



MIDWEST
RELIABILITY
ORGANIZATION

Meeting Agenda

Reliability Advisory Council (RAC)

Thursday, November 9, 2023

9:30 am to 3:00 pm central

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

Classification: **Public**

CLARITY
Outreach & Engagement

ASSURANCE
Oversight & Risk Management

RESULTS
Reliability Performance

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.

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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.

Classification: **Public**

MRO RELIABILITY ADVISORY COUNCIL Q4 OPEN MEETING AGENDA

Agenda Item

- 1 Call to Order and Determination of Quorum**
Dick Pursley, Reliability Advisory Council Chair
 - a. Determination of Quorum and Introductions
 - b. Robert's Rules of Order
- 2 Standards of Conduct and Antitrust Guidelines**
Bryan Clark, Director of Reliability Analysis, MRO
- 3 Chair's Remarks**
Dick Pursley, Reliability Advisory Council Chair
- 4 Consent Agenda**
Dick Pursley, Reliability Advisory Council Chair
 - a. Approve August 10, 2023 meeting minutes
 - b. RAC member recommendations to the OGOC for approval
 - c. PRS member recommendations to the OGOC for approval
 - d. MRO Representatives on NERC IRPS recommendations to the OGOC for approval
- 5 MRO Board of Directors, OGOC and General Update**
Bryan Clark, Director of Reliability Analysis, MRO
- 6 ERO Reliability Risk Priorities Report**
Bryan Clark, Director of Reliability Analysis, MRO
- 7 Reliability and Security Technical Committee (RSTC) Update**
John Stephens, Reliability Advisory Council Member and RSTC Member
- 8 MRO Representatives on NERC Subgroups – Written Reports**
Bryan Clark, Director of Reliability Analysis, MRO
 - a. NERC Electric Gas Working Group (EGWG) – *Jaimin Patel*
 - b. NERC Inverter-Based Resource Performance Subcommittee (IRPS) – *Open*
 - c. NERC System Planning Impacts from DER Working Group (SPIDERWG) – *Wayne Guttormson*
 - d. NERC System Protection and Control Working Group (SPCWG) – *Lynn Schroeder*
 - e. NERC Energy Reliability Assessment Working Group (ERAWG) – *Tom Whynot*

Break – 10:30 a.m.

- 9 2023 Work Plan Update**
Dick Pursley, Reliability Advisory Council Chair
 - a. Review Action Items
 - b. Cold Weather Preparedness Workshop Debrief
 - c. Draft 2024 Work Plan
- 10 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.

- 11 Assessment Review**
 - a. Review 2023 Long-Term Reliability Assessment (LTRA)

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Salva Andiappan, Principal Reliability Assessment Engineer, MRO

b. MRO Regional Winter Assessment (RWA)

Salva Andiappan, Principal Reliability Assessment Engineer, MRO

12 NERC Standards Review Forum (NSRF) Update

Gayle Nansel, Reliability Advisory Council Vice Chair

13 Protective Relay Subgroup (PRS) Update

Jake Bernhagen, Manager of Reliability Performance, MRO

14 2024 Meeting Dates

Dick Pursley, Reliability Advisory Council Chair

15 RAC Member Roundtable

Reliability Advisory Council Members

16 Other Business and Adjourn

Dick Pursley, Reliability Advisory Council Chair

Classification: Public

AGENDA

Call to Order and Determination of Quorum

a. Determination of Quorum

Dick Pursley, Reliability Advisory Council Chair

Name	Role	Company	Term
Andy Witmeier	Member	MISO	12/31/24
Binod Shrestha	Member	Saskatchewan Power Corporation	12/31/25
Bryn Wilson	Member	Oklahoma Gas & Electric	12/31/23
CJ Brown	Member	Southwest Power Pool	12/31/24
Dallas Rowley	Member	Oklahoma Gas & Electric	12/31/25
Derek Brown	Member	Eergy	12/31/23
Dick Pursley	Chair	Great River Energy	12/31/25
Durgesh Manjure	Member	MISO	12/31/23
Gayle Nansel	Vice Chair	Western Area Power Administration	12/31/25
Jason Weiers	Member	Otter Tail Power Company	12/31/24
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	12/31/25
Ron Gunderson	Member	Nebraska Public Power District	12/31/23
Open			12/31/24

Classification: Public

AGENDA

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.

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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.

Notes on Motions

Seconds. A Motion must have a second to ensure that at least two members wish to discuss the issue. The “seconder” 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.

Classification: **Public**

MEETING AGENDA – Reliability Advisory Council (RAC) – November 09, 2023

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

Classification: **Public**

AGENDA

Standards of Conduct and Antitrust Guidelines *Bryan Clark, Director of 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.

Classification: Public

AGENDA

Chair's Remarks

Dick Pursley, Reliability Advisory Council Chair

Action

Information

Report

Chair Pursley will lead this discussion during the meeting.

Classification: **Public**

AGENDA

Consent Agenda

- a. Approve August 10, 2023 meeting minutes
- b. RAC member recommendations to the OGOC for approval
- c. PRS member recommendations to the OGOC for approval
- d. MRO Representatives on NERC IRPS recommendations to the OGOC for approval

Dick Pursley, Reliability Advisory Council Chair

Action

Discussion

Report

Chair Pursley will lead this discussion during the meeting.

Classification: **Public**



Draft Minutes of the Reliability Advisory Council Meeting

Hybrid: St. Paul, MN and Webex

Thursday, August 10, 2023, 8:02 a.m. to 2:03 p.m. Central

Notice for this meeting was electronically posted to the [MRO website](#) on July 12, 2023.

A final agenda, including advanced reading materials, was also posted on August 3, 2023.

1. Call to Order and Determination of Quorum

The Reliability Advisory Council (RAC) Vice Chair, Gayle Nansel, called the meeting to order at 8:02 a.m. Nansel welcomed everyone and introductions were made. Reliability Analysis Administrator, Rebecca Schneider, advised the vice 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 and Antitrust Guidelines.

3. Vice Chair's Remarks

Vice Chair Nansel noted the open seat on the RAC with a term ending 12/31/2024 as well as the five members whose terms will expire at the end of 2023. She also noted the open seat on the NERC Inverter-Based Resource Performance Subcommittee (IRPS). Nansel mentioned the upcoming Organizational Group Oversight Committee (OGOC) meeting on September 13, 2023, where the Risk Roundtable Energy Reliability Planning Discussion will be continued from the June meeting. She also highlighted the upcoming NERC Geomagnetic Disturbance (GMD) Workshop on August 15-16, 2023, and the NERC Misoperation Workshop on October 25-26, 2023. Discussion ensued.

4. Consent Agenda

The RAC reviewed the consent agenda, which included draft minutes from the May 18, 2023 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 a recap of the second quarter OGOC meeting on June 14, 2023, which included the Energy Reliability Planning Risk Discussion. Clark also noted that the OGOC approved the recommended changes to the RAC and Protective Relay Subgroup (PRS) charters. He highlighted the third quarter OGOC Meeting Risk Roundtable on September 13, 2023. The topic is a continuation of the Energy Reliability Planning Discussion from last quarter. Clark highlighted items from the June meeting, including fuel supply and increased membership among entities that control fuel supply in Regional Transmission Organizations (RTO's), demand-side management of load, and lacking technology to ensure power grid reliability and meet the carbon-free legislation. Future meeting dates for the OGOC and Board for the remainder of the year were shared. Discussion ensued.



6. 2023 Reliability Conference Feedback

MRO Manager of Outreach and Stakeholder Engagement, Cris Zimmerman, shared survey results from the 2023 Annual Reliability Conference. The survey feedback was generally positive with an overall average score of 4.31, and the event was considered successful. A few areas of improvement were identified, such as the relevance of the material provided in relation to the attendees job function. The Outreach Department will work to improve on next year's conference, including more interaction or breakout sessions and making the presentatons available prior to the conference. Discussion ensued.

7. Advisory Council Work Plans

Security Advisory Council (SAC)

SAC Chair, Ian Anderson, and MRO Director of Security, Steen Fjalstad, provided an overview of the MRO Security Department and SAC Work Plan. Anderson highlighted the SAC and Security Advisory Council Threat Forum (SACTF) 2023 accomplishments, such as the SACTF Weekly Threat Call, the Regional Security Risk Assessment (RSRA) survey working session, and the 10th Annual MRO Security Conference in Oklahoma City on September 26-28, 2023. The SAC is also hosting a webinar on IT/OT Convergence on August 29, 2023.

Compliance Monitoring and Enforcement Program Advisory Council (CMEPAC)

MRO Director of Compliance Monitoring, Bill Steiner, provided an overview of the CMEP Advisory Council Work Plan. Steiner highlighted CMEPAC Outreach efforts, including the CMEP Conference held on July 26, 2023, in addition to monthly calls, newsletters and webinars. The CMEPAC also supports of the NERC Standards Review Forum (NSRF). Steiner noted several ongoing initiatives for the advisory council as well as some of its achievements, notably a very well-attended conference.

8. Technical Presentation

Xcel Energy Consulting Engineer, Kevin Jones, gave a technical presentation to the RAC on the topic of a 115kV fault disturbance. The featured event occurred on October 28, 2020 during Winter Storm Billy between the Blanco and Floyd County Substations. Jones shared one-line diagrams of the affected system, followed by an event summary, conclusions and recommendations. Discussion ensued.

9. Reliability and Security Technical Committee Meeting Update

Reliability Advisory Council and RSTC member, John Stephens, provided a recap of the Reliability and Security Technical Committee (RSTC) meeting on June 21-22, 2023. Stephens noted the RSTC News Bulletin distributed by NERC on August 4, 2023. The bulletin is a monthly newsletter that will keep industry informed of the RSTC's ongoing efforts and provide a brief summary of RSTC activities from the last meeting. Stephens highlighted the Standard Authorization Request (SAR) approved at the June meeting for MOD-31, relating to data collection on Distributed Energy Resources (DERs). Stephens also noted that the Energy Reliability Assessment Task Force (ERATF) has been upgraded to the Energy Reliability Assessment Working Group (ERAWG). Additionally, the Board of Trustees will meet next week to approve and issue the biennial RISC Priority Report. Stephens mentioned the upcoming NERC GMD Workshop and NERC Misoperation Workshop. The next RSTC hybrid meeting will be in September 20-21, 2023. Discussion ensued.



10. MRO Representatives on NERC Subgroups

NERC Electric Gas Working Group (EGWG) – Jaimin Patel

Patel provided a written report located in the agenda packet. Discussion ensued.

NERC Inverter-Based Resource Performance Subcommittee (IRPS) – Open

This seat is currently open and no written report was provided.

NERC System Planning Impacts from DER Working Group (SPIDERWG) – Wayne Guttormson

Guttormson provided a written report located in the agenda packet. Discussion ensued.

NERC System Protection and Control Working Group (SPCWG) – Lynn Schroeder

Schroeder provided an overview of the written report located in the agenda packet. She noted that the SPCWG continues to discuss FERC Order 881 and Ambient Adjusted Ratings (AARs) related to the PRC-023 loadability standard. Schroeder also mentioned the PRC-024 IBR White Paper draft is complete and ready for review at the next meeting, which is later today. SPIDERWG submitted a SAR on PRC-006 that the SPCWG will also be discussing. Discussion ensued.

NERC Energy Reliability Assessment Working Group (ERAWG) – Tom Whynot

Whynot provided a written report located in the agenda packet. Discussion ensued.

11. 2023 Work Plan Update

Action Item Review

Vice Chair Nansel reviewed the action items in the 2023 work plan. Updates were made accordingly. Discussion ensued.

12. Reliability Coordinator Updates

Midcontinent Independent System Operator (MISO)

RAC member, Durgesh Manjure, reported that temperatures across the footprint have been average this summer with a few extreme weeks in June and July, where emergency alerts were issued. MISO issued maximum generation alerts on July 27-28, 2023. Year-to-date, MISO's peak load was 120 gigawatts in July. Year-to date, the north central region peaked at 26 gigawatts, and the central region peaked at 62 gigawatts. Last week, the south region reached a new peak load of over 34 gigawatts. Solar is still incipient at MISO but did reach a new peak of 3,000 megawatts on June 20. Manjure noted that prices are trending downwards to more historical averages, and real-time Locational Marginal Price (LMP) is also lower.

Manjure explained that the situation in the south region was caused by high heat in the south and low wind in the north central region. Additionally, MISO lost 1,100 megawatts of generation in the north creating congestion challenges. MISO does not have enough solar to compensate for lack of wind in high heat conditions. Discussion ensued.

Saskatchewan Power Corporation (SPC)

RAC member, Binod Shrestha, reported that summer temperatures have been hotter resulting in a higher summer load. SaskPower set a new record summer peak load of 3,670 megawatts (100 megawatts higher than last summer). There was a forced outage at a large coal plant causing energy



issues with operating reserves in June, July and August. SaskPower has declared six Energy Emergency Alert 3's (EEA) this summer. Temperatures have cooled down, and load is expected to be normal (~2,800-2,900 megawatts). Winter peak load is forecasted to be 3,900 megawatts in December or January. SaskPower is not expecting any issues with operating reserves or energy adequacy during the winter months. Discussion ensued.

Southwest Power Pool (SPP)

RAC member, C.J. Brown, reported that SPP has issued many alerts due to the heat in the south. The highest loads occurred in late July. Net load days are the most challenging for SPP at or above the 45,000 megawatt level. The uncertainty response team has been working non-stop for months. SPP has seen some large load increases and set a new record peak load on July 28, 2023. Additionally, SPP is currently in a resource alert this week. Brown shared a slide illustrating the challenges of variable energy and why fuel diversity matters. Solar is not a large part of SPP's fleet yet, and wind generation is unpredictable. Discussion ensued.

13. Planning Coordinator Updates

Southwest Power Pool (SPP)

Joshua Pilgrim, Senior Engineer 2, provided an update on SPP's planning coordination activities. He discussed the Integrated Transmission Planning (ITP) process which covers reliability and economic upgrades annually. He highlighted the Transmission Services Team who studies the upgrades and projects for load additions within the footprint. Pilgrim gave a brief overview of the Generation Interconnection (GI) Process. He outlined the ITP 20 Year Assessment, which is done on a five-year planning cycle and focuses on high-voltage projects. The ITP 20 is strictly an economic study which helps inform the decisions made in other studies. Pilgrim also shared SPP's 2023 Notice to Construct (NTC) Summary. Discussion ensued.

Midcontinent Independent System Operator (MISO)

RAC member, Andy Witmeier, provided an update on MISO's system planning. Witmeier discussed the industry transformation affecting the planning process which includes fleet changes, fuel assurance, extreme weather and electrification. Witmeier shared the common MISO Transmission Expansion Plan (MTEP) project categories and noted that MTEP23 will be MISO's largest portfolio outside of a Multi-Value Project (MVP) due to large baseline reliability projects. Several ongoing projects were highlighted including MISO's Long Range Transmission Plan (LRTP) and the SPP-MISO Joint Targeted Interconnection Queue (JTIQ) Study. Witmeier shared the progress of LRTP Tranche 2 and a snapshot of MISO's Future 2A. A significant amount of new transmission is anticipated. Witmeier also provided a status update of MISO's Interconnection Queue, noting approved projects awaiting construction. Discussion ensued.

14. MRO Regional Risk Assessment (RRA)

MRO Principal Technical Advisor, Mark Tiemeier, lead a discussion on the 2023 Regional Risk Assessment (RRA). Tiemeier outlined the RRA process and methodology and shared the dates for the upcoming Risk Information Sessions and Risk Ranking Workshop in October 2023. Tiemeier highlighted the top seven risks that have been identified for 2024 and solicited feedback from the RAC members. Discussion ensued.



15. NERC Standards Review Forum Update

Vice Chair Nansel provided an update on behalf of the NERC Standards Review Forum (NSRF). Nansel will continue to follow the NSRF meetings and distribute relevant items to the RAC, as needed.

16. Protective Relay Subgroup Update

MRO Manager of Reliability Performance, Jake Bernhagen, provided an update on behalf of the Protective Relay Subgroup (PRS). Bernhagen highlighted items from the second quarter meeting on June 27, 2023, including a Commissioning Lessons Learned presentation by Xcel Energy and a Relay Automation Demonstration by Minnkota Power Cooperative. Bernhagen shared highlights from the upcoming third quarter meeting in September, notably technical presentations from Quanta Technology, LLC and Western Area Power Administration (WAPA). Bernhagen also noted the NERC Misoperation Workshop scheduled for October 25-26, 2023 in Atlanta, Georgia. Bernhagen would like to encourage further collaboration between the PRS and the other regions' relay subgroups within the ERO Enterprise.

17. 2023 Meeting Dates

Vice Chair Nansel reviewed the 2023 meeting dates for the RAC, as well as the other councils and subgroups. Clark reviewed the draft 2024 meeting dates for the RAC, as well as the other councils and subgroups. Clark noted that the first quarter RAC meeting may be virtual. He mentioned that MRO would like to promote more in-person attendance at council meetings and may alter the language used in the outreach materials, replacing the word "hybrid". Clark reminded the RAC members of MRO's reimbursement policy for travel expenses. He commented on collaboration week for 2024 and solicited feedback from the council members. Discussion ensued,

18. RAC Member Roundtable

Vice Chair Nansel invited member participants to share other relevant industry observations. No roundtable topics were shared.

19. Other Business and Adjourn

Having no further business to discuss, the meeting was adjourned at 2:03 p.m.

Prepared by: Rebecca Schneider, Reliability Analysis Administrator.

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



Exhibit A – Meeting Attendees

Reliability Advisory Council Members Present	
Name	Organization
Gayle Nansel, Vice Chair	Western Area Power Administration
Andy Witmeier	MISO
Binod Shrestha	Saskatchewan Power Corporation
Bryn Wilson	Oklahoma Gas & Electric
C.J. Brown	Southwest Power Pool
Dallas Rowley	Oklahoma Gas & Electric
Derek Brown	Evergy
Durgesh Manjure	MISO
Jason Weiers	Otter Tail Power Company
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 of Reliability Analysis
Rebecca Schneider	Reliability Analysis Administrator
Shawn Keller	Outreach Coordinator
Cris Zimmerman	Manager of Outreach and Stakeholder Engagement
Mark Tiemeier	Principal Technical Advisor
Salva Andiappan	Principal Reliability Assessment Engineer
Jake Bernhagen	Manager of Reliability Performance
Lisa Stellmaker	Executive Administrator



Carolina Margaria	Assistant Corporate Secretary and Governance Administrator
Steen Fjalstad	Director of Security
Margaret Eastman	Security Administrator
Bill Steiner	Director of Compliance Monitoring
Michelle Olson	Compliance Monitoring Administrator
Mark Flanary	Director of Risk and Mitigation
Tasha Ward	Director of Enforcement and External Affairs
Max Desruisseaux	Senior Power Systems Engineer
Eric Graftaas	Principal Power Systems Engineer
Other Attendees	
Name	Organization
Jaimin Patel	Saskatchewan Power Corporation
Lynn Schroeder	Sunflower Electric Power Corporation
Kevin W. Jones	Xcel Energy
Joshua Pilgrim	Southwest Power Pool
Ian Anderson	Oklahoma Gas & Electric
Angela Wheat	Southwestern Power Administration
Eric Hammes	Dairyland Power Cooperative
Larry Brusseau	Corn Belt Power Cooperative
Mark Eastwood	City Utilities of Springfield Missouri
John Roemen	Western Area Power Administration
Paul Mehlhaff	Sunflower Electric Power Corporation
Vic Howell	WECC

AGENDA

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

Action

Information

Report

Bryan Clark will lead this discussion during the meeting.

Classification: Public



MIDWEST
RELIABILITY
ORGANIZATION

OGOC and BOD Update

Bryan Clark, P.E.
Director of Reliability Analysis
November 9, 2023

CLARITY

ASSURANCE

RESULTS

OGOC Q3 Meeting Summary

- **Energy Reliability Planning Risk Discussion**
 - ERO Enterprise State Initiative
- **Policy and Procedure 3 Changes**
 - MRO Sponsored Rep Term Limits
 - Membership Language Around Diversity



December OGOC Meeting

- **Q4 OGOC Strategy Meeting - Closed**
 - December 13, 2023, RAC Chair and Vice Chair
 - 2023 Accomplishments
 - 2024 Draft Work Plan
 - Review 2024 RRA



Future Meeting Dates

- **Q4 OGOC Strategy Session**
 - December 13, 2023
- **Q4 BOD Meeting**
 - December 14, 2023
- **Q1 BOD Meeting**
 - February 8, 2024 (Virtual)
- **Q1 OGOC Meeting**
 - March 6, 2024 (Virtual)





Questions

AGENDA

ERO Reliability Risk Priorities Report *Bryan Clark, Director of Reliability Analysis, MRO*

Action

Information

Report

Bryan Clark will lead this discussion during the meeting.

Classification: **Public**

AGENDA

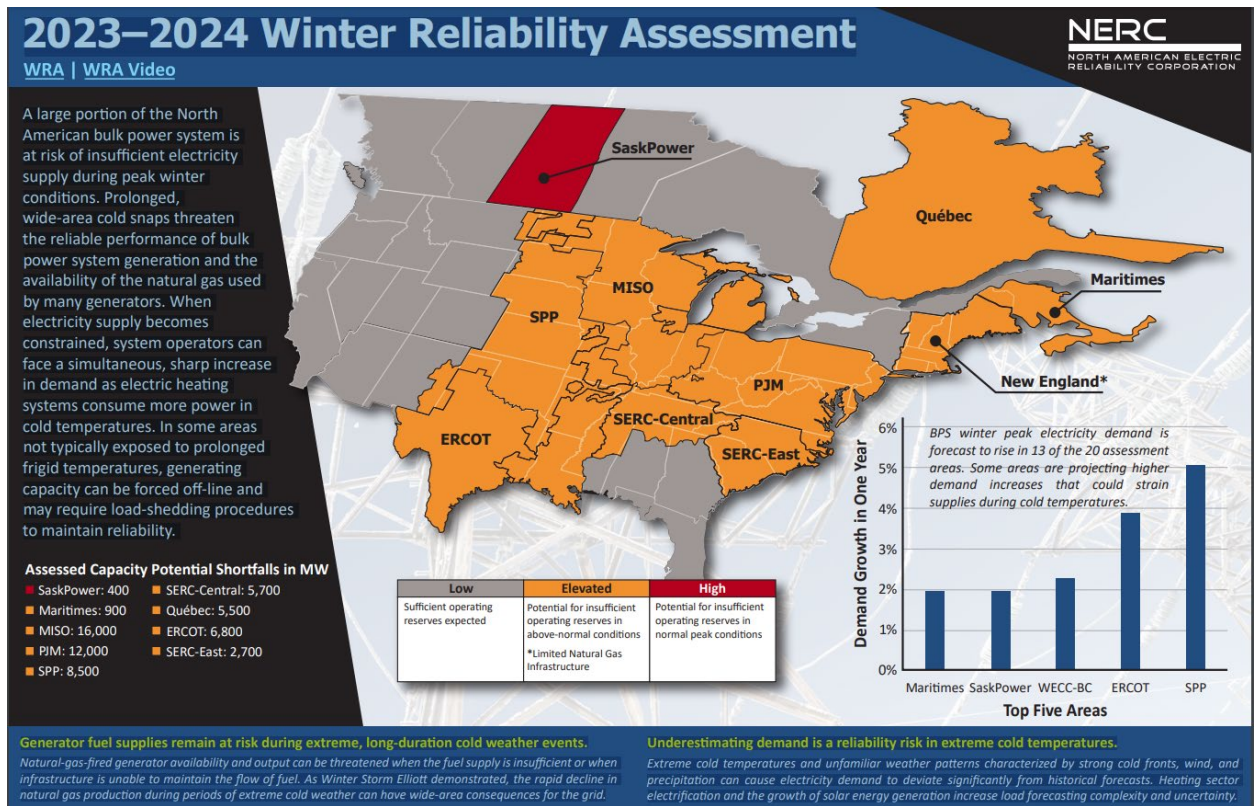
Reliability and Security Technical Committee (RSTC) Update John Stephens, Reliability Advisory Council and RSTC Member

Action
Information

Report

The Reliability and Security Technical Committee (RSTC) at NERC is charged with identifying, studying, and addressing threats to adequately planning, operating, and securing the Bulk Power System. The RSTC advises the NERC Board of Trustees on their on-going work plan, and progress on key initiatives.

- [Storm Elliott Inquiry](#) published on November 7
- [2023-24 Winter Reliability Assessment](#) has been released.



- Highlights from the September 20-21 RSTC meeting
 - Standard Authorization Requests (SAR)
 - SPIDERWG SAR Endorsed for modifications to EOP-004— **COMPLETE**
 - Transmission Planning Energy Scenario SAR – Response to Order 896 - **INFORMATION**
 - Reliability Guidelines

MEETING AGENDA – Reliability Advisory Council (RAC) – November 09, 2023

- Approved RS Reliability Guideline: Primary Frequency Control Guideline - **COMPLETE**
- Approved EGWG Reliability Guideline: Fuel Assurance and Fuel-Related Reliability Risk Analysis for the BPS – **COMPLETE**
- Approved for Posting: SCWG Product Security Sourcing Guide - **COMPLETE**
- Other Actions
 - Approved IRPS Whitepaper on Grid Forming Functional Specifications for BPS-Connected Batteries - **COMPLETE**
 - Approved SITES Whitepaper on BES Operations in the Cloud – **COMPLETED following Meeting.**
 - Approved SPIDERWG White Paper on Privacy and Security Impacts of DER and DER Aggregators - **COMPLETE**
 - Received an update regarding proposed registration requirements for Inverter-Based Resources – **INFORMATION**
 - Update from NERC Staff regarding Interregional Transfer Capability Study - **INFORMATION**
 - Reviewed 2023 Risk Priorities Report – **INFORMATION**
 - Reviewed IBR Event Report Southwest Utah Disturbance - **INFORMATION**
- Next Meeting is scheduled for December 6-7, 2023 – Virtual.

Classification: **Public**

AGENDA

MRO Representatives on NERC Subgroups – Written Reports

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

Action

Information

Report

Since the last RAC meeting, the EGWG had a joint meeting with ERAWG on October 24, 2023, at NERC DC office. The meeting agenda is posted on the [NERC website](#).

Following is a summary of EGWG activity.

Areas of Focus

- **Briefing on Joint FERC/NERC Elliott Inquiry Report**
 - A presentation on December 2022 winter storm Elliott was included in the meeting.
 - Key findings such as freezing, fuel and load forecast issues were discussed.
 - Eleven recommendations are categorized in four improvement areas such as generator cold weather reliability, natural gas infrastructure cold weather reliability, gas-electric coordination cold weather reliability and electric grid operations cold weather reliability.
 - The final report would be released in about a month.
 - This presentation is available on [FERC website](#).
- **Reliability Guideline Update**
 - NERC RSTC approved posting of reliability guideline for a 45-day industry comment period ending on November 6, 2023.
 - The reliability guideline will be sent to RSTC for final approval in the December meeting.
- **NAESB Gas-Electric Harmonization Recommendations**
 - Refer to below link to follow this forum activities/updates and voting results on recommendation.
[NAESB Gas-Electric Harmonization Forum](#)
- **EGWG Work Plan**
 - EGWG work plan comprises of mainly working on cold weather report recommendation 6 to address RISC/cold weather report and support study for reviewing fuel availability for regional flexible resources to support system variability.

Accomplishments

- None identified for this report.

Challenges

- None identified for this report.

Classification: Public

AGENDA

MRO Representatives on NERC Subgroups – Written Reports

- b. NERC Inverter-Based Resource Performance Subcommittee (IRPS)

Open

Action

Information

Report

Classification: **Public**

AGENDA

MRO Representatives on NERC Subgroups – Written Reports

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

Action

Information

Report

The last SPIDERWG meeting was held on October 24th and 25th. The meeting was a hybrid meeting with in-person and virtual attendees and covered the following working group coordination and analysis sub-group activities.

- Agenda packages and minutes are posted on SPIDERWG site ([System Planning Impacts from DER Working Group \(SPIDERWG\) \(nerc.com\)](#)).
- SPIDERWG workplan posted at [Report \(nerc.com\)](#)
- RTSC strategic plan posted at [Report \(nerc.com\)](#)
- RSTC workplan posted at <https://www.nerc.com/comm/RSTC/Documents/RSTC-Work-Plan.xlsx>
- RSTC Newsletter [RSTC September Meetings Newsletter \(nerc.com\)](#)

General Activities:

- Status updates, administrative materials, and RSTC outcomes.
- Workplan Review

Coordination Sub-Group Activities:

- Standards Committee Engagement
 - o Engagement with ongoing Standards Projects from SARs that originated from SPIDERWG work:
 - Project 2022-02 for TPL-001 and MOD-032 SAR revisions.
 - Project 2023-05 for FAC-001 and FAC-002 SAR revisions.
 - Project 2023-08 for MOD-031 SAR revisions.
- White Paper Update: Communication and Coordination Strategies for Transmission Entities and Distribution Entities regarding DERs.
 - o Finalized for submission to the RSTC
- White Paper Update: Variability, Uncertainty, and Data Collection for the BPS with DER Aggregators
- Proposed SAR Revisions Update:
 - EOP-004 – Under review
 - EOP-005 – Finalized for submission to the RSTC
 - Collaborating with NERC RTOS
 - PRC-006 – Under Review
 - Collaborating with NERC SPCWG
- o Work on lower priority proposed SAR's continuing:
 - BAL-003

Analysis Sub-Group Activities:

- Guideline Review Update: BPS Planning Practices under Increasing Penetrations of DER
- White Paper Review: Modeling of DER Aggregator and DERMS Functional Impacts
- Review of proposed guidelines:

Classification: Public

MEETING AGENDA – Reliability Advisory Council (RAC) – November 09, 2023

- DER forecasting practices and relationship to BPS studies,
- detection of aggregate DER response during grid disturbances, and
- aggregate DER response for emergency operations and cold weather.

Next meeting:

- Schedule for 2024 to be confirmed.

Areas of Focus

Following workplan deliverables are being submitted for RSTC action at the December 2023 meeting.

- SAR to revise EOP-005 (System Restoration from Blackstart Resources) – request for **Endorsement**.
- SAR to revise PRC-006 (Automatic Underfrequency Load Shedding) – request for **Review**, and **Authorization to post** for 45-day comment period starting the first business day of 2024 or for a 60-day comment period.
 - SPIDERWG plans to collaborate with SPCWG to resolve comments.
- White Paper: Communication and Coordination Strategies for Transmission Entities and Distribution Entities regarding DERs – Request for **Review**

Accomplishments

- Whitepaper: Security Risks Posed by DER and DER Aggregators – **Approved**

Challenges

- Nothing to report at this time.

Classification: **Public**

AGENDA

MRO Representatives on NERC Subgroups – Written Reports

- d. NERC System Protection and Control Working Group (SPCWG)
Lynn Schroeder, Sunflower Electric Power Corporation

Action

Information

Report

Areas of Focus (Limit to 3-5 points)

1. Position paper related to FERC order 881 and PRC-023 previously endorsed by the RSTC was discussed. Consensus was made to post for industry. As part of the paper, the SPCWG recommends reviewing loadability for all protection systems that fall under order 881 to ensure sufficient margin above normal and emergency AARs.
2. PRC024 IBR Whitepaper is being finalized to move onto the RSTC for approval. This paper discusses and provides an example of how an IBR plant, such as a wind farm, can show compliance considering the voltage that would be seen at each individual turbine control throughout the feeders of the plant.
3. Technical Reference related to maintenance for ethernet based P&C is being developed to provide industry guidance for impacts of systems such as 61850 architectures on NERC Protection System definition and related standards. The outline is complete and writing assignments have been made.
4. PRC006 SAR comments from the SPCWG were provided to SPIDERWG who plans to move this SAR to the RSTC for approval in December.
5. SPCWG will be asking the RSTC to add to the SPCWG workplan a whitepaper on footnote 13 of TPL001. This is intended to be provided to the standard drafting team.

Accomplishments (Limit to 3-5 points)

- 881/881A position paper to be posted for industry.
- PRC024 IBR Whitepaper draft completed.
- “Determination of Practical Transmission Relaying Loadability Settings” IG ready for RSTC approval.

Challenges

1. Increased IBR across the grid and their impacts to system protection, such as modeling and injection characteristics during fault conditions.

Future meeting schedule

Next meeting will be a WebEx on December 14, 2023. Two face-to-face meetings are planned in 2024, possibility of one in Atlanta in April (Georgia Tech Protective Relay Conference) and one in Salt Lake City in September (WECC).

Classification: **Public**

AGENDA

MRO Representatives on NERC Subgroups – Written Reports

- e. NERC Energy Reliability Assessment Working Group (ERAWG)
Tom Whynot, Manitoba Hydro

Action

Information

Report

In a Joint ERAWG and EGWG Meeting held 10/24/2023

Mike Knowland and David Mulcahy provided an update on Volume 2 of the Whitepaper. Volume 2 will expand on Energy Assessments for Operations and for Long-term planning. There is a SAR submitted, titled: “Energy Assessments with Energy-Constrained Resources in the Operations and Operations Planning Time Horizons. “

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

The Standard to be drafted alongside revisions to the Transmission planning energy scenarios TPL-001, TOP-002, EOP-011, and MOD-032-1 SAR “Data for Power System Modeling and Analysis” as Distributed Energy Resources continue to penetrate the system, an approved benchmark for modeling their effects is required.

Energy Assessments information to be covered in Volume 2 of the whitepaper are:

Responsibility for ERA’s

- Draft, (subject to change) the ERA’s responsibility will be the Balancing Authority’s to perform the assessment, with the RC to approve its methods, review the Operating Plan, request results, and communicate it to other BA’s should it forecast EEA.
- Draft, (subject to change) documentation of the process (modelling criteria) is annual in frequency.
- Draft, (subject to change) Operating Plans to be reviewed annually. 6 default scenarios to provide an OP for, BA’s can develop their own based on their regional characteristics.
- Draft, (subject to change) Performing the Operating Plan Energy Reliability Assessment (OPERA) is weekly in frequency.

Initial conditions to set for an ERA

- Starting with a base case, include difference scenarios, (hotter, cooler weather, adding different scenarios, contingency evaluation, discussion of probabilistic scenarios.

Classification: Public

MEETING AGENDA – Reliability Advisory Council (RAC) – November 09, 2023

ERA Deliverables

- Conversion of the aggregate data into MWh and MW for a region and if that meets the region's peak MW demand and MWh required duration.

Characteristics of Fuel:

- Proximity to fuel sources, resupply time, Considerations for transport, obstacles sea or land, (poor weather).
- Competing demand: Oil, Fuel oil for heating, Diesel Fuel, Gen Fuel
- Gas-Electric interdependencies
- Distributed energy resource (DER) events
- Capability for dual fuel
- Measuring these factors in an ERA (Energy Reliability Assessment)

Behavior of Fuel Supply:

- Focus on Natural Gas, Factoring in basic fundamentals of gas pipeline operation and scheduling, competing demand, (heating vs commercial use). Considerations for modeling constraints, disruptions, and the compressibility of natural gas.

Behavior of Energy Demand:

- Factor demand response rate (Ramp), time of use rates, Distributed Generation
- Mitigation of demand via demand response programs and their impact on energy usage. Peaks could be “shaved/lowered” but total energy requirement could exist, air conditioning would need more energy later to “catch up.”

Energy Storage:

- Short duration, daily-cycle, and long-duration. 4–8-hour storage (pumped storage).
- Longer duration, usually fuel based, (LNG or fuel oil)
- Considerations for co-location storage with solar or wind.
- ERA's must show when storage needs to be charged.
- Frequency regulation will be a factored consideration.

Mike Knowland, the chair for the working group, is seeking a co-chair for the Energy Reliability Assurance Working Group.

The next ERAWG meeting is Hybrid on December 14, 2023, early draft of the White Paper Volume 2 is expected to be available for comment.

Classification: Public

AGENDA

2023 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.

Classification: **Public**



MIDWEST
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ORGANIZATION

2023 Reliability Advisory Council Work Plan

Bryan Clark, P.E.
Director of Reliability Analysis
November 9, 2023

CLARITY

ASSURANCE

RESULTS

#1 Conduct Outreach and Awareness

- Conduct a minimum of 2 webinars/outreach in 2023 to increase reliability and decrease risk to the reliable and secure operations of the bulk power system.
 - LTRA Webinar, January 26th
 - Annual Reliability Conference, May 17th
 - Cold Weather Preparedness Workshop, October 26th
 - Multiple Newsletter Articles



#2 Provide Reliability Standard Reviews

- Periodically attend NSRF meetings
 - *Energy Reliability Planning*
 - *Generation Unavailability During Extreme Cold Weather*



#3 Review Significant Events or Disturbances on the BES

- Review of an entity event at the Q3 Meeting
 - *Misoperations Due to Human Errors*
 - *Overhead Transmission Line Ratings*
 - *Q3 Meeting Southwestern Public Service (SPS) Event Review*



#4 Development of the MRO Regional Risk Assessment

- Quarterly Risk Discussions
- Two resources provided from the RAC to support the Annual Risk Ranking exercise
 - *All MRO Reliability Risks*

– *Risk Ranking workshop held on October 23, 2023*



#5 Support Regional Representation on NERC Organizational Groups

- Five different NERC groups with a representative
 - System Planning Impacts from Distributed Energy Resources Working Group (SPIDERWG)
 - Inverter Based Resource Performance Subcommittee (IRPS)
 - Energy Reliability Assessment Working Group (ERAWG)
 - Electric Gas Working Group (EGWG)
 - System Protection and Control Working Group (SPCWG)



#6 Review the Summary of Misoperations across the MRO Region

- Accomplished through the Protective Relay Subgroup (PRS)
 - *Misoperations Due to Human Errors*
 - *First full year of closed sessions during quarterly meetings to review regional misoperations*



2024 Work Plan

- **Ideas**
- **Additional Items**
- **Edits**





Questions

AGENDA

2023 Work Plan Update

- b. Cold Weather Workshop Debrief
Bryan Clark, Director of Reliability Analysis

Action

Discussion

Report

Bryan Clark will lead this discussion during the meeting.

Classification: **Public**

AGENDA

2023 Work Plan Update

c. Draft 2024 Work Plan

Dick Pursley, Reliability Advisory Council Chair

Action

Discussion

Report

Chair Pursley will lead this discussion during the meeting.

Classification: Public

AGENDA

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.

Classification: **Public**

AGENDA

Reliability Coordinator Updates

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

Action

Information

Report

Binod Shrestha will provide an oral report during the meeting.

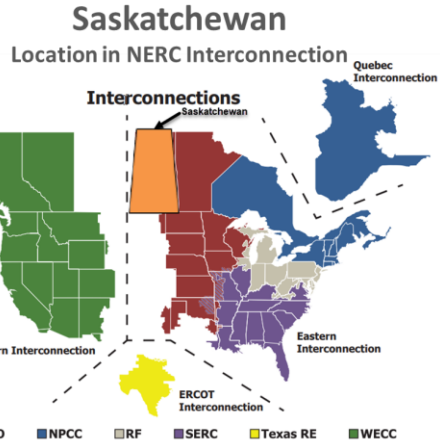
Classification: **Public**

SASKPOWER UPDATE

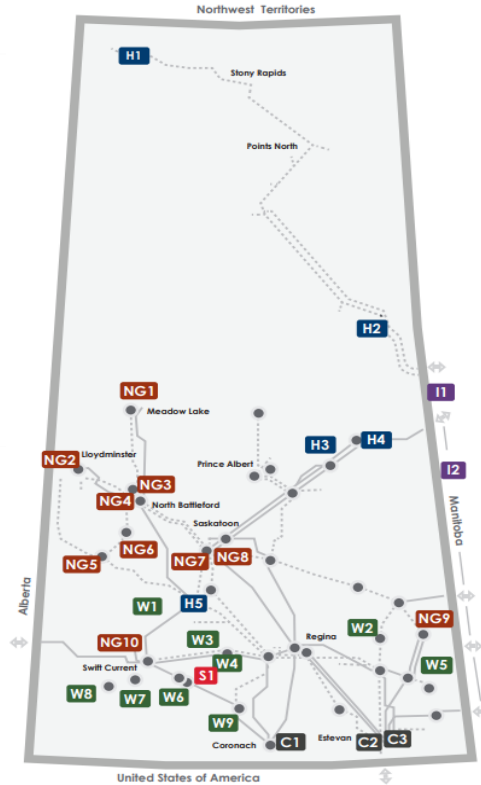
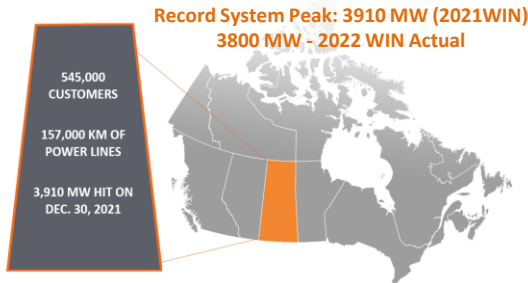
MRO RAC MEETING

Nov 9, 2023

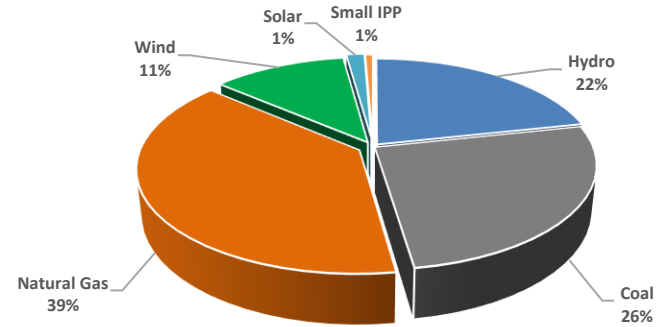
Existing System



SASKATCHEWAN'S PRIMARY ELECTRICITY SUPPLIER



Existing Generation – Installed Capacity (%)



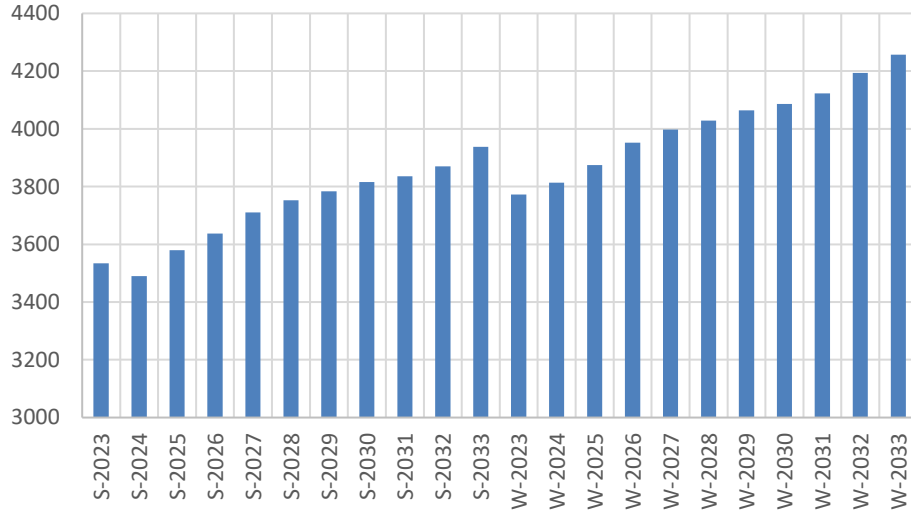
MW

7	3	10	9	3	Other Small	Other Import	Total
Hydro Facilities	Coal Facilities	Natural Gas Facilities	Wind Facilities	Solar Facility			
864	1389	2160	617	83	34	290	5437

Load and Generation Outlook

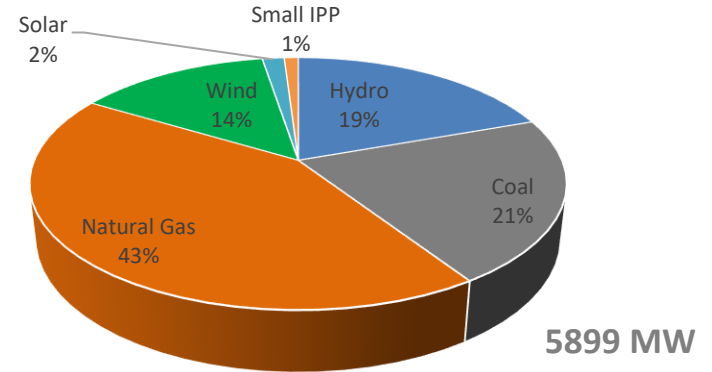
Average annual growth ~1.0%

Demand Forecast (MW)



Source: 2023 LTRA

Expected Resources – Installed Capacity (2028)



- Plans for additional gas, wind and PV solar generation

Near Term Major Projects: Generation

- New combined cycle gas facility
 - **Great Plains Power Station 377 MW (May 2024)**
- New simple cycle gas units
 - **Ermine 45MW (April 2025)**
 - **Yellowhead 45 MW (December 2025)**
- New wind and PV solar generation facilities
 - **Bekevar 200 MW wind (November 2024)**
 - **Estevan 100 MW PV (December 2026)**



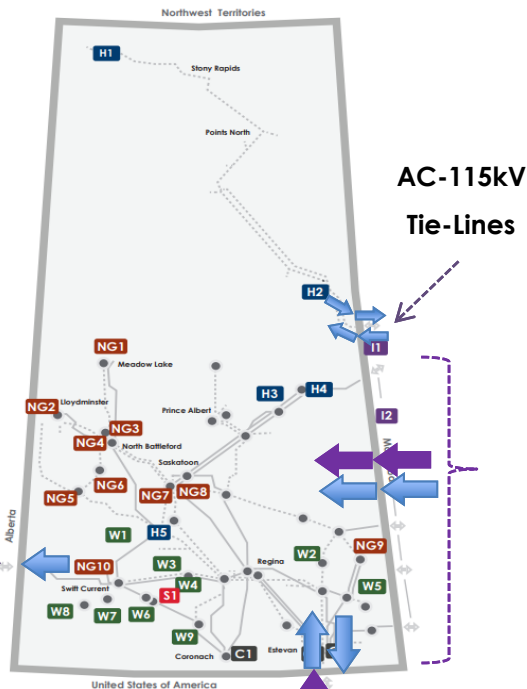
Great Plains Power Station - under construction

Interface - Transmission Service Reservations

Alberta - AESO

Asynchronous
Interconnection
(McNeill 150MW HVDC
converter station)

- Total 150 MW of Firm export capability
- Non-firm import capabilities available



North Dakota - SPP

Manitoba - MH

- 60 MW of Firm export
- 25MW of Firm import

AC-115kV
Tie-Lines

AC-230kV
Tie-Lines

- Total 290 MW of Firm import with PPA
- Planned total 100 MW of Firm import for reliability use – currently under study phase

- Phase shifting transformer-controlled AC tie-line
- Existing: Total 150 MW of Firm import/export capability on SPC side
- Up to 100 MW import can be made available by SPP under emergency conditions
- In Near-term: addition of two new 230 kV tie-lines
- 150 MW + 500 MW of Firm import capability

SaskPower Reliability Coordinator Update

2023-24 Winter Outlook

- **Load**

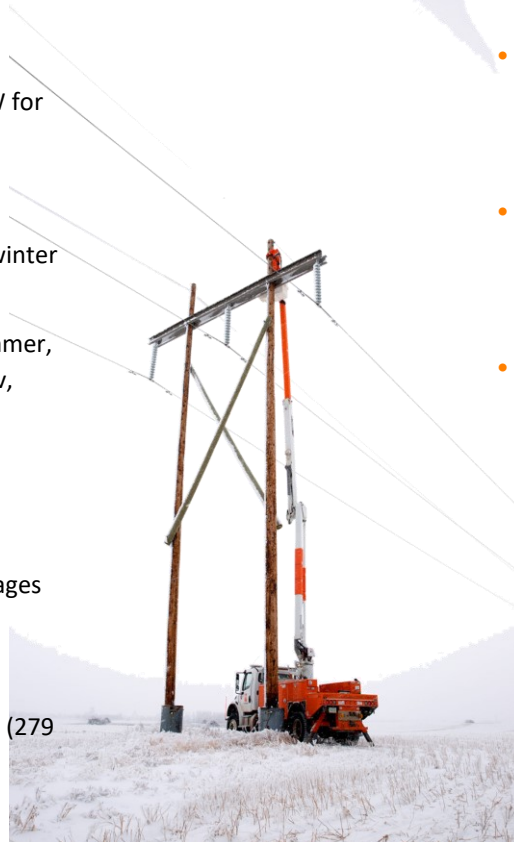
- Expected to be between 3300 MW and 3850 MW for the winter months (Nov to Apr)

- **Generation**

- Internal stakeholder meetings are complete for winter readiness
- Due to the issues at Poplar River plant in the Summer, planned generation outages are scheduled in Nov, Dec, Feb, Mar & Apr (261 MW on peak)

- **Fuel**

- Expect to have no gas or coal issues
- Hydro lake levels remain below our 10-year averages for this time of year
- Wind capacity for winter is assumed at
- 3 year on peak average wind contribution of 46% (279 MW)



- **Transmission**

- No major plans for any transmission outages impacting operations

- **Weather**

- Predicting a colder than average winter with less snow than average

- **Interchange**

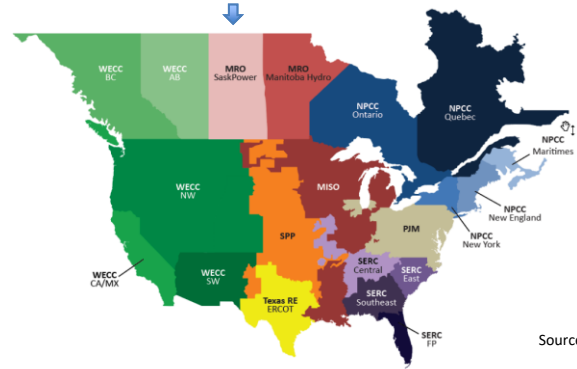
- Alberta tie is restricted to 90 MW out of 150 MW interface capability
- No firm import from the U.S.
- Contractual imports from Manitoba (290 MW)

2023-24 Winter Outlook

SaskPower Summary - NERC WRA

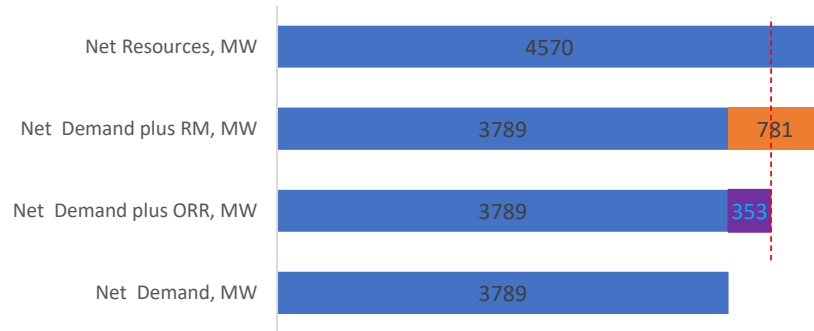
Operating reserve requirements are met

- Operating reserve requirement (ORR) 353 MW
- Carries 20% Reserve Margin (RM) (781 MW) on-peak



Source: NERC

Winter On-Peak 50/50 load



2023-24 Winter Outlook – Risk Scenario

- **Winter Risk Scenario**

- Normal winter peak load

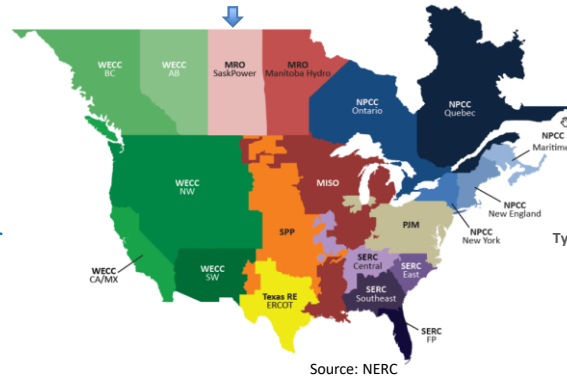
- **Winter Extreme Weather Scenario**

- Load based on extreme weather scenario 90/10

- Risk scenario assessment shows a higher risk for the use of emergency measures and operator action.

- **Operational Measures**

- Demand Response, imports, use of units in layup status
- Rescheduling of the planned generation maintenances and unplanned short term preventative generation maintenances
- Additional operator action, public appeal



Winter Risk Scenario

Net Demand 50/50, MW	3789	353
Operational measures, MW	4051	485
Forced outage, MW	4051	139
Typical additional maintenance outage, MW	4190	380
Net Resources, MW	4570	

Winter Extreme Weather Risk Scenario

Net Demand 90/10, MW	3952	353
Operational measures, MW	3773	485
Wind + Solar Derate, MW	3773	279
Forced outage, MW	4051	139
Typical additional maintenance outage, MW	4190	380
Net Resources, MW	4570	

Thank You!



AGENDA

Reliability Coordinator Updates

c. Southwest Power Pool (SPP)

Neil Robertson, Lead Functional Coordinator, SPP

Action

Information

Report

Neil Robertson will provide an oral report during the meeting.

Classification: **Public**

AGENDA

Assessment Review

- a. 2023 Long-Term Reliability Assessment (LTRA)
 - b. MRO Regional Winter Assessment (RWA)
- Salva Andiappan, Principal Reliability Assessment Engineer, MRO*

Action

Information

Report

Salva Andiappan will lead this discussion during the meeting.

Classification: **Public**



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MRO Assessment Areas 2023 LTRA Report

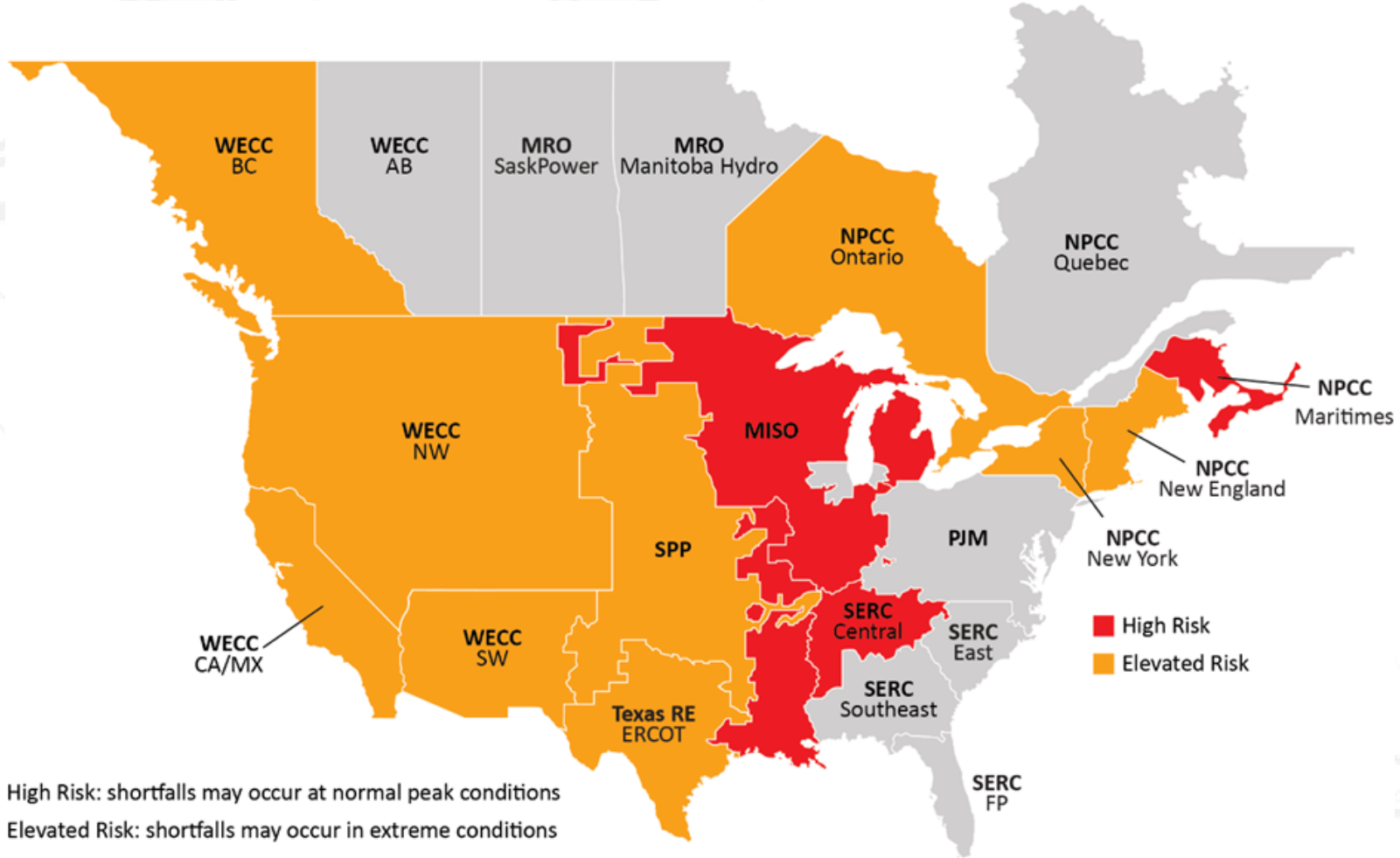
Presented by: Salva Andiappan
RA Department

CLARITY

ASSURANCE

RESULTS

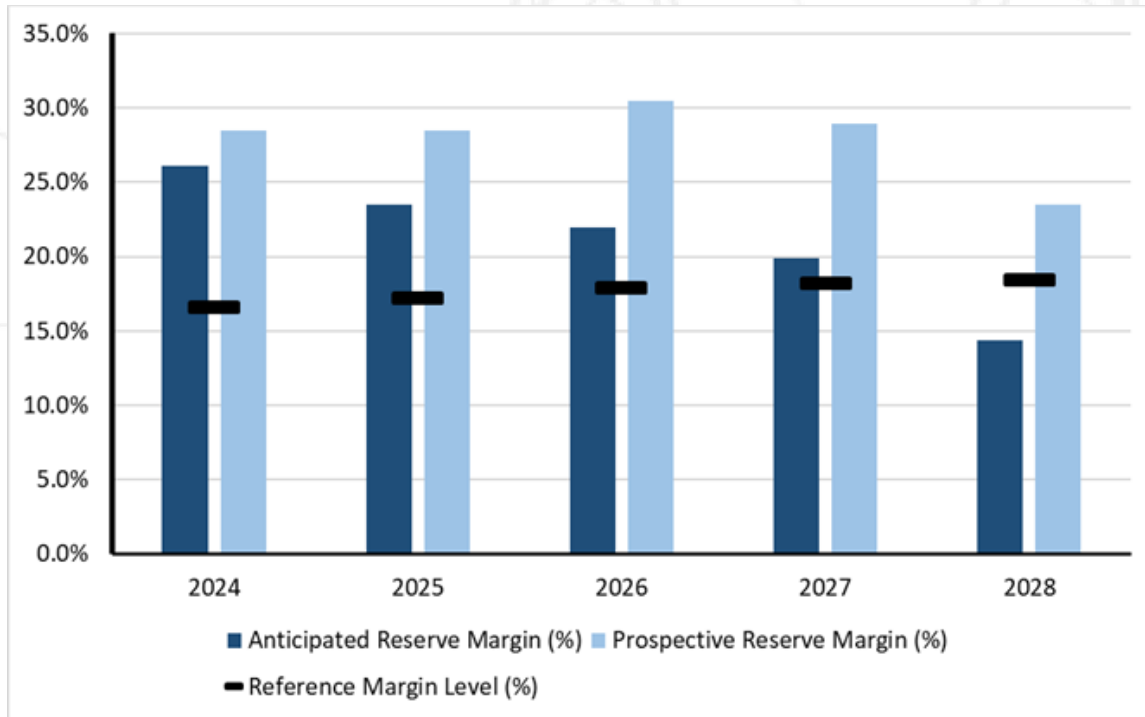
2023 LTRA



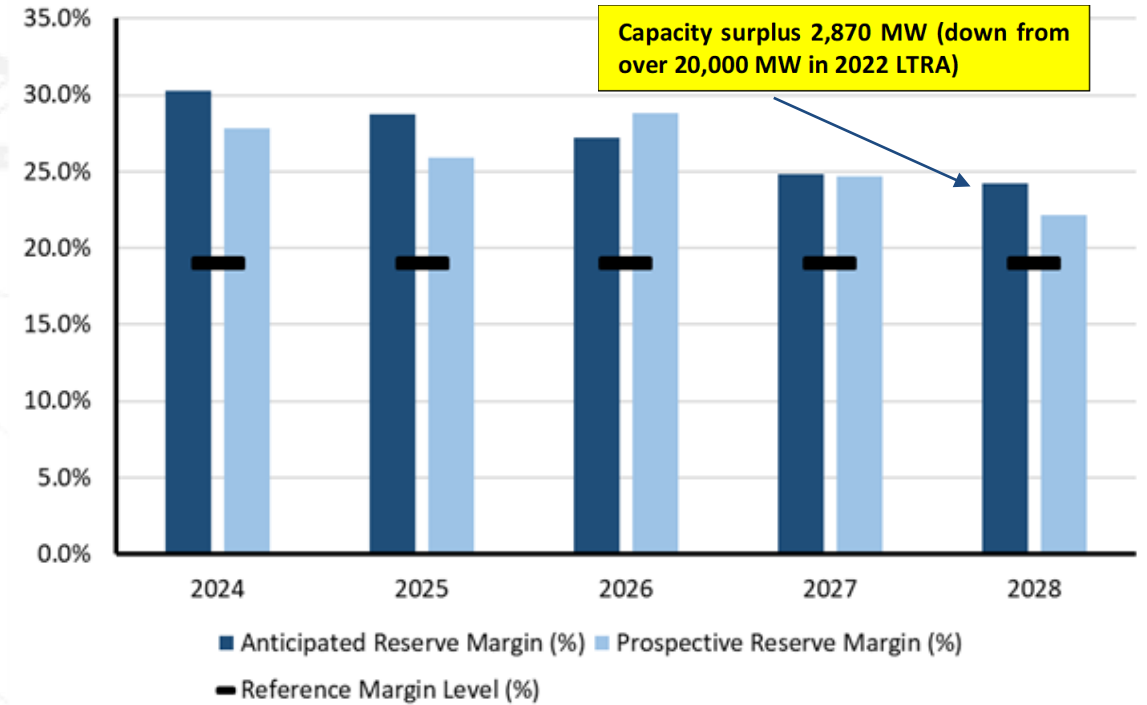
Risk Area Summary 2024-2028



2023 LTRA



MISO 5-year Projected Summer Reserves



SPP 5-year Projected Summer Reserves



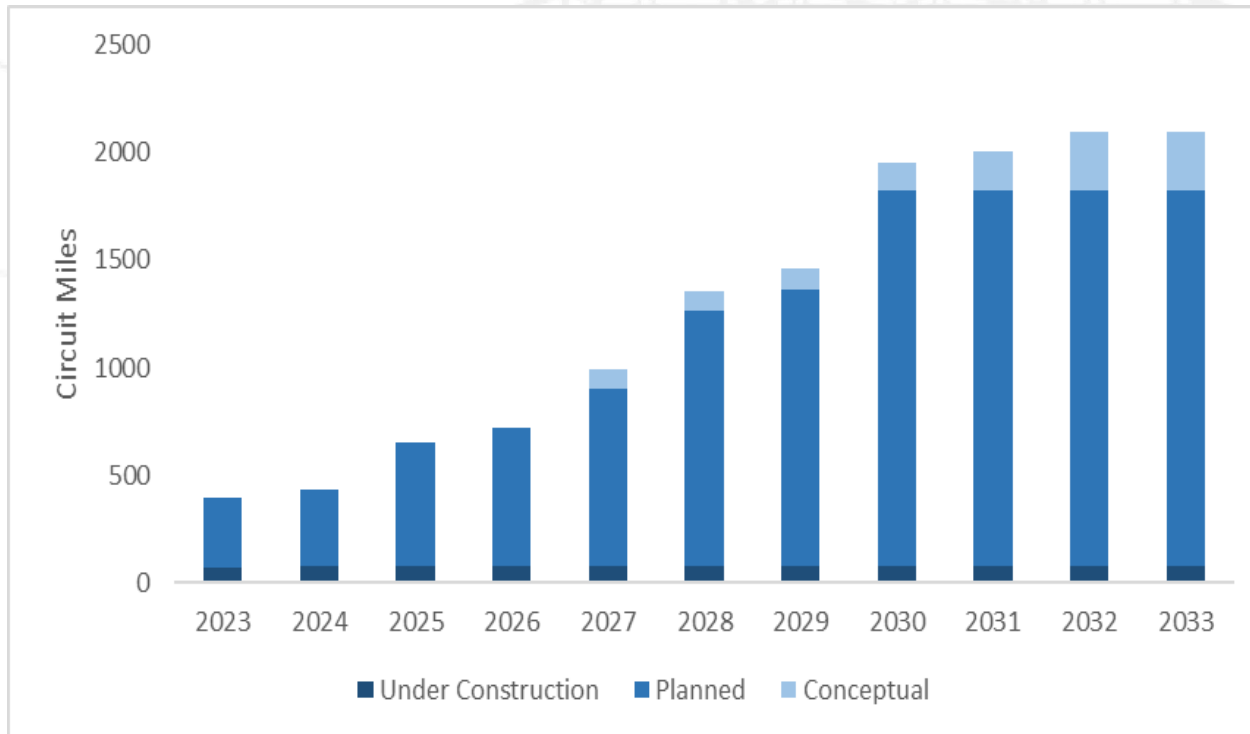
2023 LTRA

Solar and Wind Nameplate Capacity, Existing and Planned Additions through 2033

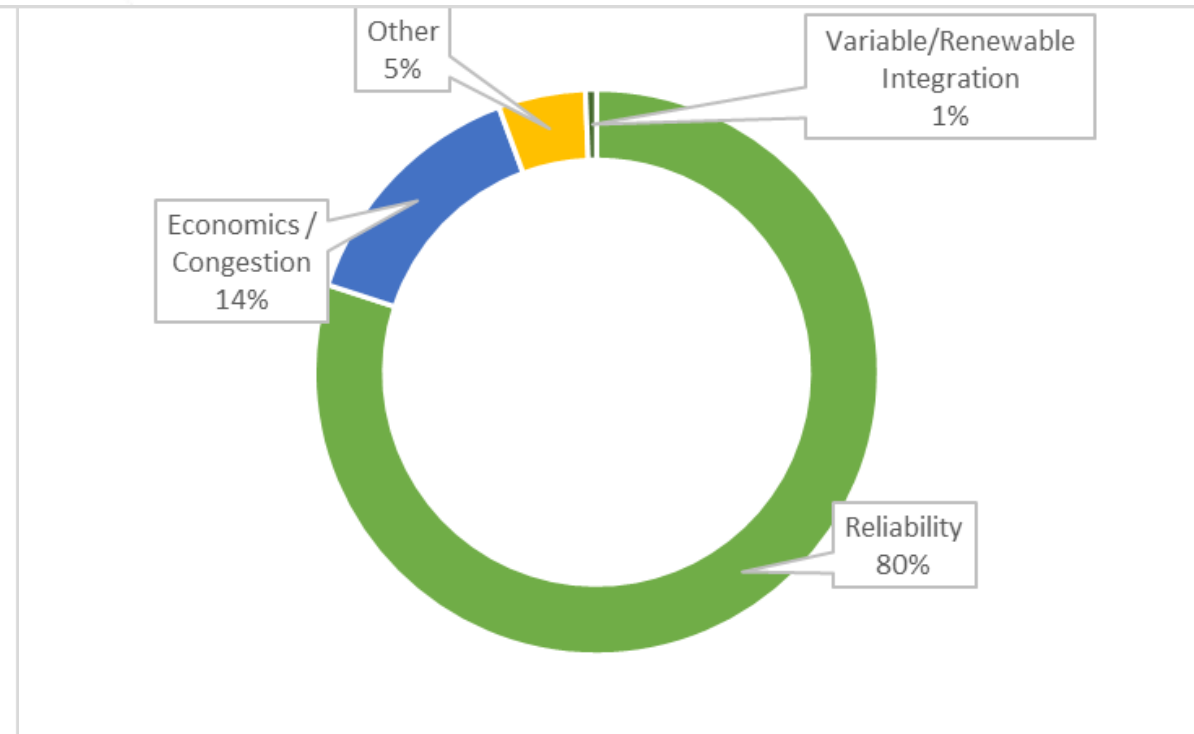
Assessment Area	Solar Nameplate (MW)					Wind Nameplate (MW)				
	Existing	Tier 1	Tier 2	Tier 3	Total	Existing	Tier 1	Tier 2	Tier 3	Total
MISO (MRO)	2570	4690	5753	13771	26,784	26447	4321	5297	23148	59,213
MH	0	0	0	0	0	259	0	0	0	259
SPC	37	10	100	316	463	615	200	0	400	1,215
SPP	361	0	8379	3213	11,953	33124	0	10757	9594	53,475
Total	2,968	4,700	14,232	17,300	39,200	60,445	4,521	16,054	33,142	114,162



MRO Transmission Development Trends by 2033



Future Transmission Circuit Miles >100 kV by Project Status



Future Transmission Circuit Miles by Primary Driver



QUESTIONS



CLARITY

ASSURANCE

RESULTS

2023 LTRA

- **MRO RAC Action Item:**

Motion to accept the 2023 LTRA report prepared by each of the MRO Planning Coordinators – MH, MISO, SPC and SPP





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MRO Reliability Advisory Council (RAC) Webinar

2023 Long-Term Reliability Assessment Overview

RAC Liaison/Emcee - TBD

Nick Przybilla, Midcontinent Independent System Operator

Kelly Hunter, Manitoba Hydro

Chris Haley, Southwest Power Pool

Suman Thapa, Saskatchewan Power Corporation

January 25, 2024

CLARITY

ASSURANCE

RESULTS



MIDWEST
RELIABILITY
ORGANIZATION

OVERVIEW OF MRO 2023 REGIONAL WINTER ASSESSMENT

Presented by: Salva Andiappan
RA Department

CLARITY

ASSURANCE

RESULTS

Key Findings

- **Normal winter peak load coupled with unplanned generation outages could result in energy shortfalls in SPC.**
- **Extreme winter peak load with typical maintenance and forced outages could result in energy shortfalls across MISO and SPP.**
- **MH anticipate resources are sufficient to meet reserve margin requirements under normal and extreme demand for the 2023 winter season.**
- **Fuel supply interruptions could create operational challenges in MISO and SPP for the upcoming winter.**
- **Long term trends indicate increasing generation forced outage rates.**
- **Significant improvement in human error related misoperations compared to last winter.**



2023 Winter Seasonal Forecast

Assessment Area	Anticipated Resources	Typical Maintenance and Forced Outages	Anticipated Resources with Typical Outages	Normal Peak Load	Anticipated Reserve Margin with Typical Outages
MH	5,332	100	5,232	4,623	+13.2%
MISO	147,097	27,676	119,421	94,394	+26.5%
SPC	4,570	519	4,051	3,789	+6.9%
SPP	60,676	10,600	50,076	43,718	+14.5%

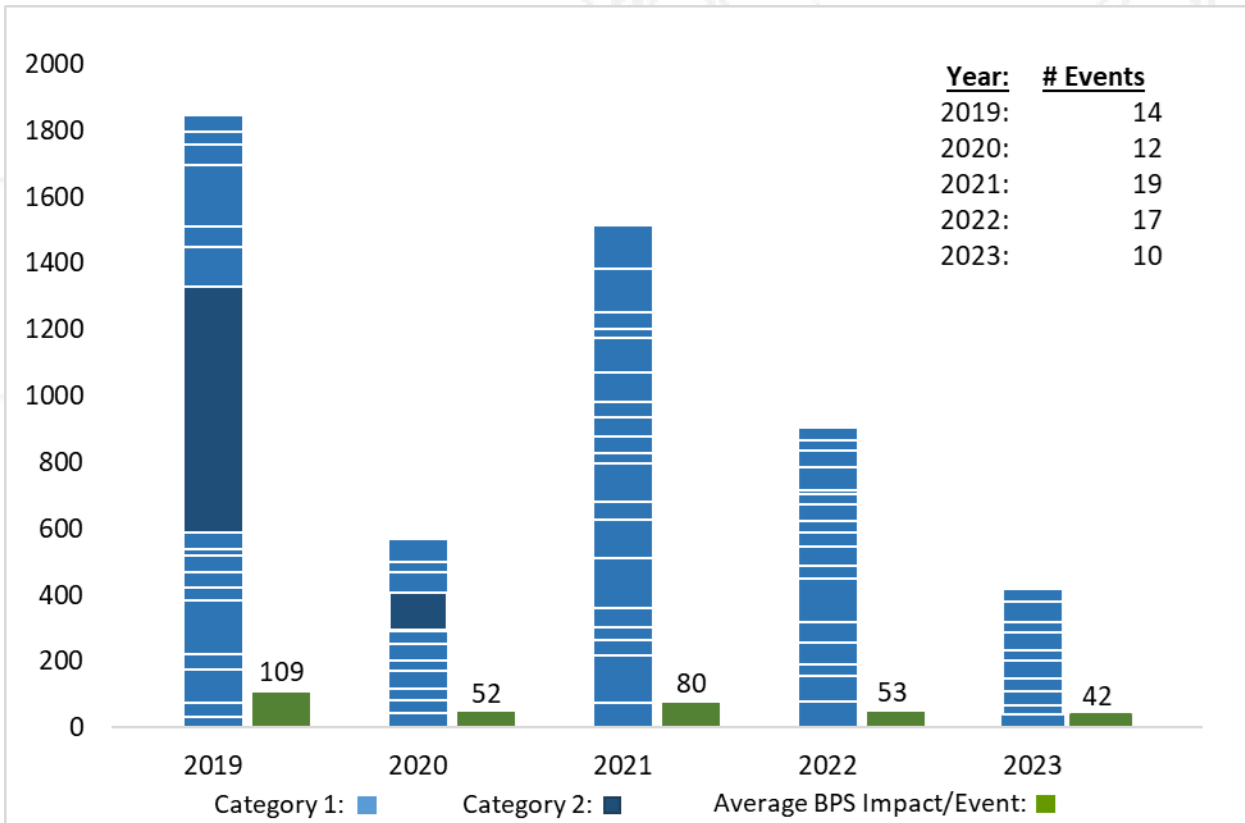
Reserve Margin Percentage with Typical Outages and Normal Peak Load

Assessment Area	Anticipated Resources with Typical Outages	Operational Mitigations	Anticipated Resources with Typical Outages + Operational Mitigations	Extreme Peak Load	Reserve Margin Under Extreme Peak Load
MH	5,232	150	5,382	4,909	+9.6%
MISO	119,421	2,400	121,821	110,278	+10.5%
SPC	4,051	485	4,536	3,952	+14.8%
SPP	50,076	2,000	52,076	46,718	+11.5%

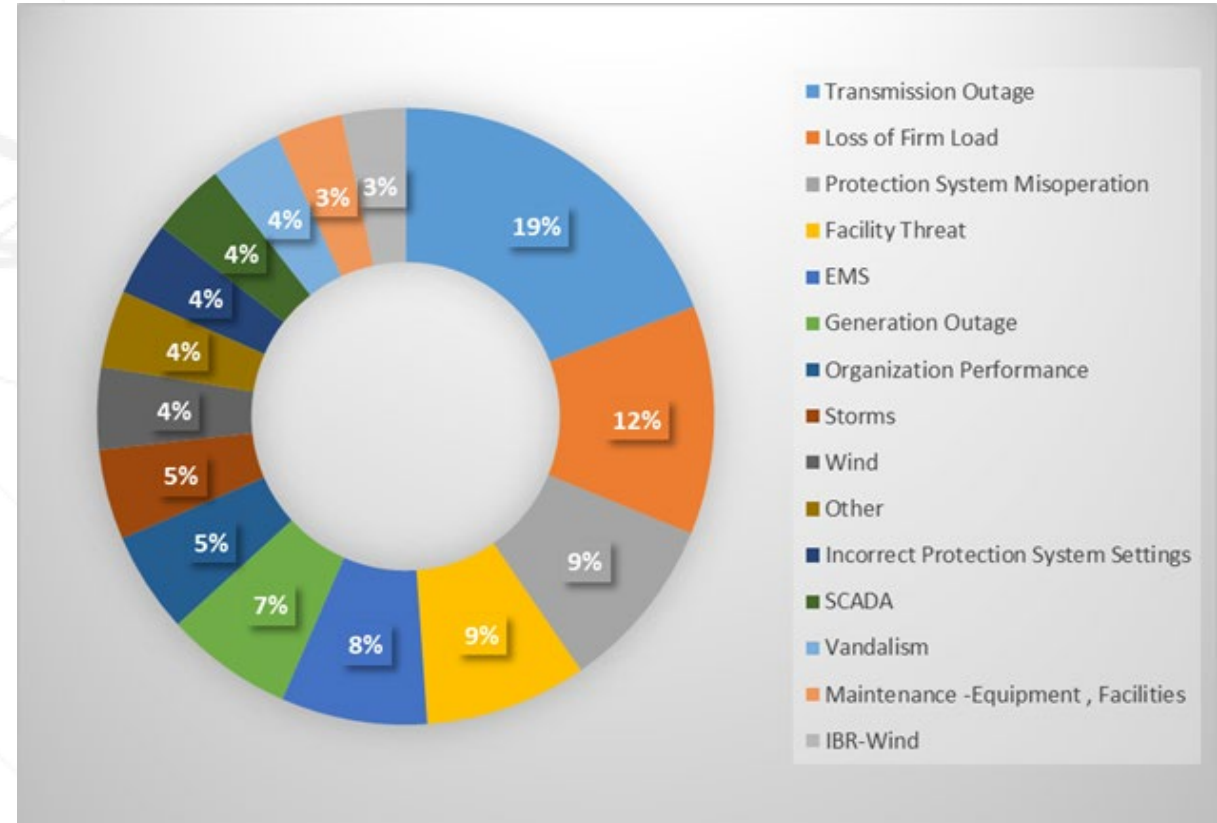
Reserve Margin Percentage with Typical Outages and Extreme Peak Load



BES Event Analysis



MRO Event Severity Index as of September 2023

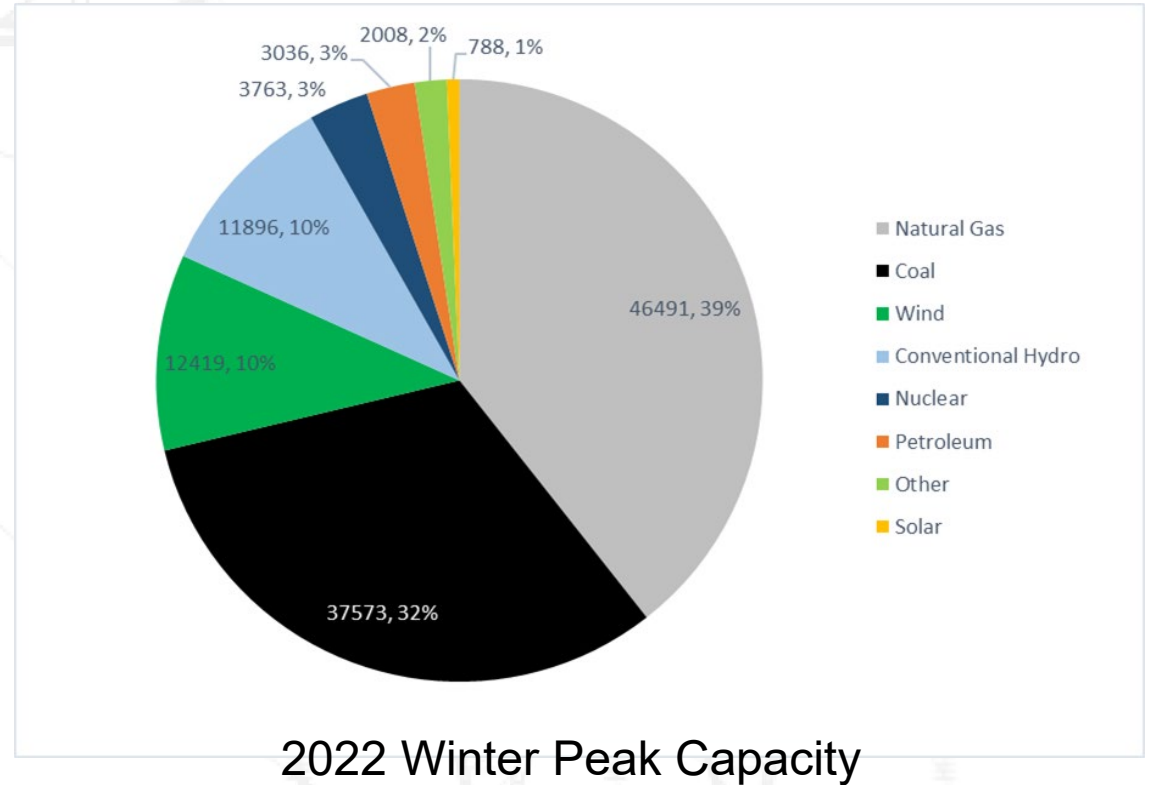
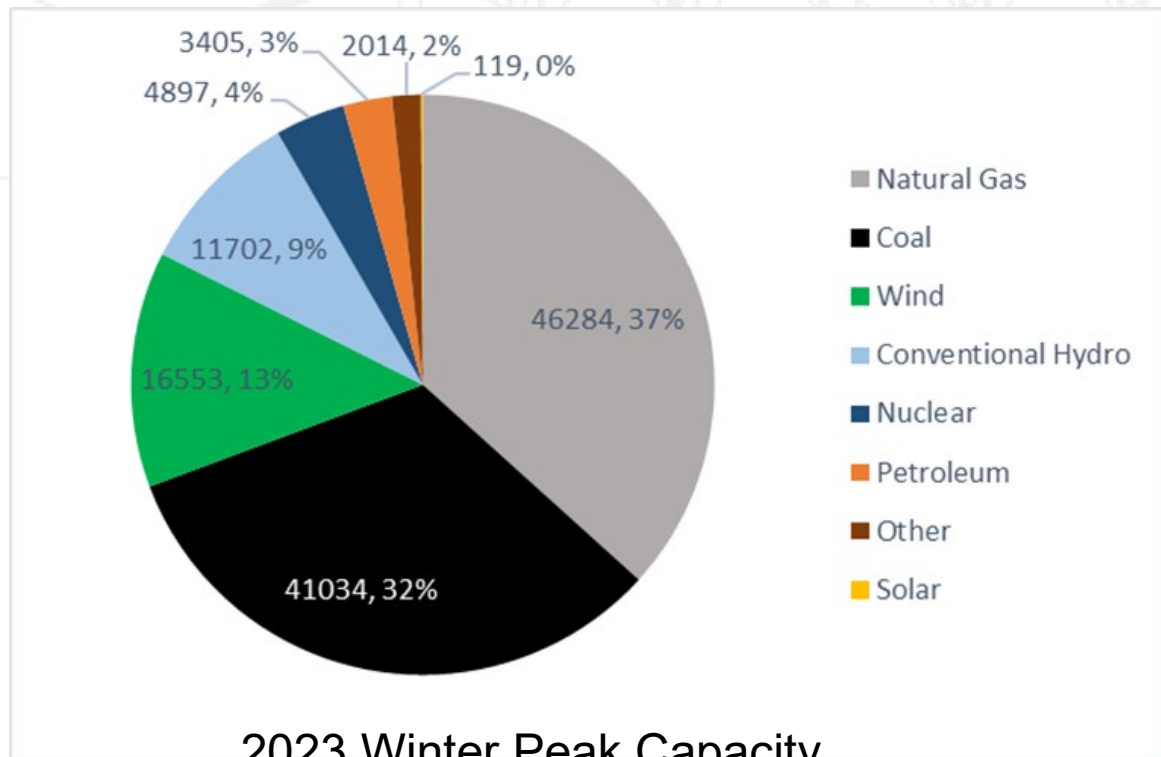


Top Event Flags since 2017

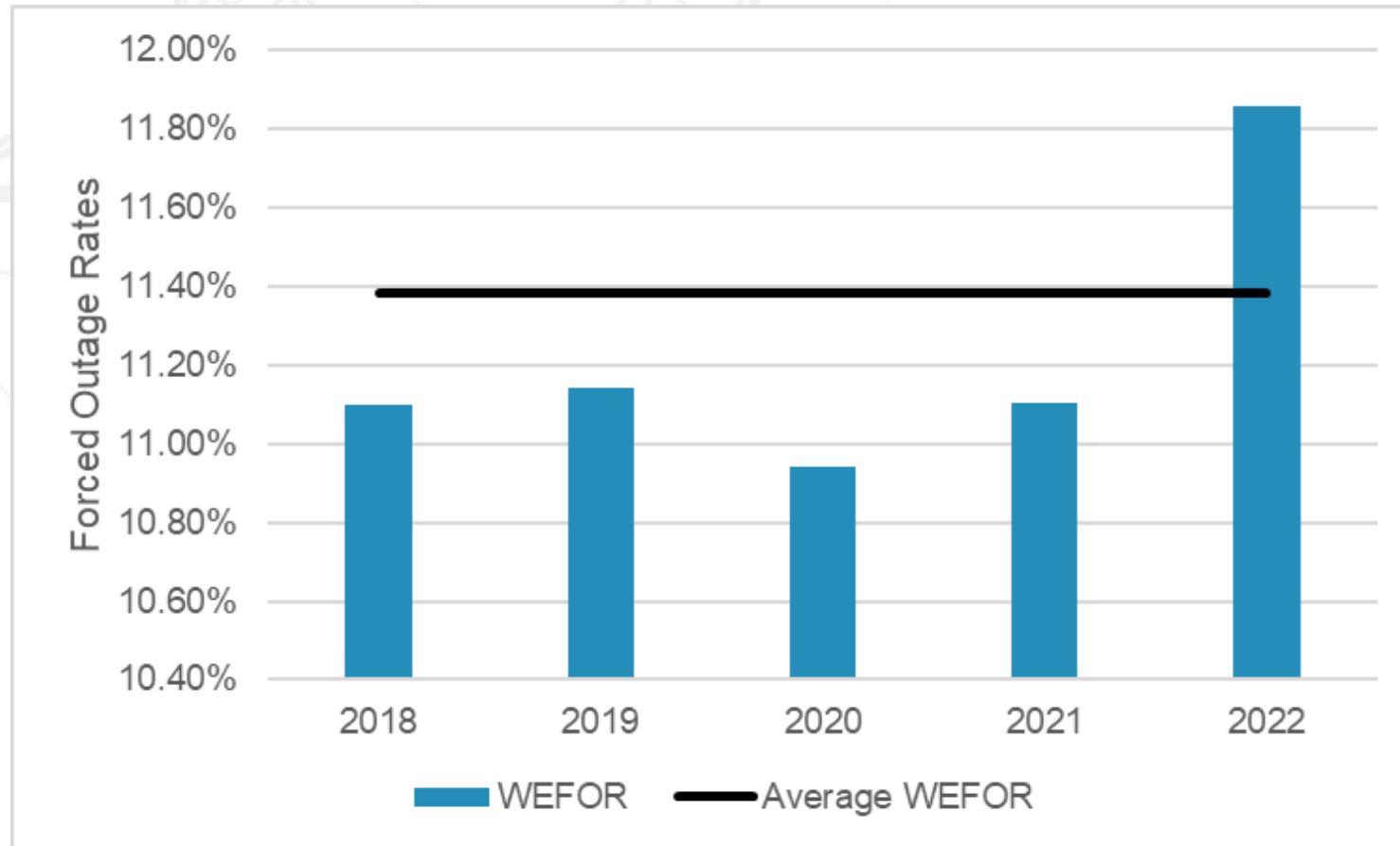
- Total 1 transmission events occurred in 2022 winter.



MRO Resource Mix



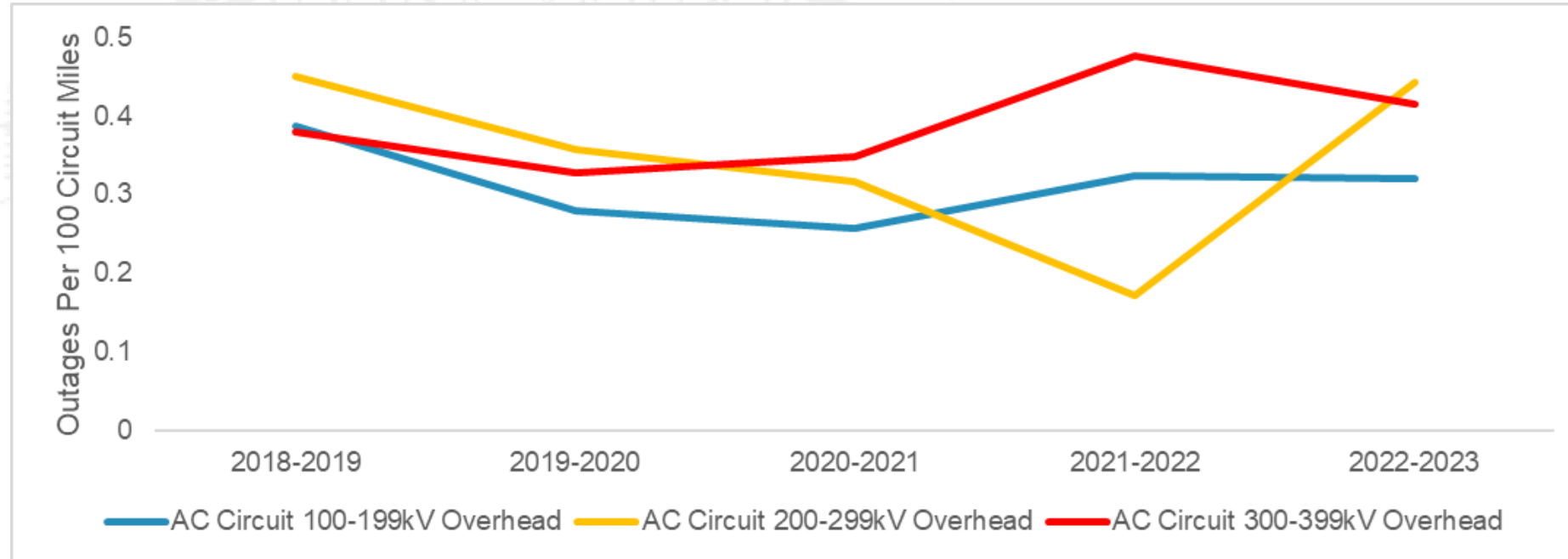
MRO 5-Year Generator MW-Weighted EFOR



- Long term trends continue to indicate increasing EFOR rates.



Annual Winter Total Outages Per 100 Circuit Miles



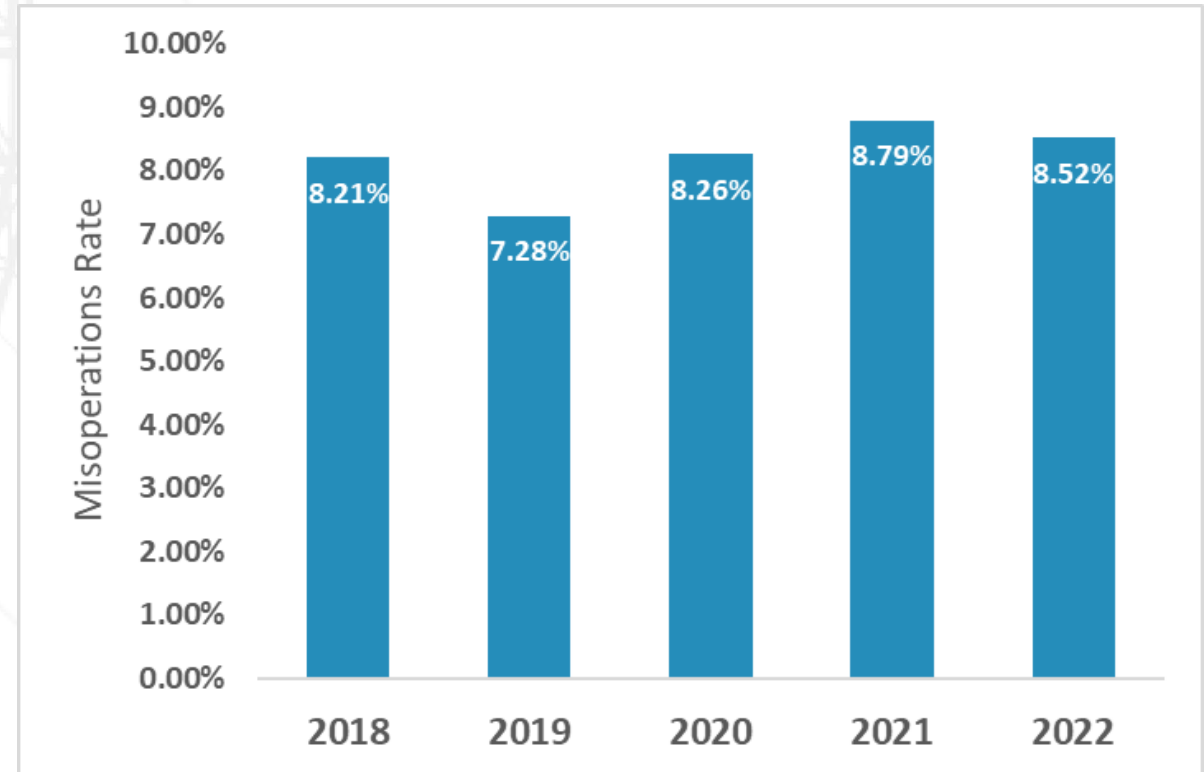
- Increase in outages for 2021-22 winter in the 100-199kV and 300-399kV voltages due to the derecho that swept through the MRO region December 15th and 16th 2021.



MRO Misoperation Rates by Year

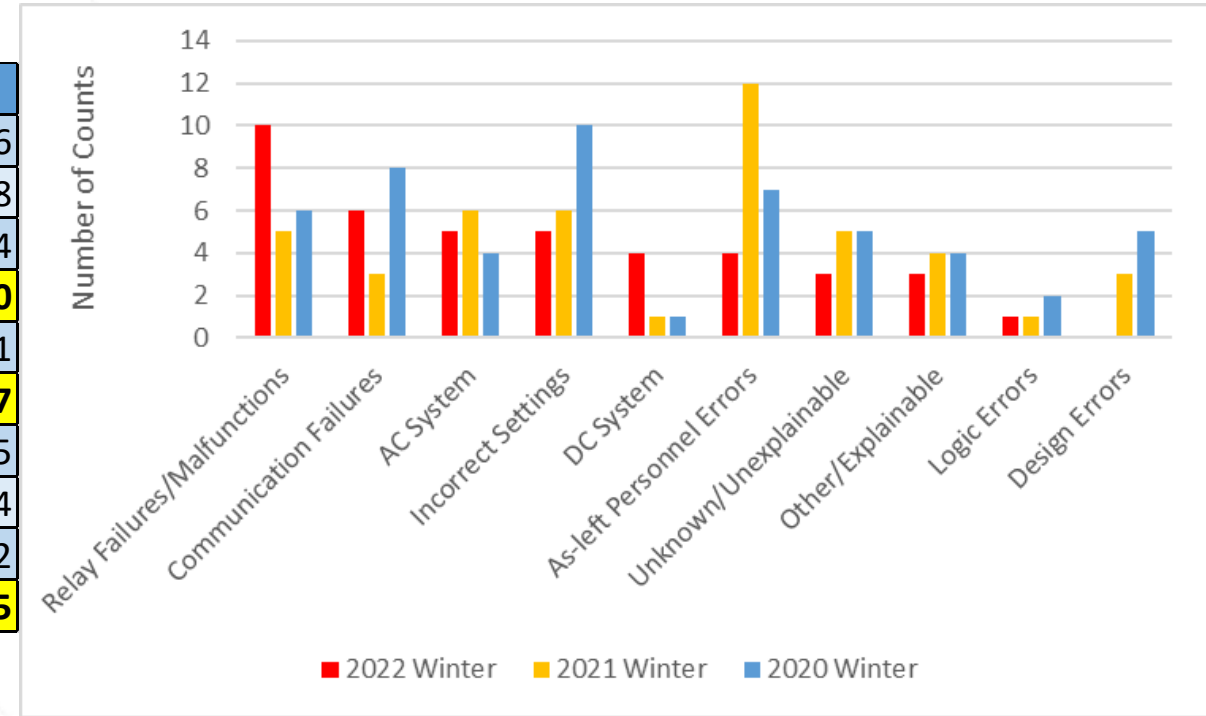
- Misoperation rate trending downward.
- Total protection system operations up 25%. Total misoperations up 18%.
- Resulting in lower misoperation rate in 2022.

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



Winter Misoperations by Cause

	2022 Winter	2021 Winter	2020 Winter
Relay Failures/Malfunctions	10	5	6
Communication Failures	6	3	8
AC System	5	6	4
Incorrect Settings	5	6	10
DC System	4	1	1
As-left Personnel Errors	4	12	7
Unknown/Unexplainable	3	5	5
Other/Explainable	3	4	4
Logic Errors	1	1	2
Design Errors	0	3	5



- Total 41 misoperations between December 1, 2022 and February 28, 2023.
- Improved human error related misoperations (incorrect settings, as-left personnel errors, logic errors and design errors)



Questions



CLARITY

ASSURANCE

RESULTS

AGENDA

NERC Standards Review Forum (NSRF) Update *Gayle Nansel, Reliability Advisory Council Vice Chair*

Action

Information

Report

Vice Chair Nansel will provide an update during the meeting.

Classification: Public

AGENDA

Protective Relay Subgroup (PRS) Update *Jake Bernhagen, Manager of Reliability Performance, MRO*

Action

Information

Report

Jake Bernhagen will provide an update during the meeting.

Classification: **Public**

AGENDA
2024 Meeting Dates
Dick Pursley, Reliability Advisory Council Chair

Action

Information

Report

Chair Pursley will provide an overview during the meeting.

	Q1 2024	Q2 2024	Q3 2024	Q4 2024
RAC	2/22	5/16	8/8	10/3
SAC	2/21	5/14	8/6	10/3
CMEPAC	2/20	5/7	7/23	10/3
PRS	3/12	6/11	9/10	12/10
OGOC	3/6	5/22	8/20	11/6
BOD	2/8	5/23	8/22	11/7

*Joint council meeting
 10/2/24 (half day)

*Networking Event
 10/2/24 (evening)

MRO CONFERENCE DATES 2024	
Q1	RAM Conference: March 19-20, 2024 networking reception and conference (hybrid)
Q2	Reliability Conference: May 14-15, 2024 networking reception and conference (hybrid)
Q3	CMEP Conference: July 23-24, 2024 networking reception and conference (hybrid); Kansas City, MO
Q4	Security Conference: October 1-2, 2024 networking reception, training and conference (hybrid)

Classification: **Public**

AGENDA

RAC Member Roundtable

Dick Pursley, Reliability Advisory Council Chair

Action

Discussion

Report

Chair Pursley will lead this discussion during the meeting.

Classification: Public

AGENDA

Other Business and Adjourn

Dick Pursley, Reliability Advisory Council Chair

Action

Discussion

Report

Chair Pursley will lead this discussion during the meeting.

Classification: Public