 2022 Regional Summer Assessment Webinar

Reliability Analysis | June 30, 2022

MRO 2022 Regional Summer Assessment Webinar

New Resource Library



Events Calendar

Enhanced Event Page

Search Events

Filter by Time

- ☒ Upcoming Events
☐ Past Events

Filter by Category

- ☐ Board of Directors >
☐ Reliability Standards >
☐ Reliability Analysis >
☐ Organizational Groups >
☐ Security >
☐ Risk Assessment >
☐ Compliance Monitoring >

Filter by Type

- ☐ Meeting Materials
☐ Reports and Manuals

NSRF Weekly Web Meeting

Wednesday, August 10, 2022 | 9:00 am – 10:00 am (View additional dates)

Webex | [Organizational Groups](#), [NERC Standards Review Forum](#)

The NSRF meets via WebEx every Wednesday from 9:00 a.m. to 10:00 a.m. (CT).

[DETAILS](#)

MRO Finance and Audit Committee 3Q Closed Meeting

Webex | [Finance and Audit Committee](#), [Board of Directors](#)

The MRO Finance and Audit Committee Budget Meeting is a closed meeting.

[DETAILS](#)

CMEP Advisory Council Monthly Call

Tuesday, August 09, 2022 | 3:00 pm – 4:00 pm (View additional dates)



MRO Annual Reliability Conference

InterContinental Kansas City at the Plaza, Kansas City, Missouri | [Reliability Advisory Council](#), [Reliability Analysis](#), [Organizational Groups](#)

Wednesday, May 18, 2022 8:30 am - 3:45 pm

Midwest Reliability Organization's Reliability Advisory Council invites you to MRO's Annual Reliability Conference, which will be held at the InterContinental Kansas City at the Plaza in Kansas City, Missouri. This much anticipated one-day conference will focus on bulk power system reliability topics across the industry and specific to the MRO region.

[Tweet](#) [Facebook](#) [LinkedIn](#) [Email](#)



Additional Details

For questions about this event contact:

Lisa Stellmaker

Rebecca R. Schneider

Event Documents

MRO 2022 Reliability Conference Packet

Reliability Advisory Council,
Organizational Groups | May 16, 2022

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Highlights from MRO's 2022 Hybrid Reliability Conference

Reliability Advisory Council, Reliability Analysis, Uncategorized | August 9, 2022

Midwest Reliability Organization's Reliability Advisory Council (RAC) held its 2022 Reliability Conference on May 18 in Kansas City, Missouri. This hybrid conference attracted more than 300 participants in person and...

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Managing Periods of Bulk Power System Instability

Reliability Advisory Council, Reliability Analysis, Uncategorized | August 8, 2022

When manual load shedding is necessary This is the third article in a three-part series on manual load shedding and its criticality to the preservation of reliability for the...

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Managing Periods of Bulk Power System Instability

August 8, 2022

When manual load shedding is necessary



This is the third article in a three-part series on manual load shedding and its criticality to the preservation of reliability for the North American bulk power system during times of duress. The first article was published in August and the second article in December of 2021.

In the first two articles of this series, “why” load shedding is a necessary action and “how” load shedding is accomplished was described. The conditions that lead to load shedding, or “when” load shedding is necessary, will be discussed in more detail in this final article. The previous articles also described the two primary precursors for load shedding – one being local in nature (specific concerns regarding components of the Bulk



About the Authors:



C.J. Brown, Southwest Power Pool

C.J. Brown received his bachelor of science in applied mathematics/economics from the University of Central Arkansas in 2000 and was NERC Reliability Coordinator certified in 2007. He has been with Southwest Power Pool (SPP) since 2006 and is currently the director of system operations at SPP. His responsibilities include oversight of the SPP real time operations for tariff administration, markets, balancing authority and reliability coordination functions in the Eastern and Western interconnections. He has over 20 years of experience in the electric utility industry with roles in generation, power marketing, market monitoring and system operations.



Dick Pursley, Great River Energy

Dick Pursley is the Director, Operations and Transmission Services at Great River Energy, where he has oversight of control center operations and support, along with substation and transmission line construction and maintenance activities. Pursley has worked in the electric utility industry for 31 years, the last 21 of which have been with Great River Energy in the utility operations area. He has served on several NERC and MRO organizational groups and is an active member of the NERC Event Analysis Subcommittee and MRO's Reliability Advisory Council. Pursley earned his BS in electrical engineering and MS in agricultural engineering from the University of Minnesota.



John Stephens, City Utilities of Springfield

John Stephens has been the Director, Power System Control at City Utilities of Springfield for 24 years. He is responsible for real-time Transmission Operations and has experience in wholesale power market transactions, open access transmission policy, and NERC compliance. Stephens has been an active participant on many SPP organizational groups and also serves on NERC and MRO working groups and committees, including the NERC Reliability Issues Steering Committee, NERC Reliability and Security Technical Committee, and MRO Reliability Advisory Council. Stephens is a registered Professional Engineer in the state of Missouri and holds a BSEE from Rose-Hulman Institute of Technology. He earned his MSEE from Clemson University.

Future Website Enhancements

- **Calendar view of events**
- **Ability to subscribe to specific news categories**
- **MRO blog page**
 - Less formal and more concise than news articles
 - Open to organizational group members and other invited SMEs
 - Still requires review prior to posting and will have a disclaimer applied



Tell us what you think!

Send your comments, suggestions, and ideas for future enhancements to:

websitegeneral@mro.net



CLARITY

ASSURANCE

RESULTS

AGENDA 7

MRO Board of Directors OGOC and General Update

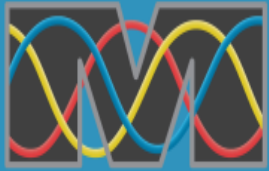
Bryan Clark, Director, Reliability Analysis, MRO

Action

Information

Report

Bryan Clark will lead this discussion during the meeting.



MIDWEST
RELIABILITY
ORGANIZATION

OGOC and BOD Update

Bryan Clark, P.E.
Director of Reliability Analysis
August 17, 2022

Approvals

- **Charter change submitted by the RAC**
- **New Joint Meeting Format**
 - Discontinued old format

Joint Council Meeting

- **One Representative from each council**
 - Quarterly Risk Roundtable Topic
- **Effective Immediately**
- **Q3 OGOC Meeting scheduled for Sept. 21st**
 - *Ambient Adjusted Ratings*
- **Charter update to reflect changes**

Future Meeting Dates

- **OGOC with Council Rep**
 - September 21st
- **BOD Meeting**
 - September 22nd



Questions

AGENDA 8

Reliability and Security Technical Committee (RSTC) Overview and Highlights

Stephen Crutchfield, Principal Technical Advisor & Coordinator for the RSTC, NERC

Action

Information

Report

Stephen Crutchfield will provide an update during the meeting.

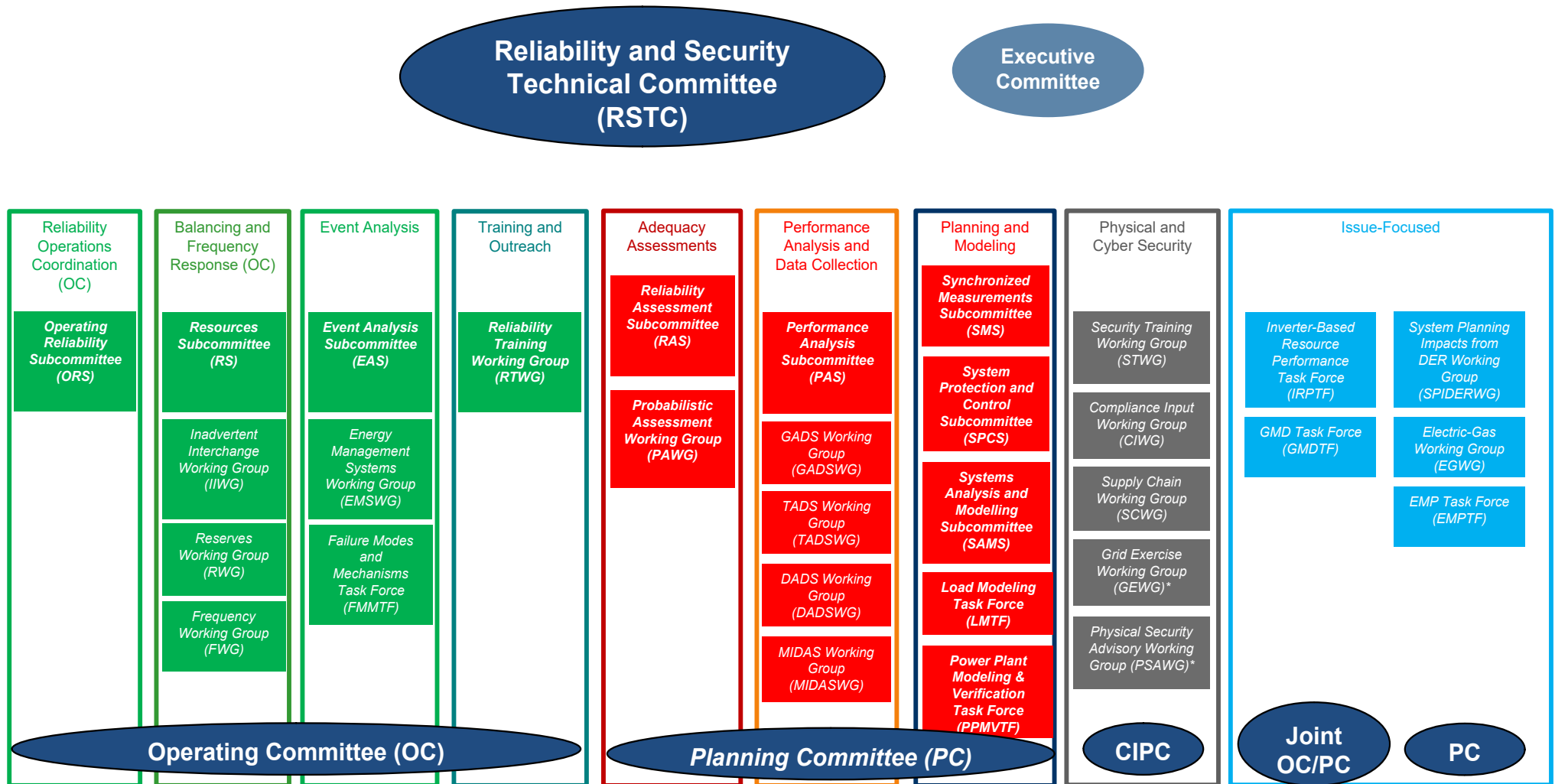
Reliability and Security Technical Committee

Overview and Activity

Stephen Crutchfield
Principal Technical Analyst
MRO Reliability Advisory Council
August 17, 2022

- November, 2019 - Stakeholder Engagement Team brought RSTC recommendation to NERC Board of Trustees (Board)
 - Approved Proposal to form RSTC and the RSTC Charter
 - Appointed Chair and Vice-chair
- February, 2020 – Board appoints sector and at-large RSTC members to the RSTC
- March, 2020 – Final OC/PC/CIPC meetings as well as half day RSTC organizational meeting
- June, 2020 – First full RSTC meeting
- September, 2020 – RSTC Approved New Organization Model, Notional Work Flow Process and assigned Sponsors to most subgroups

Initial State – 31 subgroups

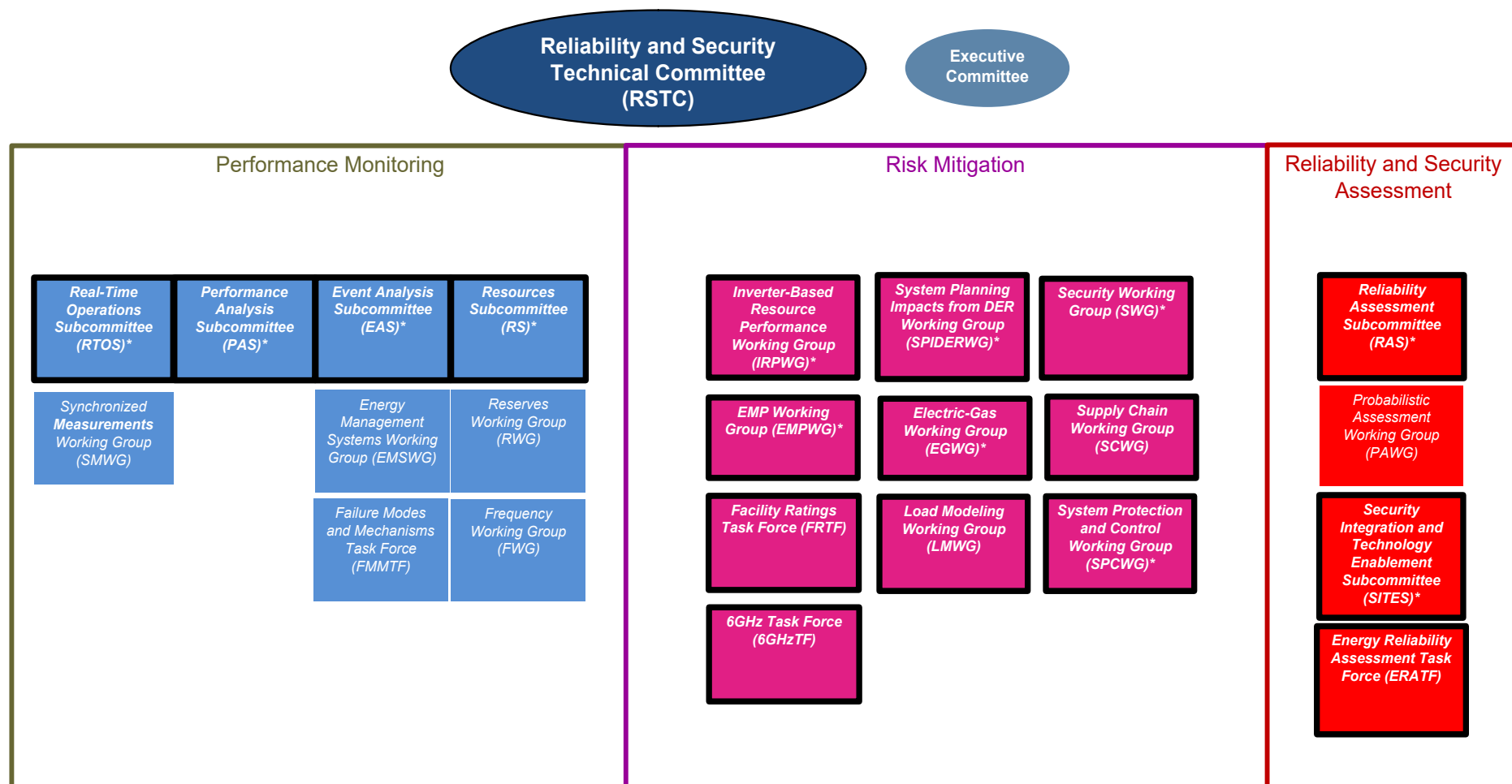


- Organize RSTC subgroups by Program Areas:
 - Performance Monitoring
 - Reliability and Security Assessment
 - Risk Mitigation
- The Program Areas are NOT subcommittees but rather a simple way to organize work in distinct groups
- Sponsors assigned based on subgroup topics and work loads
- Security is a consideration for each subgroup where appropriate

Recent Organization Changes

- June 2021
 - Disbanded Power Plant Modeling and Verification Task Force (PPMVTF)
 - Completion of work plan
- December 2021
 - Approved the formation of the 6 GHz Task Force
 - Approved a scope revision for the Facility Ratings Task Force to report solely to the RSTC

Current RSTC Organization



Approval/Endorsement Items

- Since June, 2020, the RSTC has approved or endorsed:
 - Reliability/Security Guidelines - 15
 - Implementation Guidance -2
 - White Papers - 11
 - Scope Documents - 18
 - Reference Documents - 7
 - SARs – 12

Approval/Endorsement Items

- The RSTC has also endorsed:
 - Annual Long-Term and Seasonal Reliability Assessments
 - Annual State of Reliability Reports
 - Frequency Response Annual Analysis (FRAA)
 - Framework to Address Known and Emerging Reliability and Security Risk
 - Concept Paper: Integrating Security Topics into RSTC Technical Groups
 - Special Assessment: NERC Energy Management System Performance Special Assessment (2018–2019).
 - Standing Committees Coordinating Group (SCCG) Scope.

June 2022 Meeting Highlights

- Endorsed two SARs submitted by the Energy Reliability Assessments Task Force (ERATF) to address assessing risks associated with unassured energy supplies, including the timing and inconsistent output from variable renewable energy resources, fuel location, and volatility in forecasted load, which can result in insufficient amounts of energy on the system to serve electrical demand.
- Endorsed a SAR submitted by the Inverter-Based Resource Performance Subcommittee (IRPS) to address concerns about the lack of accurate modeling data and the need to perform electromagnetic transient (EMT) studies during the interconnection process and long-term planning horizon.

June 2022 Meeting Highlights

- Approved two Reference Documents updated by the Real Time Operating Subcommittee (RTOS)
 - *Reliability Coordinator Reliability Plan Reference Document*
 - *GMD Monitoring Reference Document*
- Accepted the GADS Section 1600 Data Request to post for a 45-day public comment period
- Approved two White Papers submitted by the System Planning Impacts From Distributed Energy Resources Working Group (SPIDERWG)
 - *BPS Reliability Perspectives for Distributed Energy Resource Aggregators*
 - *Recommendations for Simulation Improvement and Techniques Related to DER Planning*

June 2022 Meeting Highlights

- Approved the System Protection and Control Working Group (SPCWG) recommendation to add Generating Availability Data Source (GADS) Cause Code Amplification Code for outages related to frequency deviation identified in the *FERC-NERC-Regional Entity Staff Report: The February 2021 Cold Weather Outages in Texas and the South Central United States*. The codes will be implemented by the Performance analysis Subcommittee (PAS)
- Approved the *FERC RM22-3: Internal Network Security Monitoring - NERC Security Working Group Whitepaper*

June 2022 Meeting Highlights

- The EAS had a vacancies for the MRO Regional Representative and TRE Entity Representative.
- The RSTC approved the new members:
 - Jake Bernhagen (MRO) as MRO Regional Representative
 - Freddy Garcia (ERCOT) as TRE Entity Representative

- RSTC reviewers were solicited to review the following documents:
 - *White Paper: DER Impacts to Under Voltage Load Shedding Program Design (SPIDERWG)*
 - *Technical Report: Beyond Positive Sequence RMS Simulations for High DER Penetration Conditions (SPIDERWG)*
 - *Inter-Area Short Circuit Paper (SPCWG)*

- The RSTC reviewed the 2021 RISC Report and the Joint FERC NERC Cold Weather Report recommendations for RSTC subgroup work plan items assigned to appropriate RSTC groups.
 - The RSTC will form a review team in late 2022/early 2023 to assess progress in mitigation the risks.
- Sector and At-large Nominations
 - Nominating Subcommittee will evaluate the expertise of all Sector reps to determine the additional expertise/diversity needed
- Reliability Guideline Effectiveness Metrics
 - <https://www.nerc.com/comm/Pages/Reliability-and-Security-Guidelines.aspx>
- RSTC Sunset Review

- The RSTC Continues to review and update Reliability and Security Guidelines with metrics to assess the effectiveness of each guideline. Tranche 1 will be presented for approval at the September meeting.
- The RSCT Executive Committee has developed a draft 2022-2024 RSTC Strategic Plan which will be presented to the full RSTC for comment in September. It is anticipated that the final Strategic Plan will be presented for RSTC approval at the December meeting with Board approval request coming in February, 2023.
- Inverter-based resource mitigations, such as Reliability Guideline refinements and new SARs to address potential gaps and propose improvements to the Reliability Standards.

- The RSTC will continue to monitor the CIP-002 Transmission Owner Control Centers Field Test. The Standard Development *Project 2021-03 CIP-002 Transmission Owner Control Centers* provided an update on their field test at the June RSTC meeting (summary of field test below).
 - Transmission Owner (TO) Control Centers Performing Transmission Operator (TOP) Obligations – V5TAG is aware of multiple interpretations of the language “used to perform the functional obligation of” in CIP-002-5.1 Attachment 1, section 2.12 and recommends clarification of:
 - The applicability of requirements on a TO Control Center that performs the functional obligations of a TOP, particularly if the TO has the ability to operate switches, breakers and relays in the BES.
 - The definition of Control Center
 - The language scope of “perform the functional obligations of” throughout the Attachment 1 criteria

A map of North America, including Canada, the United States, and Mexico. A horizontal band of blue gradient, darker in the center and lighter towards the edges, stretches across the middle of the map. The text "Questions and Answers" is centered within this band.

Questions and Answers

AGENDA 9

MRO Representatives on NERC Subgroups – Written Reports

- a. NERC Electric Gas Working Group (EGWG)
Jaimin Patel, SPC and RAC Member

Action

Information

Report

Since the last RAC meeting, the EGWG had WebEx meeting on May 12, 2022. The last [meeting agenda](#) is posted on the [NERC website](#). There is no next meeting date/information available at this time.

Following is a summary of EGWG activity.

Areas of Focus

- **Discussion on NERC Reliability and Security Technical Committee (RSTC) Input Into Design Basis Criteria**
 - The design basis criteria for a natural gas study was presented to the RSTC in March. EGWG has created a small sub-group to incorporate comments received from the RSTC. The updated design basis criteria will be presented to the RSTC for approval by September this year.
- **Finalize Fuel Assurance Guideline Effectiveness Survey and Formulate Process for Dissemination**
 - The survey process for the EGWG reliability guideline (fuel assurance and fuel-related reliability risk analysis for the Bulk Power System) was completed. The survey will be used to determine efficacy of the guideline.
- **Presentation on FERC Pipeline Certificate Policy Statement (PL-18-1-000)**
 - Chris Smith from the Interstate Natural Gas Authority of America (INGAA) provided a presentation on overview of proposed changes to FERC review. A copy of the presentation is posted [here](#).

The meeting minutes are posted [here](#).

Accomplishments

- EGWG has completed and approved the reliability guideline survey.

Challenges

- None identified for this report.

Please provide any comment/feedback/follow-up question regarding above summary.

AGENDA 9

MRO Representatives on NERC Subgroups – Written Reports

- b. NERC Inverter-Based Resource Performance Subcommittee (IRPS)
David Brauch, MISO and RAC Member

Action

Information

Report

AGENDA 9

MRO Representatives on NERC Subgroups – Written Reports

- c. NERC System Planning Impacts from DER Working Group (SPIDERWG)
Wayne Guttormson, SPC and RAC Member

Action

Information

Report

Last SPIDERWG meeting was held on Aug 2nd and 3rd. The meeting covered the following coordination and analysis activities of the working group. Agenda package posted on SPIDERWG site. Draft minutes not available yet.

- White Paper: NERC Standards Review and DERs
 - Discuss RSTC comments
- Standards: Process Engagement & Support
- White Paper: Security Risks Posed by DER and DER Aggregator
 - Presentation of new work and joint SITES work
- White Paper: DER Aggregator
 - Discuss proposed new work from the approved white paper.
- AESO Presentation on DER Impacts
- White Paper: Distributed Battery Energy Storage
 - Discuss RSTC comments
- White Paper: DER Impacts to UVLS Programs
 - Discuss RSTC comments
- Technical Report: Beyond Positive Sequence RMS Simulations for High Penetration Conditions
 - Discuss RSTC comments
- Reliability Guideline: BPS Planning under Increasing DER
- Reliability Guideline: Merge of Previous Modelling Guidelines
- DER Study – What if I didn't model?
 - Presentation of findings from an internal NERC study.
- Work Plan Review

Next meeting is scheduled for November 1st and 2nd. Meeting is currently planned as virtual.

Areas of Focus

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

- White Paper: NERC Standards Review and DERs – for **Approval**
- White Paper: Distributed Battery Energy Storage – **Request for RSTC Reviewers**
- White Paper: DER Impacts to UVLS Programs – for **Approval**
- Technical Report: Beyond Positive Sequence RMS Simulations for High Penetration Conditions – for **Approval**

MEETING AGENDA – Reliability Advisory Council (RAC) – August 17, 2022

Accomplishments

- None submitted for this report.

Challenges

- None identified for this report.

AGENDA 9

MRO Representatives on NERC Subgroups – Written Reports

- d. NERC System Protection and Control Working Group (SPCWG)
Mark Gutzmann, Xcel Energy and RAC Member

Action

Information

Report

The NERC SPCWG conducted one virtual meeting on July 14th, 2022. The SPCWG activity has been associated with the Inter-Entity Short Circuit Model recommendations, FERC Order 881 and a Commissioning Technical Reference.

Areas of Focus

1. Inter-Entity Short Circuit Model
An SPCWG sub-team has been diligently working 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 is assembling a team to review the impacts of Order 881 with-respect-to relay loadability (PRC-023-4).
3. The SPCWG discussed the continuing question regarding a Commissioning Technical Reference or a SAR to create a Commissioning Standard.

Accomplishments

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

Challenges

None noted.

AGENDA 9

MRO Representatives on NERC Subgroups – Written Reports

- e. NERC Energy Reliability Assessment Task Force (ERATF)
Tom Whynot, Manitoba Hydro and RAC Member

Action

Information

Report

AGENDA 10

NERC Rep Assignments

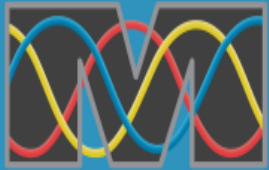
Bryan Clark, Director, Reliability Analysis, MRO

Action

Information

Report

Bryan Clark will lead this discussion during the meeting.



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MRO RAC NERC Rep Assignments

Bryan Clark, P.E.
Director of Reliability Analysis
August 17, 2022

Electric Gas Working Group (EGWG)

- **Jaimin Patel (SaskPower) – Representative**
 - Provide technical assistance in support for assessing fuel-related concerns in other NERC program areas
 - Support the development of measurements or metrics related to fuel-related risk in the BPS

Inverter-Based Resource Performance Subcommittee (IRPS)

- **David Brauch (MISO) – Representative**
 - Explore the performance characteristics of utility-scale inverter-based resources directly connected to the BPS
 - Provide recommended practices by clearly articulating performance characteristics that support BPS reliability

Energy Reliability Assessment Task Force (ERATF)

- **Thomas Whynot (Manitoba Hydro) – Representative**
 - Support industry readiness and success on Ensuring Energy Adequacy
 - Identify the levels of energy that are required to meet operational needs

System Protection Control Working Group (SPCWG)

- **Mark Gutzmann (Xcel Energy) – Representative**
 - Provide subject matter expertise on Protection System operations to the ERO Enterprise
 - Provide technical support in the development of Implementation Guidance

System Planning Impacts from Distributed Energy Resources Working Group (SPIDERWG)

- **Wayne Guttormson (SaskPower) – Representative**
 - Focus on DER from a transmission planning system analysis perspective
 - Develop recommended practices for system planning assessments of the BPS under increasing penetrations of aggregate DER



Questions

MEETING AGENDA – Reliability Advisory Council (RAC) – August 17, 2022

AGENDA 11

2022 Work Plan Update

a. Review Action Items

Dick Pursley, Reliability Advisory Council Chair

Action

Discussion

Report

Chair Pursley will lead this discussion during the meeting.

AGENDA 11

2022 Work Plan Update

b. Reliability Risk Matrix Updates

Bryan Clark, Director, Reliability Analysis, MRO

Action

Discussion

Report

Bryan Clark will lead this discussion during the meeting.

AGENDA 12

Reliability Coordinator Updates

- a. Midcontinent Independent System Operator (MISO)
Durgesh Manjure, MISO and RAC Member

Action

Information

Report

Durgesh Manjure will provide an oral report during the meeting.

AGENDA 12

Reliability Coordinator Updates

- b. Saskatchewan Power Corporation (SPC)
Binod Shrestha, SaskPower and RAC Member

Action

Information

Report

Binod Shrestha will provide an oral report during the meeting.

AGENDA 12

Reliability Coordinator Updates

- c. Southwest Power Pool (SPP)
CJ Brown, SPP and RAC Member

Action

Information

Report

CJ Brown will provide an oral report during the meeting.

AGENDA 13

Western Area Power Administration – Upper Great Plains Region Oahe Event Review

Bob Soper, Lead Electrical Engineer, WAPA – UGPR

Action

Discussion

Report

Bob Soper will lead this discussion during the meeting.

AGENDA 14

2022 MRO Regional Risk Assessment – Operational and Planning Risks

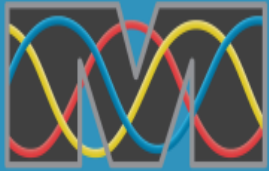
Bryan Clark, Director, Reliability Analysis, MRO

Action

Information

Report

Bryan Clark will provide an update during the meeting.



MIDWEST
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ORGANIZATION

2022 MRO Regional Risk Assessment – Operational and Planning Risks

Bryan Clark, P.E.

Director of Reliability Analysis

August 17, 2022

Reliability Risk Matrix

- A tool to provide guidance through the decision-making processes when ranking reliability risks

Reliability Risk Matrix						
Consequence/Impact (C)		Likelihood (L)				
		L1	L2	L3	L4	L5
		Very Unlikely	Unlikely	Possible	Likely	Almost Certain
C5	Severe	Medium	High	High	Extreme	Extreme
C4	Major	Medium	Medium	High	High	Extreme
C3	Moderate	Low	Medium	High	High	High
C2	Minor	Low	Low	Medium	Medium	High
C1	Negligible	Low	Low	Low	Medium	Medium

Consequence/Impact – How could a typical event due to this risk effect BPS Reliability?	
Severe (C5)	Impacts may have widespread effects to the BPS across North America.
Major (C4)	Impacts may have widespread effects to the RC area.
Moderate (C3)	Impacts may have widespread effects to portions of the RC area.
Minor (C2)	Impacts may have effects on the local entity.
Negligible (C1)	Impacts may have small or non-existent effects to the BPS.

Likelihood – What is the reasonable probability that consequences will occur?	
Almost Certain (L5)	Mandatory Controls – No NERC reliability standards in place for mitigation. Emerging Trends – Increasing trends have been identified. Event History – Documented events or widely publicized exploits have been recorded.
Likely (L4)	Mandatory Controls – No NERC reliability standards in place for mitigation. Emerging Trends – Some trends have been identified. Event History – Documented events or generally publicized exploits have been recorded.
Possible (L3)	Mandatory Controls – NERC reliability standards in place for limited mitigation. Emerging Trends – Some trends have been identified. Event History – No documented events, or moderately publicized exploits have been recorded.
Unlikely (L2)	Mandatory Controls – NERC reliability standards are in place for mitigation. Emerging Trends – Some trends have been identified. Event History – No documented events, or minimally publicized exploits have been recorded.
Very Unlikely (L1)	Mandatory Controls – NERC reliability standards are in place for mitigation. Emerging Trends – No known trends identified. Event History – No documented events or publicized exploits have been recorded.

MRO Operational and Planning Risks

Operations and Planning Risks	
1	BPS Modelling Accuracy *
2	Uncertainty of Winter Planning Reserve Margins *
3	Reactive Capability of IBRs and Reactive Resource Adequacy *
4	Inverter Based Resource Modelling and Ride Through Capabilities *
5	Misoperations Due to Errors Occurring During Commissioning *
6	Vegetation Management of 100-200 kV Circuits *
7	Cold Weather Operation of SF6 Gas Insulated Circuit Breakers *
8	Overhead Transmission Line Ratings During Cold Weather *
9	Lack of Energy Assurance Assessments - New
10	Generation Availability During Severe Cold Weather - New

MRO Reliability Risk Matrix – Operations and Planning Reliability Risk Rankings						
Consequence/ Impact (C)		Likelihood (L)				
		L1	L2	L3	L4	L5
		Very Unlikely	Unlikely	Possible	Likely	Almost Certain
C5	Severe					
C4	Major			9	2, 10	
C3	Moderate		3, 4	1		
C2	Minor			8	5, 6, 7	
C1	Negligible					



MRO 2022 Regional Risk Assessment

Top risks to the reliable and secure operation of the North American bulk power system in MRO's regional footprint.

Top Reliability Risks

Uncertainty of Winter Planning Reserve Margins

Analyses of recent system events indicate that actual system conditions can and have exceeded forecast winter reserve margins, particularly during cold weather conditions in the south central U.S.



Generation Availability During Severe Cold Weather

Generation availability assumed during cold weather in the southern U.S. has been shown to be unrealistically high due to a lack of generator winterization and natural gas curtailments.



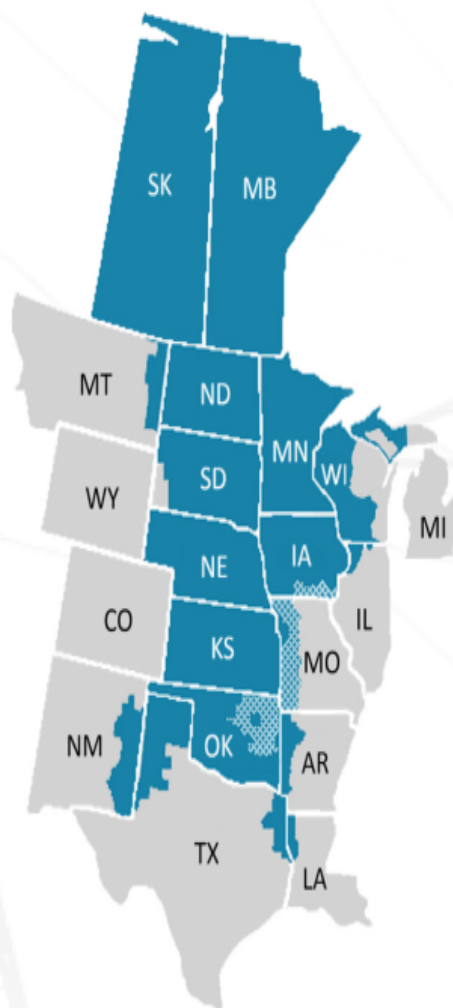
Lack of Energy Assurance Assessments

The rapidly changing resource mix requires rethinking the way in which generating capacity, energy supply, and load serving needs are studied. Energy assurance will need to be accurately assessed for all hours of the year with increasing reliance on wind and solar as a fuel source.



Bulk Power System Modeling Accuracy

The rapid increase in inverter-based resources, along with the changing characteristics and magnitude of load related to distributed energy resources (DER), is challenging current bulk power models.



Top Security Risks

Supply Chain Compromise

The risk of a cybersecurity event carried out through the vendor supply chain and possibly impacting reliability of the bulk power system remains high.



Insider Threats

The threat of an employee or a contractor using authorized access, wittingly or unwittingly, to do harm to the security of the bulk power system has increased given remote connectivity during the pandemic.



Malware and/or Ransomware

Vulnerability to a malware and/or ransomware attack on the bulk power system continues to increase with modernization and the deployment of new technologies.



More information on these risks along with mitigation recommendations can be found in the full report here: www.mro.net



Top Operational and Planning Risks

- Uncertainty of Winter Planning Reserve Margins
- Generation Availability During Severe Cold Weather
- Lack of Energy Assurance Assessments
- BPS Modeling Accuracy

Uncertainty of Winter Planning Reserve Margins

- Analysis of winter events has shown reserve margins to be consistently overstated, particularly in the south central U.S.
- Assumed generation availability has also proven to be overstated in the southern U.S. due to generator unavailability during cold weather

Generation Availability During Severe Cold Weather

- Weather Related Outages: Caused by frozen equipment, ice accumulation on wind turbine blades, ice/snow cover on solar panels, and exceedances of low temperature limits for wind turbines
- Fuel Limitations: Due to lack of fuel, fuel supply instability, low gas pressure, or less efficient alternative fuel supply
- Equipment Issues: Due to control system failures, excessive turbine vibrations, or other equipment problems

Lack of Energy Assurance Assessments

- Historically, industry ensured energy requirements solely through capacity and reserve
- The Grid Transformation is resulting in a system that has a higher level of energy uncertainty, regardless of fuel type
- The NERC Energy Reliability Assessment Task Force (ERATF) submitted two separate Standard Authorization Requests (SAR) to ensure energy assurance assessments are included in both Planning Time Horizon and Operations Planning Time Horizons

BPS Modeling Accuracy

- The current modeling practices are solely based on the vendor provided technical data and testing data, the generator performance data is not incorporated into the modeling process yet.
- Accurate base model set is only a good start of the assessment process. Reasonable scenario assumptions and sound credible contingency event selection are as important as modeling accuracy.

Other Operational and Planning Risks

- Reactive Capability of IBRs and Reactive Resource Adequacy
- Inverter Based Resource Modelling and Ride Through Capabilities
- Misoperations Due to Errors Occurring During Commissioning
- Vegetation Management of 100-200 kV Circuits
- Cold Weather Operation of SF6 Gas Insulated Circuit Breakers
- Overhead Transmission Line Ratings During Cold Weather



Questions

AGENDA 15

NERC Standards Review Forum (NSRF) Update

Gayle Nansel, Reliability Advisory Council Member

Action

Information

Report

Gayle Nansel will provide an update during the meeting.

AGENDA 16

Protective Relay Subgroup (PRS) Update

Jake Bernhagen, Senior Systems Protection Engineer, MRO

Action

Information

Report

Jake Bernhagen will provide an update during the meeting.

MEETING AGENDA – Reliability Advisory Council (RAC) – August 17, 2022

AGENDA 17

2022 Meeting Dates

Dick Pursley, Reliability Advisory Council Chair

Action

Information

Report

Chair Pursley will provide an overview during the meeting.

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

*Joint with OGOC

MRO CONFERENCE DATES 2022

Q1	RAM/CIP Conference: March 23, 2022 *virtual
Q2	Reliability Conference: May 17-18, 2022 networking reception and conference Kansas City
Q3	CMEP: July 25-26, 2022 networking reception and conference
Q4	Security Conference: October 4-5, 2022 SAC technical training and conference

MEETING AGENDA – Reliability Advisory Council (RAC) – August 17, 2022

AGENDA 18

RAC Member Roundtable
Reliability Advisory Council Members

Action

Discussion

Report

AGENDA 19

Other Business and Adjourn

Dick Pursley, Reliability Advisory Council Chair

Action

Discussion

Report

Chair Pursley will lead this discussion during the meeting.