



ANNUAL REPORT 2021





Contents

1. About Us
2. Letter From CEO and Board Chair
2. Value Proposition
3. Strengthening Engagement and Alignment
4. Effective And Efficient Operations
5. Governance Structure
6. The People That Make It Happen
8. The Path Forward



About Us

As part of the ERO Enterprise, MRO operates as a cross border Regional Entity headquartered in Saint Paul, Minnesota. The MRO Region spans the provinces of Saskatchewan and Manitoba, and all or parts of the states of Arkansas, Illinois, Iowa, Kansas, Louisiana, Michigan, Minnesota, Missouri, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, and Wisconsin. The region includes approximately 225 organizations that are involved in the production and delivery of electric power, including municipal utilities, cooperatives, investor-owned utilities, transmission system operators, federal power marketing agencies, Canadian Crown Corporations, and independent power producers.

MRO's primary responsibilities are to: ensure compliance with mandatory Reliability Standards by entities who own, operate, or use the North American bulk power system; conduct assessments of the grid's ability to meet electric power demand in the region; and analyze regional system events.





VISION

OUR VISION

A highly reliable and secure North American bulk power system.

OUR MISSION

To identify, prioritize and assure effective and efficient mitigation of risks to the reliability and security of the North American bulk power system by promoting Highly Effective Reliability Organizations® (HEROs).

Letter From CEO and Board Chair



*Thomas Kent, NPPD President and
CEO, Board Chair*



*Sara Patrick, MRO President and
CEO*

2021 will be recorded as another year of considerable change, uncertainty, and risk. We continued to manage through a global pandemic, a significant supply chain compromise, and extreme severe weather that impacted reliability of the bulk power system in the southern Midwest portion of the U.S. Unfortunately, this theme of extremes continues today. As we reflect on the year, it is important to remind ourselves of the challenges we faced, to celebrate the accomplishments, and to acknowledge what remains to be done.

The many challenges we face today emphasize the important work we do at MRO and across the ERO Enterprise. As regulators, we are charged with overseeing “a highly reliable and secure North American bulk power system” – undoubtedly one of the most critical infrastructures in North America. Although we may not have our hands on the controls, our role is essential and is more important now than ever before.

MRO has developed innovative approaches to inform and help prepare entities that own, operate, and use the bulk power system in our region for the challenges that lie ahead. Over the past five years, the bulk power system has undergone an incredible transformation in both generation resources and availability. While this transformation provides significant benefits, it also presents new and different risks, making the need for cooperation across government and industry increasingly important to reliability and security. Sharing information and working together to address these risks is critical to our collective success.

Regulation exists to mitigate risk, and we focus our efforts on the greatest risks to reliability and security. The bulk power system is a highly complex, interconnected system involving multiple owners, operators and users, and as it's often said, we are only as strong as our weakest link. Bearing this in mind, MRO's oversight activities need to be tailored and customized to the risk that each registered entity presents to reliability and security of the system as a whole. This concept has matured over time, and understanding each entity's unique and different risk takes significant effort to implement from a regulatory perspective. Continually performing Inherent Risk Assessments and developing Compliance Oversight Plans for each of our 220+ registered entities is an example of how we do this. Although time consuming, the result of this work is a more effective, targeted approach to identifying, responding to, and mitigating risk.

It is an impossibility for regulation to respond to all risk. Mandatory standards provide a baseline of protection against risk, but our work as regulators goes well beyond the rules and requirements. The ERO Enterprise mission is “To identify, prioritize and assure effective and efficient mitigation of risks to the reliability and security of the North American bulk power system.” At MRO, we do this by promoting Highly Effective Reliability

Organizations (or HEROs) within our regional footprint, which spans the central Midwest corridor from the Canadian provinces of Saskatchewan and Manitoba all the way down to Texas.

NERC, in coordination with others across the ERO Enterprise, develops long-term, periodic, and seasonal assessments of the grid's ability to meet projected electricity demand for all of North America. To compliment these ERO-wide assessments, MRO develops its own independent seasonal assessments targeted specifically at the MRO region.

In addition to these seasonal assessments, our staff works alongside industry subject matter experts that serve on MRO's advisory councils to develop and publish an annual regional risk assessment (RRA). Because risks and risk severity can differ across the ERO regions, MRO's RRA uses interconnection-wide data to identify those risks that may have a higher probability of occurrence and/or impact within the MRO footprint. New in 2021, the RRA used a risk matrix tool developed by MRO's Reliability Advisory Council to rank and prioritize risk. The resulting information, in addition to trends identified through analysis of system events, is used to inform MRO's outreach efforts and provide lessons learned and best practices to improve reliability across our regional footprint. More information on this important tool and efforts to implement something similar continent-wide is included in this report.

MRO has also developed innovative solutions to address both cyber and physical security risks—risks that often outpace the development of mandatory standards. MRO's Security Advisory Council was formed in 2017 to provide a forum for security experts across the region to raise awareness and share information on security risks and best practices. The council hosts multiple outreach events each year that include an annual security conference and security training, targeted roundtable sessions, a regional security risk assessment, and various webinars and newsletter articles on important security topics.

As it stands today, the electricity industry is the only critical infrastructure sector with long-standing mandatory standards to address physical and cyber security risk. While these standards provide some protection, the SolarWinds hack that was identified in December 2020 and which continues to evolve today is one example of how sophisticated and organized our adversaries have become. In 2019, MRO's Security Advisory Council established a weekly threat forum to share real-time information on existing and emerging security threats. At the onset of the COVID-19 pandemic, the threat forum expanded to include a separate weekly call to support discussions on pandemic preparedness and response, and the risks associated with remote work. These weekly calls are great examples of ways we can immediately address emerging risk.

Enforcement is not the first tool we reach for as a regulator to protect reliability and security of the bulk power system. Outreach—sharing information, lessons learned, best practices, and clarity on the rules and requirements—has proven to be the most effective way to address complex risk and support HEROs in the work they do to operate a reliable and secure grid. To remain on par with risk, we have significantly increased our outreach efforts over the past five years. MRO's conferences, training sessions, webinars, and organizational group meetings continued to see sharp increases in attendance and interest in 2021. Much of the outreach conducted at MRO is stakeholder driven. Industry subject matter experts that serve on MRO's advisory councils and subgroups help to determine relevant topics, develop content, identify speakers, and even act as emcees. The work of these dedicated individuals is highlighted in this report and reflects the coordination and collaboration that is key to our success.

What we accomplished in 2021 truly demonstrates a commitment to the important work we do. In the face of significant challenges, we remained resilient; credit which is owed to many—our staff, board members, industry stakeholders, and colleagues across the ERO Enterprise. As we look ahead to 2022, we are optimistic that we will again have opportunities to connect with our colleagues, peers and friends without peering through a computer monitor.

Thank you for your continued support!



Value Proposition

MRO provides a wide-area view of reliability and security insights for registered entities in the region and across the North American bulk power system. Our regional reliability and risk assessments complement continent-wide assessments and share actionable information and mitigation recommendations that entities can use to improve their respective operations. Additionally, MRO provides a significant amount of outreach and forums for registered entities to share information and best practices that benefit the region as a whole.

Learning from Bulk Power System Events

A large part of the important work we to do to assess regional risk involves analyzing regional Bulk Electric

System (BES) events or disturbances through the [ERO Enterprise Event Analysis Process](#). The goal of this process is to determine the causes of system outages, promptly assure tracking of corrective actions to prevent recurrence, and provide lessons learned and best practices to industry. System events are generally described as an unexpected outage on the power system caused by a common disturbance or equipment failure where generation or power is lost. These events can be categorized based on impact and severity as described in the ERO Event Analysis Process. This program is voluntary and entities willingly share information in order to improve bulk power system reliability. MRO's Reliability Analysis Department is responsible for conducting a thorough root cause analysis of each event with NERC staff and shares the results of this analysis with the registered entity that submitted the event. The sooner event

information is provided to MRO and NERC, the sooner we can share information with industry that may prevent a similar future occurrence.

The event analysis charts below reflect a steady increase in the number of events submitted to MRO in 2021 over previous years. The most common category is 0, followed by 1a and then 1h. The least impactful events are categorized with a lower number such as 0 and increase as the disturbance is more severe. The complete list of category definitions can be found in the ERO Event Analysis Process document.

February 2021 Severe Cold Weather Event

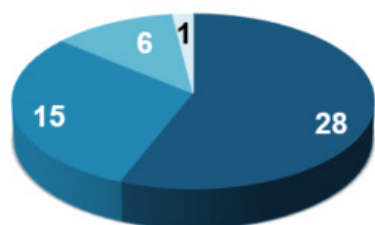
In mid-February 2021, Texas and the surrounding south central United States experienced extreme cold temperatures and multiple fronts of freezing precipitation over the course of approximately six days. This cold weather event resulted in higher than expected electric demands during the same period that higher than expected forced generation outages and derates were occurring. In the Texas Interconnection, approximately 20,000 MW of continuous manual firm load shed was required over the course of three days to balance system load with the remaining available generation. This resulted in the largest controlled firm load shed event in U.S. history. During this same event, a total of approximately 3,400 MW of firm load shed was required at varying times in the Southwest Power Pool (SPP) and Midcontinent

Independent System Operator (MISO) footprints due to energy emergencies and transmission constraints. These load sheds were of much shorter duration than what was experienced in the Texas Interconnection.

An inquiry team, jointly led by the Federal Energy Regulatory Commission (FERC) and North American Electric Reliability Corporation (NERC), was assembled consisting of subject matter experts from FERC, NERC, and each of the six regional entities, including two MRO staff members. The team focused its efforts on assessing generation performance, system operations and planning, gas supply, and weather during the February 2021 event. The goal was to identify root causes, key findings, lessons learned, and recommendations for industry to prevent reoccurrence of such an event.

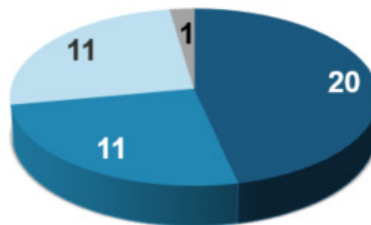
The inquiry team sent questionnaires to all registered entities (those companies required to comply with applicable NERC Reliability Standards) affected by the February cold weather event and also conducted interviews with impacted entities. FERC published the inquiry team's findings in [The February 2021 Cold Weather Outages in Texas and the South Central United States](#). The report includes 28 recommendations to address cold weather risks ranging from a joint-led technical conference hosted by FERC, NERC and the Regional Entities, to modifications to reliability standards.

MRO 2019 Events



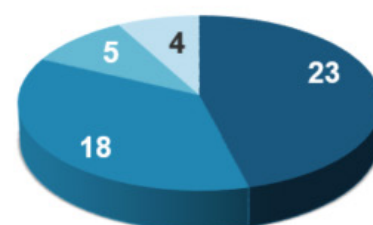
■ 0 ■ 1a ■ 1h ■ 2c ■ 2f
Event Category

MRO 2020 Events



■ 0 ■ 1a ■ 1c ■ 1h
■ 2c ■ 2d ■ 2f ■ tbd
Event Category

MRO 2021 Events

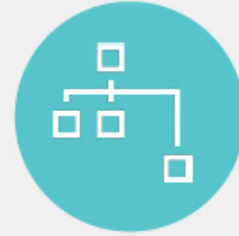


■ 0 ■ 1a ■ 1h ■ tbd
Event Category

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.



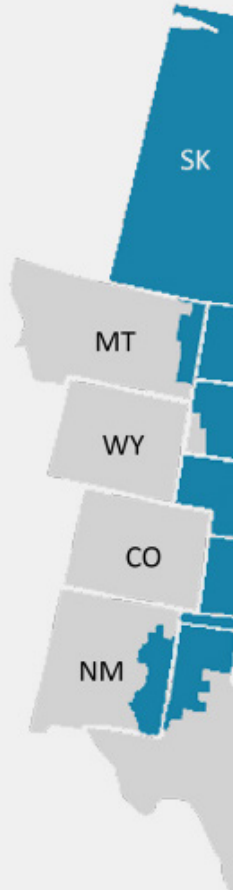
Lack of Energy Assurance Assessments

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 that presently nets with distributed energy resources, is challenging current bulk power models.



Assessing and Mitigating Regional Risk

Regional Risk Assessment

In the latter half of 2021, MRO staff collaborated with industry subject matter experts serving on the three advisory councils to identify and assess risks to the reliable and secure operations of the bulk power system within MRO's regional footprint. The result of that effort is MRO's 2022 Regional Risk Assessment (2022 RRA), which was published earlier this year. Because risks and risk severity can differ across the ERO regions, the 2022

RRA focuses on identifying those risks that may have a higher probability of occurrence and/or impact within the MRO footprint.

Risks are categorized into two main groups: 1) operational and planning risks, and 2) physical and cyber security risks. Several new risks were identified in the 2022 RRA over previous assessments given several key events that occurred in 2021. Each risk identified in the 2022 RRA was collectively assessed and ranked by staff and advisory council members using MRO's Risk Matrix, which provides a mechanism for prioritizing risk based on impact and likelihood. The impact of each risk on the bulk power system and the probability of occurrence was determined by evaluating risk history,

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 about these risks and mitigating activities can be found in MRO's 2022 Regional Risk Assessment at www.mro.net

available trends, and whether or not controls exist to mitigate the risk.

Risk was also assessed in the 2022 RRA utilizing MRO's CMEP work by trending the noncompliance history of higher risk requirements. Where possible, the risk severity was tied to the relevant operations and planning or physical and cyber security risk to reflect the relationship between the two. As part of the ongoing progression of risk-based compliance, MRO monitors aggregated risks across multiple low inherent risk registered entities to identify critical reliability standards that, when evaluated across multiple low inherent risk registered entities, rises to a level that supports active monitoring. This practice helps focus MRO's CMEP

activities to reduce potential residual risk, strengthen risk controls, and improve overall effectiveness and efficiency.

To the extent practical, the 2022 RRA includes recommendations on mitigating activities to help registered entities become more aware of, and reduce risk to, individual systems. This assessment is part of an ongoing effort to ensure the region remains properly focused on identifying and mitigating the greatest risks to reliability and security of the bulk power system and MRO staff will continue communicating key findings and recommendations to both industry and the ERO Enterprise.

Developing a Tool for Risk Prioritization

MRO's Reliability Advisory Council (RAC) developed a risk matrix tool in 2019 to aid in the prioritization of risk. This project was led by RAC member Dallas Rowley from Oklahoma Gas and Electric, who was one of the recipients of MRO's first HERO Award in recognition of his effort. Based upon feedback from the board's Organizational Group Oversight Committee and the other two advisory councils (Security and CMEP), the risk matrix tool was augmented to prioritize a broader range of risks and account for mandatory compliance obligations that serve as risk-reducing controls. The end result

provides industry-specific information on the impact and likelihood of reliability and security risks, and introduces a repeatable and consistent criteria for prioritizing risks.

The risk matrix was first used during the development of MRO's 2021 Regional Risk Assessment and helped to focus the activities of MRO's advisory councils to address risk. This program was so successful it garnered interest outside of the MRO region and led to an ERO Enterprise collaboration project to evaluate use of the tool across North America in support of the [ERO Framework to Address Known and Emerging 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. |

The use of MRO's risk matrix was expanded upon in 2021 during the development of the 2022 RRA, when volunteers from MRO's three advisory councils joined staff in prioritizing regional risks. The result is a much more focused, risk-based RRA, with both reliability and security risks reflected in a single heat map for comparison.

NERC's Reliability Issues Steering Committee (RISC) formed a sub team to work with NERC and MRO staff in 2022 to explore whether MRO's risk matrix could be used in future ERO RISC reports to communicate top continent-wide reliability and security risks. Such a tool would not only provide uniform prioritization of risk across the ERO Enterprise, it would inform resource allocation and project prioritization decisions across the ERO by allowing risk to be consistently assessed by different organizations and geographic locations.

Seasonal Reliability Assessments

As a compliment to NERC's North American reliability assessments, MRO performs seasonal reliability assessments of the regional grid's ability to meet electric demand during a given season. MRO published both a [Regional Summer Assessment](#) and a [Regional Winter Assessment](#) in 2021 for the first time ever. In these seasonal assessments, MRO staff study data related to Event Analysis or system disturbances, generation and transmission availability, and also significant Energy Emergency Alerts.

Assessing historical performance from the previous year helps to identify trends and anticipate resource availability for the upcoming season in terms of both normal load forecasts and extreme demand scenarios. In addition to the published assessments, MRO staff hosts informational webinars to share lessons learned and best practices with industry regarding seasonal bulk power system reliability.

Regional Security Risk Assessment

Led by the Security Advisory Council (SAC), MRO performs a regional security risk assessment each year to identify and assess the most relevant security

risks facing industry within MRO's regional footprint. Security experts from entities across the MRO region and from the Electricity Information Sharing and Analysis Center, along with government security partners, are invited to participate in this closed event. The top risks identified are included in MRO's regional risk assessment and are used by the SAC to determine appropriate mitigating activities and outreach for the coming year.

Considering the Evolving Energy Landscape

The bulk power system is undergoing an unprecedented change requiring a fundamental shift to the ways in which generating capacity, energy supply, and load serving needs are understood and evaluated. Historically, analysis of the resource adequacy of the bulk power system focused on generating capacity of resources that were primarily dispatchable and available during peak demand time periods. Reserve margins were planned so that deficiencies in capacity versus daily peak demand occurred no more than one-day-in-ten-years. As generation attributes change to be more distributed and variable, the historical approach used to determine resource adequacy is not sufficient to ensure energy needs are met by modern resources.

For these reasons, the concept of energy assurance is prioritized as one of the top risks to reliability in MRO's 2022 RRA. This risk is also closely related to the risks of generation unavailability due to cold weather and uncertainty of planning reserve margins, which were top risks in the 2021 RRA.

In 2021, MRO contributed to the following efforts to mitigate this risk:

- Conducted generator site visits under MRO's Generator Winterization Program.
- Held briefings with state regulators, trade organizations, and individual registered entities on the topic.

- Published articles in [Midwest Reliability Matters](#) and [external publications](#) highlighting energy assurance as a risk, along with multiple presentations at MRO's 2021 Reliability Conference.
- Participated in the FERC/ERO Inquiry into the February 2021 Cold Weather Outages in Texas and the South Central United States.
- Supported the NERC Energy Reliability Assessments Task Force (ERATF) and its development of a [whitepaper](#) on energy assurance, which led to the creation of a Standards Authorization Request (SAR) to augment the NERC Reliability Standards.

Addressing a problem of this magnitude requires a significant amount of coordination and collaboration across the ERO Enterprise, the electricity industry, regulatory agencies across North America, and other sectors that support our work. This work will be a strong focus for MRO in 2022 and beyond.

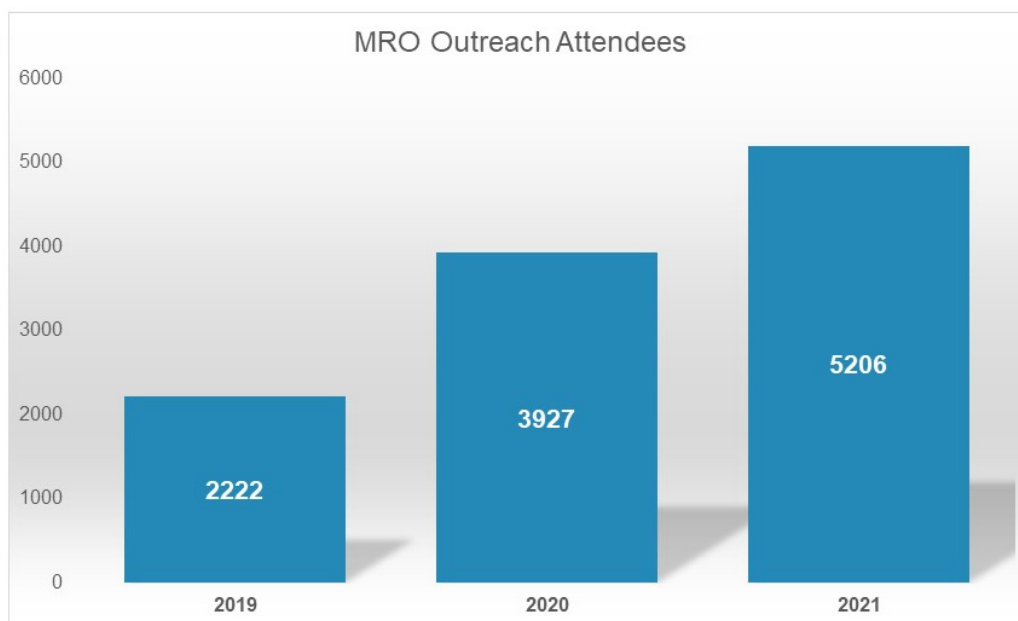
Sharing Information and Best Practices

Given the wide area view of risk and the activities MRO undertakes each day toward our shared vision

of a highly reliable and secure North American bulk power system, we are in a unique position to be a leader in sharing information, lessons learned, and best practices that contribute to regional system improvements. To meet a growing industry demand for this type of information, much of our efforts in 2021 were focused on delivering high quality outreach. Over the past two years, MRO has seen a 130 percent increase in attendees at conferences, webinars and outreach events - setting a new record high in 2021 of more than 5,000 attendees in total.

As part of the reconfiguration of MRO's organizational groups in 2019, industry volunteers on MRO's three advisory councils play a much greater role in identifying relevant topics and assisting with delivering valuable outreach to regional constituents. Even though interest in, and attendance at, MRO events continues to rise (especially with individuals outside the MRO region), we have been able to maintain an average event feedback score of 4.5 out of 5.

MRO's annual reliability, security, and CMEP conferences draw the largest audiences with over 350 attendees at each of these events in 2021. Shorter, more focused webinars on specific topics also saw an increase in 2021, with average attendance reaching more than 200 – significantly more than the average





of 67 in 2019. A joint outreach webinar conducted by MRO's Security and CMEP Advisory Councils on the topic of [Bulk Electric System Cyber System Information in the Cloud](#) drew 369 attendees, the largest ever for an MRO webinar.

Promoting and Supporting HEROs through Risk-Based Oversight

MRO is committed to its mission “to identify, prioritize and assure effective and efficient mitigation of risks to the reliability and security of the North American bulk power system by promoting Highly Effective Reliability Organizations® (HEROs).” This framework for reliable operations uses the theory and principles of high reliability organizations, which are organizations that have succeeded in avoiding catastrophes in environments where accidents can be expected due to complexity, interdependence, and risk.

Effective Compliance Oversight Plans

A Compliance Oversight Plan (COP) is an entity-specific oversight strategy that begins with an assessment of the entity's inherent risk, existing controls, and prior performance. This is a lengthy process that includes a detailed review of the entity's registration, compliance history, system performance and event history, and other risk factors. The resulting COP identifies what Reliability Standards are most applicable based on the entity's risk, as well as the appropriate interval for MRO's monitoring activities and the type of tools that should be used during oversight. Not only does the COP guide MRO's monitoring activities for each individual entity, it has the added benefit of being a good resource for the entity to prioritize continuous improvement efforts.

By the end of 2021, MRO had completed all of the COP's for the Transmission Operators, Balancing Authorities, and Reliability Coordinators where MRO is the Compliance Enforcement Authority or the Lead Regional Entity. This is a significant milestone given

the progression of COP development over the past two years. COPs are dynamic, and revisions are necessary if a registered entity experiences significant changes or assumes new compliance responsibilities, or new reliability and security risks emerge.

MRO continues to work closely with others across the ERO Enterprise to innovate and enhance COP processes. Two such initiatives are underway for 2022, including a streamlined COP process for low-inherent risk entities and a tool for analyzing COPs across multiple organizations to identify compliance trends.

Standardizing Processes across the ERO Enterprise

As the ERO Enterprise matures its risk-based approach to implementing the Compliance Monitoring and Enforcement Program (CMEP), the need for a more comprehensive system to manage and analyze CMEP information has become more acute. Align and the ERO SEL (Secure Evidence Locker) are key components of the ERO's reimagined suite of CMEP work and data management tools.

These tools are designed to process and track all CMEP activities with a goal of improving security and standardizing processes across the ERO Enterprise. Not only does Align provide a single, common portal for registered entities, it improves the oversight capabilities of ERO Enterprise staff.

In 2021, MRO participated in the following activities in

support of the development and deployment of Align and the ERO SEL:

- Created user stories for the development of Align Release 2, 3, and 4
- Completed user acceptance testing for Align Release 1, 2, and 3 and the ERO SEL
- Hosted training for all US registered entities in the MRO region and regional staff for Align Release 1 and 2 along with the ERO SEL
- Provided outreach to registered entities and regional staff via webinars, newsletter articles, and hot topics
- Prepared historical data for migration
- Managed Help Desk Tickets for Align and the ERO SEL
- Contributed to warranty call discussions

MRO was one of the first Regional Entities to go live with Align in March of 2021, along with Texas Reliability Entity.

Addressing Risks Associated with Extreme Winter Weather

Generator winterization preparation has been an area of focus across North America in response to weather-related events that placed undue burden on the bulk power system. One recommendation from [The South Central United States Cold Weather Bulk Electric](#)





[System Event of January 17, 2018](#) report was for “enhanced outreach to Generator Owners/Generator Operators” regarding generator winterization measures. In response to this recommendation, MRO successfully launched its Generator Winterization Program early in 2021.

Using a risk-based approach that considered geographic diversity, sector representation, and a variety of generation types, MRO sent surveys to ten generating facilities across the MRO region in an effort to capture information on winterization efforts and plans. The [NERC Reliability Guideline: Generating Unit Winter Weather Readiness](#) served as a reference for MRO’s assessment as the guideline identifies seven key areas of an effective winter readiness program.

In addition to the survey, four facilities accepted the opportunity for a site visit by MRO staff to review the site’s generator winterization plan and to share lessons learned and best practices received as part of MRO’s survey. The site visits were mutually beneficial and provided both parties an opportunity to share best practices and lessons learned related to cold weather preparedness. Each of the four site owners were provided a final report summarizing MRO’s visit.

MRO plans to develop and publish a public document that captures relevant best practices related to generator winterization in the future. This important work will continue in 2022.



Strengthening Engagement and Alignment

With the ERO Enterprise

MRO shares the ERO Enterprise vision of a highly reliable and secure North American bulk power system. The brilliant model of the ERO Enterprise allows for each of the six Regional Entities to focus on initiatives most impactful to specific geographic areas and respective footprints, while utilizing NERC's oversight role to ensure consistency in program implementation. While some risks are regionally unique, many of the risks we face as an enterprise and as industry exist continent-wide. In order to share innovative approaches amongst the regions and ensure ERO-wide alignment of efforts focused on

continent-wide risks, the ERO Enterprise utilizes over 20 different collaboration groups made up of staff at each of the Regions and NERC.

Over 50 percent of MRO staff participate on these ERO collaboration groups, and a number have leadership roles. In 2021, Director of Enforcement and External Affairs, Tasha Ward, was co-chair of the ERO Enforcement Group, Director of Internal Oversight and IT Ken Gartner was co-chair of the ERO Corporate Risk Group, Director of Communications Jessie Mitchell was co-chair of the ERO Communications Group, and Principal Risk Assessment and Mitigation Engineer Adam Flink co-chaired the Operations and Planning Compliance Task Force. MRO President

and CEO Sara Patrick, along with NERC President and CEO Jim Robb, co-chaired the ERO Executive Committee with overall responsibility for the strategic direction of the ERO Enterprise and direct oversight of six other ERO collaboration groups responsible for communications, finance, IT, human resources, and corporate risk. MRO Senior Vice President and Chief Operating Officer Richard Burt, along with NERC Senior Vice President and Chief Engineer Mark Lauby, co-chaired the ERO Operations Leadership Team with responsibility for operationalizing the ERO Enterprise strategic plan and overseeing the remaining collaboration groups who implement the delegated responsibilities of the ERO Enterprise such as reliability analysis, compliance monitoring, enforcement, and registration.

With Members and Registered Entities

Despite pandemic restrictions and the inability to meet in person, MRO's organizational groups continued to meet regularly - focusing efforts in 2021 on assessing reliability and security risks most prevalent in the MRO region, developing mitigation strategies, and expanding outreach efforts to help registered entities become more aware of and reduce risk to their individual systems. The following is a summary of that work.

Compliance Monitoring and Enforcement Program Advisory Council

The Compliance Monitoring and Enforcement Program Advisory Council (CMEPAC) continued to share information and best practices with registered entities across the MRO region, hosting a monthly call to discuss compliance related topics throughout 2021. The council also performed the required five-year review of MRO's Standards Process Manual and hosted MRO's annual CMEP Conference virtually for the second time due to the pandemic. CMEP members volunteered and are still participating in a pilot readiness assessment initiative focused on Reliability Standard CIP-012, Communications Between Control Centers.

NERC Standards Review Forum

The NERC Standards and Review Forum (NSRF) operates under guidance from the CMEPAC and provides a way for regional stakeholders to review and provide jointly agreed upon comments to NERC standards drafting teams during the standards development process. The NSRF meets weekly, with approximately 100 utility professionals in attendance. These individuals represent MRO's seven industry sectors and work collaboratively to develop and approve comments that are submitted to NERC for consideration. In 2021, the NSRF submitted 19 comment forms for 15 different standards. Feedback from NSRF participants reflects a high degree of satisfaction with the forum and individuals across the region are encouraged to participate.

Reliability Advisory Council

The Reliability Advisory Council (RAC) had a very productive year, focusing a significant amount of time and effort on providing regional outreach on important risk topics. One of the key outreach events hosted by the RAC in 2021 was MRO's annual Reliability Conference, which was held virtually for the second year in a row due to the pandemic. The conference welcomed more than 400 attendees to hear presentations on the changing resource mix and impact on coal plant operations, the joint NERC/NATF facility ratings practice initiative, and the 2021 February severe cold weather event. Given the increased industry focus on extreme weather scenarios and the February 2021 severe cold weather event, the RAC hosted its first ever Cold Weather Preparedness Workshop last year. The workshop focused on Regional Transmission Organization's preparations for cold weather operations, the recommendations from the joint FERC/NERC February 2021 Cold Weather Inquiry Report, and resource adequacy considerations for state regulators.

Protective Relay Subgroup

The Protective Relay Subgroup (PRS) that reports to the RAC continued its important work on assessing misoperations and the impact of misoperations on reliability of the bulk power system in MRO's region.

The PRS is planning to conduct outreach on the recent FERC/NERC Protection System Commissioning Programs report that was published in November of 2021. This report was a summary of findings from a joint staff review team that involved assessing a specific set of registered entities protections system testing or commissioning programs. The goal of the review was to reduce misoperations attributable to protection system commissioning. Misoperations during commissioning was identified as a high risk in the 2021 MRO Regional Risk Assessment.

Security Advisory Council

The Security Advisory Council (SAC) continued to provide a significant amount of outreach in 2021 to help raise awareness and share information on security risks with entities across the region. In addition to publishing newsletter articles, conducting webinars, and leading a technical roundtable, the SAC hosted MRO's Annual Security Conference and training that featured more than 20 speakers and over 530 participants.

SAC Threat Forum

The SAC Threat Forum (SACTF) was implemented in 2019 to share real-time information on existing and emerging security threats that could impact the regional bulk power system. The SACTF held 48 calls to facilitate the trusted sharing of threat information in 2021, and held a second weekly call to discuss COVID-19 during the height of the pandemic for entities to share response efforts. This second call has now been discontinued. Feedback from regional participants has been overwhelmingly positive for both calls.

MRO Representation on NERC Committees

MRO has a long and successful history of supporting NERC organizational groups by sponsoring stakeholder representatives to attend NERC committee meetings. As part of its sponsorship, MRO reimburses expenses incurred by the selected representatives attending NERC committee meetings for a three-year term. This program helps to reduce duplication of efforts and provides an important feedback loop between the two organizations.

MRO revisited the NERC committees it sponsors representatives on in 2021 following a redesign of NERC's organizational groups. As a result of its analysis, MRO added, continued, and discontinued sponsorship to various groups, ultimately increasing the number of sponsored representatives from 6 to 13. The groups to which MRO sponsors representatives is available on [MRO.net](https://www.mro.net). MRO members are encouraged to submit nominations for open seats.

Responding to Questions

MRO's heros@mro.net email address continues to be an effective method for supporting registered entities with specific compliance questions. Each question submitted to this email address is thoroughly reviewed by a specific team of staff that provides personalized responses to each requestor. A total of 64 questions were received in 2021, and MRO staff met with entities to discuss 8 of the questions, resulting in greater understanding of the question and MRO staff's response. Of the 64 questions submitted, 17 percent were addressed within a day of submission. The average response time overall is just under 12 days, which is significantly better than the 30-day response goal. The following chart reflects the type of questions posed to staff through the heros@mro.net address.

With Canadian Partners

MRO is one of three cross-border Regional Entities with oversight responsibilities that span the interconnected Canadian provinces. MRO operates in Manitoba under the legislative framework in place in the province, and in Saskatchewan under a Memorandum of Understanding with Saskatchewan Power Corp.

With the pandemic still hampering our ability to travel and conduct in-person meetings, MRO continued to engage with Canadian partners through virtual means throughout 2021. Staff attended the State of the Canadian Electricity Industry webinar in March, hosted by the Canadian Electricity Association (CEA), now known as Electricity Canada. The event, focused on the COVID-19 pandemic and its impacts on Canada's electricity sector, included panel discussions with the presidents and CEOs from several Canadian utilities.

At the request of CEA's Generation Council, Richard Burt, MRO's Senior Vice President and COO, and John Seidel, Principal Technical Advisor, delivered a presentation on the February 2021 Severe Cold Weather Event that impacted ERCOT, MISO and SPP. Burt and Seidel provided a high-level chronology of the event, along with actions that grid operators took to manage the load-generation balance and avoid a full-scale system collapse. The presentation was well received and generated much discussion and dialogue.

MRO staff also attended the 2021 CAMPUT Annual Conference. The two-day conference, organized by CAMPUT, Canada's association of energy and utility regulators, focused on the country's carbon-neutral future. The conference drew over 550 participants and featured keynotes and panelists offering their insights and expertise on a variety of social, political, economic, and technological impacts as Canada embarks on such a future. In 2021, the ERO also provided presentations to CAMPUT members on the Align/SEL project and NERC's standard development process.

In addition to the Canadian Regulators meeting that is conducted annually in conjunction with NERC's Q3 board meeting, MRO staff also attends a Saskatchewan Electric Reliability Authority meeting. The 2021 virtual meeting was attended by Lam Chung, Vice President and Engineer for Strategy, Innovation and Finance, and Tasha Ward, Director of Enforcement and External Affairs. Chung and Ward delivered a presentation highlighting recent activities and focus areas for MRO, including the September strategic planning session and operational impacts due to the pandemic. The presentation also provided details on MRO's process for assessing risk determinations associated with non-compliances.

These touchpoints with our Canadian partners are important to the success of MRO. We have great participation and engagement from our Canadian registered entities, and are proud of their involvement on our advisory councils and our board.

With State Regulatory Agencies

MRO's External Affairs department continued to strengthen relationships and become a valuable and trusted resource for other federal and state regulatory agencies in 2021. This effort supports the ERO Enterprise state outreach initiative to increase awareness and share information with state regulatory agencies to inform these individuals of publically available reliability and security information, as well as enhances visibility into ERO Enterprise work.

Meetings with state regulators within MRO's footprint included sharing information on MRO and other key players within the ERO Enterprise, along with technical resources like NERC's Long-Term Reliability Assessment, Summer Reliability Assessment, State of Reliability Report, and ERO Reliability Risk Priorities Report. MRO's Regional Risk Assessment, as well as MRO's seasonal assessments, add to the value of these continent-wide resources by highlighting key risks to MRO's regional footprint. The primary purpose of making connections and developing relationships with state regulators is to become a trusted expert on risk to reliability and security of the North American power grid. This effort is ongoing.





Effective and Efficient Operations

Corporate Risk Initiatives

Staff commenced a formal process in 2021 to identify and assess MRO's corporate risks. A small team was formed to oversee this initiative and develop a corporate risk register that would enable MRO to prepare for and mitigate a variety of risks to the business. The corporate risk register also provides a means for risk information to flow across the organization, reaching the appropriate level for action. The risk register is an indicator of the health of the organization and serves as input to MRO's strategic plan. During the preliminary phase of this project, the corporate risk register captured areas of corporate risk related to four central risk types: financial, legal, operational (facility, systems, people), and reputational. Key staff were asked to name specific risk concerns in these areas and share which poses the greatest threat to MRO's ability to meet its mission and achieve its business objectives. This information was documented,

ranked by severity of impact and likelihood, and then graphically mapped in order to further assess, prioritize, and respond. A list of internal controls that mitigate these risks was added to the register to reveal any gaps that remain to be addressed. The final risk register identified and mapped 19 corporate risks - four of which ranked highest in terms of priority. Those four risks related to system and data security and MRO's ability to attract and retain talent. This information was used during development of MRO's strategic plan in 2021 and will be an input to the 2023 business plan and budget. Other outcomes of the project include a corporate risk manual and a monitoring and review schedule that will allow staff to benchmark ongoing progress to the corporate risk program.

Enhance Cyber and Physical Security

MRO continued to see cybersecurity threats become more prevalent and sophisticated during 2021. Though small in size, because of the sensitivity and criticality of the work performed, and information managed by

MRO, it is more important than ever for the company to have strong cyber and physical security controls and processes in place. In some cases, controls and processes that usually only exist at much larger organizations. Recognizing this, several steps were taken in 2021 to enhance MRO's overall security posture. Some of these activities were manifested in the development of a corporate Insider Threat Program, participation in NERC's biennial grid security exercise (GridEx), internal tabletop exercises to test emergency response and disaster recovery plans, and efforts to continually refine our vulnerability management processes. Security collaboration and knowledge sharing amongst NERC and the Regions also became more refined and evolved into a key component of cyber and physical security activities within the ERO.

It is fully expected that cyber risks and threats will continue to evolve and grow over time. Protecting an organization from these risks and threats is a journey. As MRO continues on this journey it is anticipated that the work and efforts to protect the organization will continue to evolve and grow.

Respond to a Global Pandemic

The ongoing global pandemic required MRO staff to continue working remotely throughout 2021, which was done with only minor interruptions to planned work. The health and safety of our staff and stakeholders remained the highest priority for MRO's COVID-19 Emergency Response Team (ERT), with nearly all meetings, stakeholder engagements, and audits conducted virtually.

Throughout this time, MRO worked with its entities on creative approaches to certain projects (like virtual facility walk-throughs), in addition to providing [regulatory relief](#) to registered entities for noncompliances directly related to the pandemic.

The ERT had met a total of 50 times since the onset of the pandemic in early March 2020. The COVID-19 Preparedness Plan created by the ERT

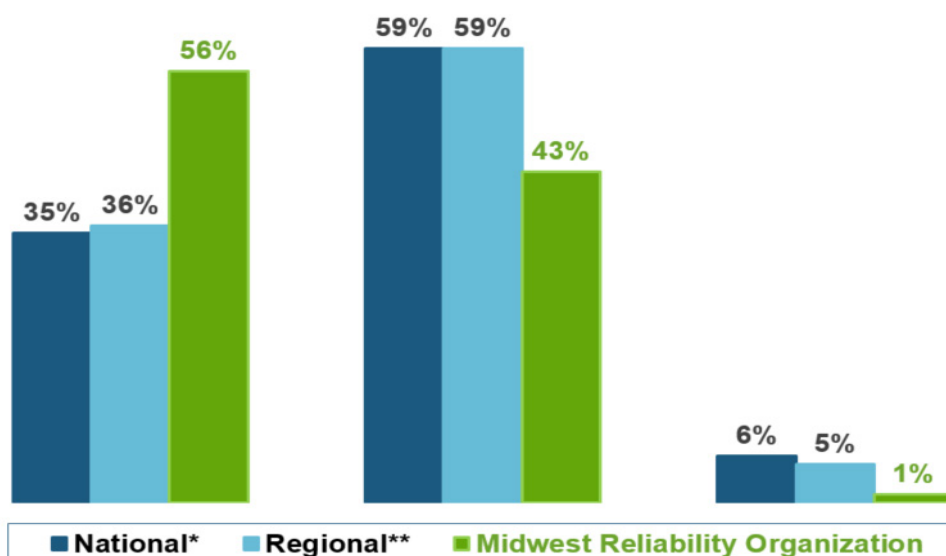
will remain a valuable resource for future pandemic response efforts.

MRO took advantage of an opportunity to expand and renovate its corporate offices while staff was working remotely because of the pandemic. The renovation included pandemic health and safety measures like an HVAC ionization system with the latest HEPA filters, multiple hand-washing stations, adequate meeting space that allows for social distancing, and individual work spaces for each employee. The expansion was completed in mid-2021 and staff were welcomed back to the office on January 3, 2022, with the opportunity to work remotely fifty percent per pay cycle. We continue to be grateful for the adaptability and resilience of our staff and stakeholders as we navigate through these uncertain times!

Employee Engagement Initiatives

In March of 2021, MRO conducted an employee engagement survey to measure the level of staff engagement and satisfaction. The timing was particularly important given the ongoing pandemic and other stressors related to racial injustice, political unrest, and increasing risks to the bulk power system. The survey was conducted anonymously through a third party and measured both engagement and satisfaction. The response rate was very high at 94 percent and the results reflect that MRO is 35 percent above the regional and national normative data.

Employee Engagement Comparisons





The results reflected that the levels of both employee engagement and satisfaction at MRO are very high, with *Pay*, *Benefits*, and *Executive Leadership Effectiveness* scoring the highest of the ten categories surveyed. Action items were developed and continue to be implemented to respond to the survey results.

Additionally, MRO received Mogul's TOP 100 Award for workplaces with the best benefits in 2021. This award is granted to employers who prioritize employee equity and wellness.

Diversity, Equity, and Inclusion

The Diversity, Equity, and Inclusion (DEI) Committee at MRO was formed in June of 2020 following the events surrounding George Floyd's death. MRO identified an opportunity to condemn injustice and discrimination and reaffirm our commitment to live by our values and continue to cultivate a workplace that prioritizes equality, diversity, and openness. MRO implemented and introduced an opportunity for employees to voluntarily join a committee focused on diversity, equity, and inclusion initiatives to support our efforts to educate, learn, appreciate and celebrate our differences.

The DEI committee had numerous successes throughout the year including leading the effort to

change the previous Columbus Day company holiday to Indigenous People's Day in recognition and honor of the first inhabitants of America and the Tribal Nations that are still thriving today. The committee successfully developed a proposal and gained approval to add Juneteenth to the company holiday schedule. Additional education was provided to staff related to this holiday and the celebration of diversity and equality commemoration, specifically celebrating the end of slavery in the United States. Today, Juneteenth further symbolizes this freedom and achievement with greater awareness and emphasis due to the social unrest events that the world has experienced over the last year and a half.

The DEI also introduced the Growing to C.A.R.E. (Celebrate Awareness, Respect and Equity) book club within the organization as an opportunity to engage in discussions to gain new perspectives, learn about other cultures, understand how to effectively communicate, and move forward together.

The first DEI Days was sponsored in the fall of 2021 and promoted and celebrated the diverse backgrounds of our employees through educational events focusing on diversity in STEM, diversity in the workplace, and awareness around being comfortable being uncomfortable. Continuing to provide educational material, training classes, and open sessions for discussion allows employees to build trust, to talk about hard and complex subjects, to embrace learning, and to be open-minded.

The DEI committee also developed an employee survey focused on gaining a better understanding about the MRO employee population in an effort to explore the experiences and needs of our employees as individuals. The data received yielded positive results and serves as a guide to target growth in this area for 2022.

Individual Development Plans

Significant progress occurred in 2021 to provide opportunities for the organization to focus on learning

and development initiatives, as well as reinforcing a dedicated focus on connection and engagement in a virtual environment. Two dedicated initiatives included the introduction and training on how to write and implement Individual Development Plans (IDPs) and assessing individual strengths. The IDP assists each employee in identifying areas to strengthen skills, and opportunities to increase exposure to gain additional experience in their current roles, and an opportunity to discuss future aspirations.

The IDP also serves as a tool to aid in the facilitation of ongoing discussions related to growth and development to help achieve success of an employee's plan. In conjunction with the implementation of the IDPs, all staff completed the Clifton Strengths assessment and training that provided each employee a personalized top-five strengths theme report and training to reference and utilize in situations and discussions going forward

Financial Results

MRO's board-approved 2021 Business Plan and Budget considered the ERO Enterprise Long-Term Strategy, key objectives and metrics, along with MRO's Strategic Plan. The annual budgeting process is a coordinated effort between NERC and the Regional

Entities and is subject to review and comment by industry stakeholders before approval by the NERC Board of Trustees, and finally FERC. Funding for the budget is primarily provided through assessments to load-serving entities—those owners, operators, and users of the bulk power system responsible for delivering electricity to retail customers—based on how much net energy is needed to meet end user requirements.

MRO's unaudited financial results were 4.8 percent under the approved 2021 budget. The underage was primarily driven by pandemic travel restrictions and a reduction in operating costs due to remote work. Costs related to the unbudgeted facility expansion project in 2020 did carry-over into 2021 when the project was completed. Those costs were offset by reductions in other budget areas.

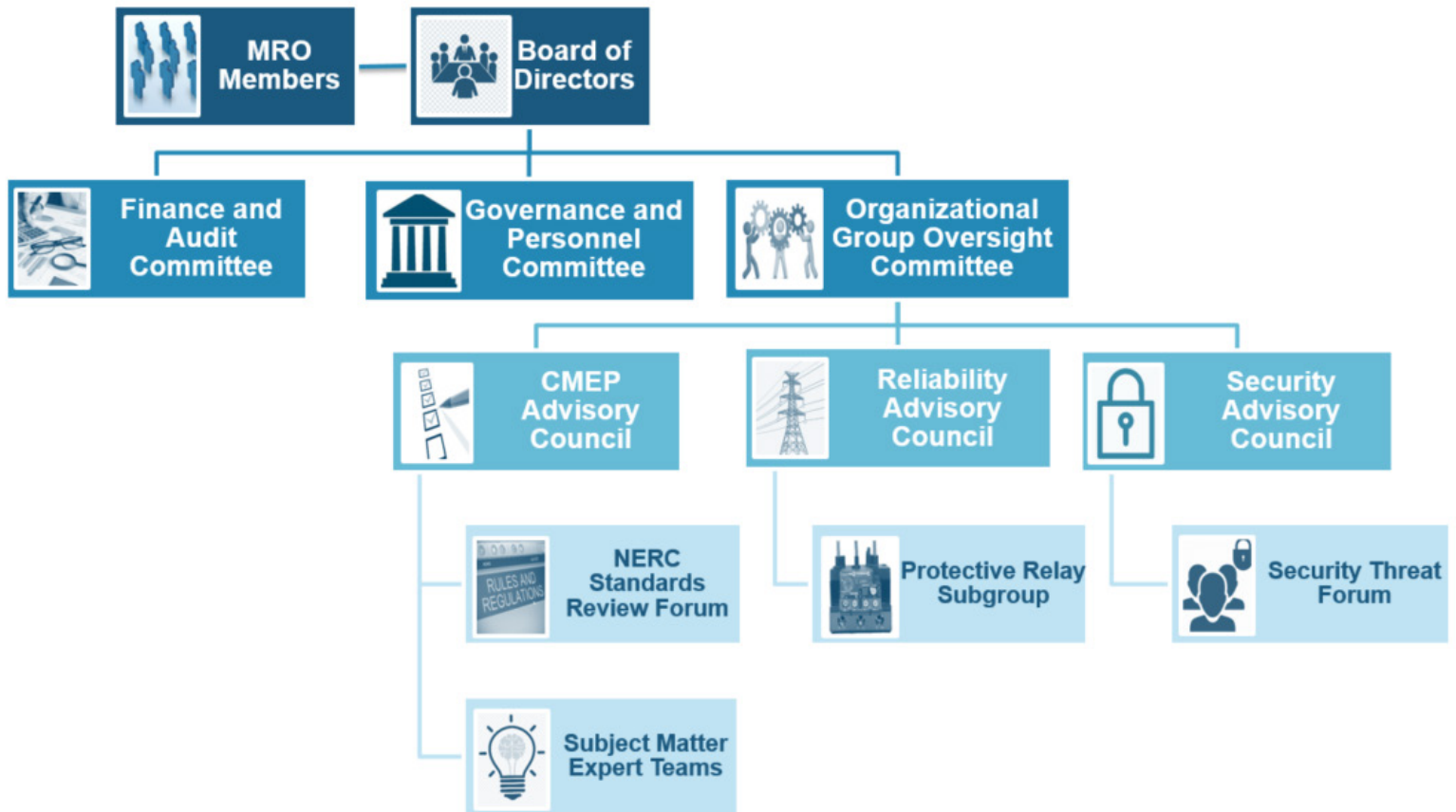
The 2022 budget is 8.8 percent more than the 2021 approved budget. It accommodates additional FTEs that support strategic initiatives to address industry and corporate risks, and presumes a return to in-person operations, travel, and meetings. As such, the budget reflects increased participation in outreach including support from MRO advisory councils. The associated total assessments are 5 percent more than the MRO assessments in 2021.

2021 Budget



2022 Budget





Governance Structure

The Benefits of MRO Membership

Membership with MRO is voluntary, free of charge and open to any person or entity with an interest in the reliable operations of the bulk power system in MRO's regional footprint. MRO has two classes of membership: member and adjunct member. To be eligible for membership, an entity must demonstrate that it belongs to one of the seven industry sectors in the MRO Region or qualifies as an adjunct member. Industry sector members can nominate individuals to serve on MRO organizational groups to share best practices and lessons learned, develop industry guidance, and belong to a network of industry peers.

MRO's organizational groups focus on identifying, assessing and mitigating regional risk in support of a shared vision with the ERO Enterprise of a highly reliable and secure North American bulk power system. In 2021, the board's Organizational Group Oversight Committee undertook an initiative to increase diversity on MRO's organizational groups. Diverse teams have proven to focus more on facts and remain objective during decision-making, leading to improved and more accurate group thinking. Additionally, diverse teams consider and process those facts more carefully given various perspectives and experiences.

For more information on membership with MRO, or on open organizational group positions, visit [MRO's website](#).

MRO Members

| | | |
|---|--|--|
| Acciona Wind Energy USA | Golden Spread Electric Cooperative, Inc. | Northwestern Energy |
| AE Power Services LLC | Grand River Dam Authority | Oklahoma Gas and Electric |
| Algonquin Power & Utilities Corp | Great River Energy | Oklahoma Municipal Power Authority |
| ALLETE, Inc. d/b/a Minnesota Power | Green Country Energy | Omaha Public Power District |
| Alliant Energy | Hastings Utilities | Otter Tail Power Company |
| Ameren | Heartland Consumers Power District | Pattern Operators LP |
| American Electric Power | Hutchinson Utilities Commission | Proven Compliance Solutions |
| American Transmission Company | Iberdrola Renewables | Ramakrishna Gokaraju, University of Saskatchewan |
| Ames Municipal Electric System | Iowa Association of Municipal Utilities | Rochester Public Utilities |
| Archer Energy Solutions, LLC | Iowa Industrial Energy Group | Saskatchewan Power Corporation |
| Arkansas Electric Cooperative Corporation | ITC Great Plains, LLC | Sheridan Electric Cooperative |
| Badger Power Marketing Authority of Wisconsin | ITC Midwest LLC | Southern Minnesota Municipal Power Agency |
| Basin Electric Power Cooperative | Kansas City Board of Public Utilities | Southern Power Company |
| Birch Infrastructure PBLLC | Kansas Electric Power Cooperative, Inc. | Southwest Power Pool |
| Muscatine Power & Water | Lincoln Electric System | Southwestern Power Administration |
| Capital Power Corporation | Madison Gas and Electric Company | Southwestern Public Service Company |
| Caprock Wind, LLC | Manitoba Hydro | Sunflower Electric Power Corporation |
| Cedar Falls Utilities | Marshfield Utilities | Tenaska Power Services Co. |
| Central Iowa Power Cooperative | McKenzie Electric Cooperative | The Empire District Electric Company |
| Central Power Electric Cooperative, Inc. | MidAmerican Energy Company | The Energy Authority |
| City of Independence Power & Light | Midcontinent Independent System Operator, Inc. | Upper Missouri Power Cooperative |
| City Utilities of Springfield, Missouri | Midwest Energy Inc. | Upper Peninsula Power Co. |
| Coffeyville Municipal Light & Power | Minnesota Chamber of Commerce | Utility Services, Inc. |
| Corn Belt Power Cooperative | Minnkota Power Cooperative, Inc. | Western Area Power Administration |
| Dairyland Power Cooperative | Missouri River Energy Services | Western Farmers Electric Cooperative |
| Dogwood Power Management, LLC | Montana-Dakota Utilities Company | Willmar Municipal Utilities |
| Dominion Energy Marketing, Inc. | Moorhead Public Service | Wisconsin Industrial Energy Group |
| East River Electric Power Cooperative, Inc. | Mountrail-Williams Electric Cooperative | Wisconsin Rapids Water Works and Lighting Commission |
| Evergny | Nebraska Public Power District | WPPI Energy |
| Flat Ridge 2 Wind Energy LLC | New Ulm Public Utilities | |
| Flat Ridge Wind Energy LLC | NextEra Energy Resources, LLC | |
| Glencoe Light and Power | Northern States Power Company (Xcel Energy) | |

Recognizing HEROs

Our sincere thanks to all of the individuals who volunteered their time and expertise on MRO organizational groups in 2021. Your participation is critical to our success!

CMEP Advisory Council

- Carl Stelly (Chair), Southwest Power Pool
- Terri Pyle (Vice Chair), Oklahoma Gas and Electric
- Andy Crooks, Saskatchewan Power Corp.
- Eric Ruskamp, Lincoln Electric System
- Fred Meyer, The Empire District Electric Company
- Joseph DePoorter, Madison Gas & Electric
- Mahmood Safi, Omaha Public Power District
- Mark Buchholz, Western Area Power Administration
- Matt Caves, Western Farmers Electric Cooperative
- Mike Smith, Manitoba Hydro
- Paul Mehlhaff, Sunflower Electric Power Cooperative
- Sharon Koller, American Transmission Co.
- Thad Ness, Xcel Energy
- Tracey Stewart, Southwestern Power Administration
- Tiffany Lake, Evergy
- Theresa Allard, Minnkota Power Cooperative

Reliability Advisory Council

- Dick Pursley (Chair), Great River Energy
- Jason Weiers (Vice Chair), Otter Tail Power Company
- Allen Klassen, Evergy
- Binod Shrestha, Saskatchewan Power Corp.
- CJ Brown, Southwest Power Pool
- Dallas Rowley, Oklahoma Gas and Electric
- Dean Schiro, Xcel Energy
- Derek Brown, Evergy
- Durgesh Manjure, MISO
- Dwayne Stradford, American Electric Power
- Gayle Nansel, Western Area Power Administration
- John Stephens, City Utilities of Springfield
- Nandaka Jayasekara, Manitoba Hydro
- Nick Giffin, American Transmission Co.
- Ron Gunderson, Nebraska Public Power District

Security Advisory Council

- Jason Nations (Chair), Oklahoma Gas and Electric
- John Breckenridge (Vice Chair), Evergy
- Chris Carlson, Grand River Dam Authority
- Clayton Whitacre, Great River Energy

- Damon Ounsworth, Saskatchewan Power Corp.
- Jamey Sample, Xcel Energy
- Jared Moses, American Electric Power
- Jodi Jensen, Western Area Power Administration
- Joe Petaski, Manitoba Hydro
- Joe Polen, MISO
- Justin Haar, Minnkota Power Cooperative
- Sam Ellis, Southwest Power Pool
- Tim Anderson, Dairyland Power Cooperative
- Tony Eddleman, Nebraska Public Power District
- Waren LaPlante, Allete

SAC Threat Forum

- Brett Lawler (Chair), Xcel Energy
- Jodi Jensen (Vice Chair), Western Area Power Administration

Protective Relay Subgroup

- John Grimm (Chair), Xcel Energy
- Robert Soper (Vice Chair), Western Area Power Administration
- Alex Bosgoed, Saskatchewan Power Corp.
- Casey Malskeit, Omaha Public Power District
- Cody Remboldt, Montana-Dakota Utilities
- David Wheeler, Southwestern Public Services Co.
- Dennis Lu, Manitoba Hydro
- Derrick Schlangen, Great River Energy
- Derek Vonada, Sunflower Electric Power Corporation
- Gary Stodter, MidAmerican Energy
- Greg Hill, Nebraska Public Power District
- Greg Sessler, American Transmission Company
- Matt Boersema, Western Farmers Electric Cooperative
- Jeff Beasley, Grand River Dam Authority
- Ryan Einer, Oklahoma Gas and Electric
- Ryan Godwin, American Electric Power
- Scott Paramore, Kansas City Board of Public Utilities
- Terry Fett, Central Iowa Power Cooperative
- Wayne Miller, ITC Holdings

NERC Standard Review Forum

- Joe DePoorter (Chair), Madison Gas and Electric

- Larry Heckert (Vice Chair), Alliant Energy
- Bill Shultz, Southern Company Generation
- Bobbi Welch, MISO
- Bryan Sherrow, Kansas City Board of Public Utility
- Christopher Bills, City of Independence Power & Light
- David Heins, Omaha Public Power District
- Douglas Webb, Evergy
- Fred Meyer, Algonquin Power Co.
- Jamie Monette, Minnesota Power/ALLETE
- Jamison Cawley, Nebraska Public Power District
- Jeremy Voll, Basin Electric Power Cooperative
- Jodi Jensen, Western Area Power Administration
- John Chang, Manitoba Hydro
- Marc Gomez, Southwestern Power Administration
- Matthew Harward, Southwest Power Pool
- Michael Brytowski, Great River Energy
- Seth Shoemaker, Muscatine Power & Water
- Terry Harbour, MidAmerican Energy
- Troy Brumfield, American transmission Co.

MRO NERC Representatives

- Armin Boschmann, Manitoba Hydro (CIPC)
- Damon Ounsworth, Saskatchewan Power (CIPC)
- David Brauch, MISO, NERC Inverter Based Resource Performance Task Force (IRPTF)
- Jaimin Patel, Saskatchewan Power (EGWG)
- John Breckenridge, Evergy (CIPC)
- Mahmood Safi, Omaha Public Power District (CCC)
- Marc Child, Great River Energy (CIPC)
- Mark Buchholz, Western Area Power Administration (MCCF & SPP)
- Mark Gutzmann, Xcel Energy (SPCS)
- Paul Crist, Lincoln Electric System (CIPC)
- Silvia Parada Mitchell, NextEra Energy (MRC)
- Steve Sanders, Western Area Power Administration (RTOS)
- Sunny Raheem, Great River Energy (SPIDERWG)
- Thad Ness, Xcel Energy (CCC)



HERO

HIGHLY EFFECTIVE RELIABILITY ORGANIZATION

Volunteer Recognition Program

MRO places a high priority on supporting its industry volunteers. One of the ways we do this is through our [volunteer recognition program](#). This program allows MRO to recognize the dedication and commitment of the many industry volunteers that help to make MRO's vision and mission a reality.

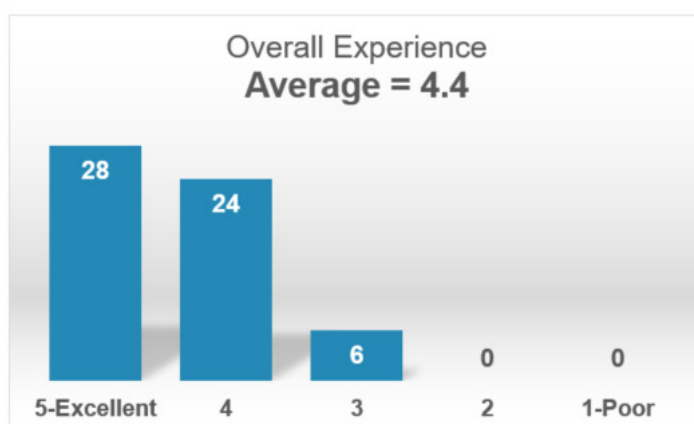
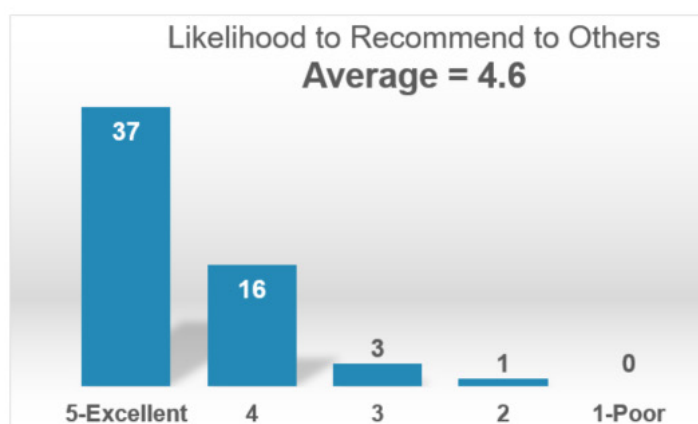
As part of the volunteer recognition program, MRO presents an annual HERO Award to recognize individuals who have shown exemplary initiative and commitment to advancing the concept and principles of Highly Effective Reliability Organizations throughout the MRO region and in support of our vision and mission. The following 2021 HERO Award recipients are highlighted on [MRO's website](#):

- Mark Buchholz, Western Area Power Administration
- Sharon Koller, American Transmission Company

Also in 2021, the following volunteers were recognized for their years of service with MRO:

- Allen Klassen, Westar Energy, 10 years
- Dean Schiro, Xcel Energy, 12 years
- Gary Stodter, MidAmerican Energy Company, 3 years
- Jeremy Voll, Basin Electric Power Cooperative, 4 years
- Jodi Jensen, Western Area Power Administration, 12 years
- Joe DePoorter, Madison Gas & Electric, 12 years
- John Breckenridge, Evergy, 12 years
- Mike Smith, Manitoba Hydro, 4 years
- Nick Giffin, American Transmission Company, 4 years
- Ryan Godwin, American Electric Power, 3 years
- Sharon Koller, American Transmission Company, 6 years
- Steve Sanders, Western Area Power Administration, 7 years
- Tracey Stewart, Southwestern Power Administration, 3 years
- Warren LaPlante, Minnesota Power, 4 years
- Wayne Miller ITC Holdings, 6 years

What MRO organizational group members said in 2021 about their Service:



The People That Make It Happen

MRO's Leadership Team



Sara Patrick
President and CEO



Richard Burt
Senior Vice President and Chief
Operating Officer



Lam Chung
Vice President for Strategy,
Innovation and Finance



Lisa Zell
Vice President General Counsel
and Corporate Secretary



Bryan Clark
Director of Reliability
Analysis



Jeff Norman
Director of Compliance
Monitoring



Jessie Mitchell
Director of Communications



Julie Peterson
Assistant Corporate
Secretary and Senior
Counsel



Karla Schiller
Director of Human
Resources



Ken Gartner
Director of Internal
Oversight and Information
Technology



Steen Fjalstad
Director of Security



Tasha Ward
Director of Enforcement and
External Affairs



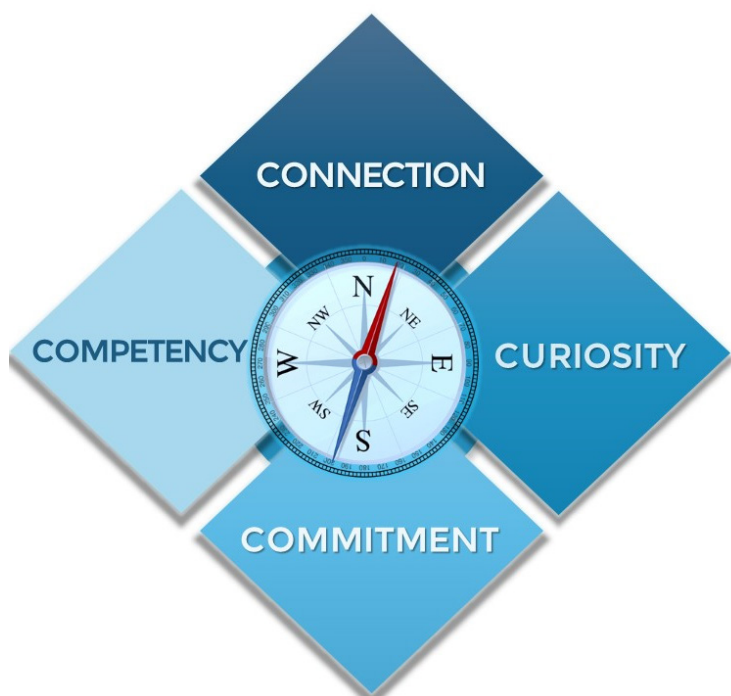
William Steiner
Director of Risk Assessment
and Mitigation

Leadership Philosophy

MRO's leadership team has worked hard to establish and foster a culture where people are **connected** to the work they do and the people they work with, both at MRO and across the ERO Enterprise. A culture where we practice authentic kindness and motivate and inspire each other to contribute new and bold ideas that lead to better alignment and results.

A culture where **curiosity** is encouraged and people feel empowered to examine the status quo and ask tough questions. A culture that starts with the WHY and where a **commitment** to our vision of a highly reliable and secure North American bulk power system is led by example. A culture that values technical **competency**. One where decisions are not made solely on the basis of power and authority, but that defers to the intelligence, experience and expertise of our boots on the ground.

Finally, a culture that communicates an invented future; where we all have opportunities to lead and be part of the solution. These are the keys to our sustainable success.



Our Core Principles

Accountability

- Maintain the public trust in fulfilling responsibilities and use our funding wisely.
- Act in a timely manner on the basis of facts to address issues related to events, emerging reliability risks, the needs of stakeholders, and the public interest.

Independence

- Be impartial, objective, fair, and intellectually honest.
- Ensure governance practices that provide both regulatory independence and inclusion of stakeholder expertise to address reliability and security matters.

Inclusiveness and Transparency

- Create opportunities for stakeholder engagement.
- Consider and balance the diverse interests of all stakeholders, including costs imposed to the consumer.
- Leverage industry expertise and avoid unnecessary duplication.

Innovation

- Assess emerging risks and adapt to change.
- Encourage new ideas and prioritize efforts that contribute to improving productivity and reliable operations.

Excellence

- Strive for operational excellence by being rigorous, accurate, and exacting.
- Promote the active participation of the best technical experts.
- Make informed decisions regarding efficient use and allocation of resources.

Integrity

- Maintain the highest levels of ethical conduct.
- Maintain respectful relationships.
- Protect the security of confidential information

2021 MRO Board of Directors



Thomas Kent, Chair
Nebraska Public Power
District
Cooperative Sector



Brad Cox, Vice Chair
Tenaska Power Services
Generator Power Mktg.
Sector



Charles Marshall
ITC Holdings
Transmission System
Operator Sector



Darcy Neigum
Montana-Dakota Utilities
Investor Owned Sector



Dehn Stevens
MidAmerican Energy
Investor Owned Sector



Dr. Dana Born
Independent Director



Dr. Paul Barber
Independent Director



Gordon Pietsch
Great River Energy
Cooperative Sector



Iqbal Dharmi
Saskatchewan Power
Canadian Sector



James "JP" Brummond
Alliant Energy
Investor Owned Sector



Jeanne Tisinger
Independent Director



Jennifer Flandermeyer
Regional Director



JoAnn Thomson
Otter Tail Power Co.
Investor Owned Sector



Keri Glitch
MISO
Transmission System
Operator Sector



Lloyd Linke
Western Area Power Assc.
Federal Power Sector



Michael Desselle
Southwest Power Pool
Transmission System
Operator Sector



Michael Lamb
Xcel Energy
Investor Owned Sector



Paul Crist
Lincoln Electric System
Municipal Utility Sector



Scott Nickels
Rochester Public Utilities
Municipal Utility Sector



Silvia Parada Mitchell
NextEra Energy
Generator Power Mktg.
Sector



Stuart Lowry
Regional Director



Thomas Graham
Independent Director



Tony Clark
Manitoba Hydro
Canadian Sector

The Work of the Board

In early 2021, board leadership requested the creation of a task force composed of board members to review the board's size and composition (Task Force). The board currently sits at 23 members, including 19 stakeholder directors representing seven industry sectors and four independent directors. The purpose of the Task Force was to evaluate the current representation structure of the board and sector member distribution to determine: 1) how the board represents MRO membership, 2) if the definition of industry sectors as it stands today is appropriate for MRO's membership or if industry sector names and/or definitions need to change, and 3) what is the appropriate board size.

Task force was led by Dr. Paul Barber (Independent Director), and included Michael Desselle (Transmission System Operator), Iqbal Dhami (Canadian Utility), Thomas Graham (Independent Director), Stuart Lowry (President and CEO/Cooperative) and JoAnn Thompson (Investor Owned Utility). The Task Force began its work in July and met monthly, dividing its focus into the following topics:

- Board Size and Efficiency
- Regional Director Roles
- Sector Representation
- Board Balance

In these discussions, the Task Force analyzed numerous data points, including: notable MRO membership characteristics; sector definitions and reliability functions; board characteristics; sector representations and governance structure; cost elements associated with the board under various conditions; how MRO registered entities are involved in NERC, how NERC has defined its sectors and how its sector definitions compare with those of MRO; and compared three key indicators that inform various aspects of reliability and governance (Membership, Reliability Impact on Load, and Compliance Effort for Reliability). As the Task Force neared the end of its analysis, it was clear that ensuring board balance and MRO sector representation was fundamental, but that other important factors must also be accounted for, such as, geographic representation, Net Energy for Load (NEL), and the standards requirements for each sector.

The Task Force presented the following findings at the fourth quarter MRO board meeting.

Board Size and Efficiency: The Task Force found

that the size of the board was not a hindrance in its effectiveness because it lent itself to offering numerous industry perspectives, institutional knowledge, and further enhanced diversity, along with providing active committee engagement. Therefore, the recommendation of the Task Force was that the board size remain at 23 members.

Regional Director Roles: The regional director roles were originally created for the purpose of integrating the former SPP RE region into MRO, and that purpose has been satisfied. The Task Force found worth in repurposing these roles to assist with the continued membership alignment of the board with geographic and sector representation, as well as meeting board skill set needs. The GPC will review board composition and expertise in the first quarter of the year in which any regional director seat expires to identify gaps that could be fulfilled through this role.

Sector Representation: Extensive data and discussion was collected and analyzed by the Task Force in the review of MRO's membership sectors and the board's representation of the same. Upon comparing MRO sectors with others across the ERO Enterprise, the Task Force ultimately determined that MRO sector definitions need not be in precise alignment with NERC and the other regions and, further, any notable differences as it pertained to MRO were appropriate.

Board Balance: The discussion on board balance focused on how to ensure a balance of sector representation of the MRO members, along with other important factors such as geographic diversity, NEL, and the standards requirements for each sector. The Task Force determined that the process used to trigger the review of the regional director position descriptions should also trigger the GPC's review of board balance.

In conclusion, the Task Force recommended and the board approved no changes to the board size and composition.

As then-Chair Kent commented at the Q3 board meeting, "This was great work done by the Task Force and we thank them for their considerable time and efforts. What they have done is not only to review where we are at today, but they have also laid out a governance process to periodically review board composition to ensure board members stay current with good governance best practices so we may also do our part to ensure the safety and security of the bulk power system."



The Path Forward

MRO's strategic planning process began with an environmental scan of industry trends and forecasts, existing and emerging industry risks, along with business risks to the organization. In preparation for strategic planning, I read the book "FLUX: 8 Superpowers for Thriving in Constant Change" by April Rinne. The book reminds us that around the world, it's an era of change. And it is not just WHAT is changing; it's HOW FAST the world we've known is evolving. The pace of change has never been as fast as it is today, and yet, it is likely to never again be this slow.

Given where we are today, on the heels of another year of pandemic response and cyber activity at unprecedented levels, Rinne's message of seeing change as an opportunity and not a threat provides optimism for the future. She writes about the importance of being clear and grounded in your values to thrive in constant change. MRO's vision of a highly reliable and secure North American bulk power for the benefit of society provides a clear and noble vision that is easy to stand behind. The many challenges we face today emphasize the need for us to work collaboratively in pursuit of this vision.

In September, the board held its biennial strategic planning session. MRO's Board of Directors, senior leadership team, and technical experts proficient in key risk areas, gathered together to confirm MRO's vision, mission, and core principles, as well as the assumptions made during the initial environmental assessment. A SWOT (strengths, weaknesses, opportunities, threats) analysis was conducted to inform the strategy, identify key focus areas, and set priorities. The group then leaned into MRO's past experiences and the present landscape, to develop long-term objectives and a thoughtful roadmap to where and who we want to be in 2024. MRO's 2022-2024 Strategic Plan

identifies three strategic priorities, focused on PEOPLE, PROCESSES, and PARTNERSHIPS. The future of MRO relies upon developing the next generation of leaders that will continue to advance the organization's vision and mission. Improving staff training, creating career advancement and development opportunities, focusing on soft skills and technical competency, and fostering a culture of diversity, equity and inclusion are objectives in this area. Focusing on PEOPLE will ensure that MRO remains an innovative, resilient, and high-performing organization with an increased emphasis on leadership development and culture.

Amazing results can be achieved through a mindset of continuous improvement and the ability to imagine an invented future. Leveraging the skills of futuristic thinkers at MRO, across the ERO, and within industry, is critical to addressing complex and evolving risk. Planning for the future must be integrated with delegated responsibilities and MRO's public trust obligation to be an effective and efficient regulator, and to use funding wisely. Streamlining and improving PROCESSES will drive operational excellence throughout MRO, while emphasizing effectiveness and efficiency.

The electric industry is facing numerous, dynamic challenges that require forward-thinking insight and analysis to develop and support initiatives that ensure a highly reliable and secure bulk power system into the future. Increased coordination across all industry stakeholders, as well as other critical infrastructure sectors, is critical to MRO's success. PARTNERSHIPS with our industry stakeholders, colleagues across the ERO Enterprise, trade associations, U.S. federal and state agencies, Canadian federal and provincial regulators, related industries, and more, result in a nimble, adaptive, and collaborative culture that allows MRO to carry out its mission as a trusted and valued member of the ERO Enterprise.

These strategic priorities serve to guide the key objectives and supporting activities identified in a very thoughtful, forward-thinking three-year strategic plan that is grounded in our values and provides MRO the flux capacity for thriving in constant change . . . which may well be our new/novel normal.

Our future is bright!

-Sara Patrick, President and CEO



PEOPLE

1 Ensure that MRO remains an innovative, resilient, and high-performing organization with an increased emphasis on leadership development and culture.

1. Ensure continuous learning, growth, and career development opportunities.
2. Foster a culture of diversity, equity, inclusion, honesty, and trust through constructive feedback, empowerment, and clarity of roles.
3. Promote opportunities for crossdepartmental and inter-ERO collaboration.
4. Formalize processes to ensure ecosystem, continuity of leadership and a skilled and engaged workforce

2 Drive operational excellence throughout MRO in all processes and procedures, while emphasizing effectiveness and efficiency.

1. Focus on identifying, assessing, and mitigating corporate risks and ensure expenditure of resources are prioritized and appropriately deployed.
2. Foster a culture of continued improvement and innovation through forward thinking and futuristic visioning.
3. Leverage KPIs to measure operational effectiveness.
4. Identify and implement processes to assess and prioritize work.



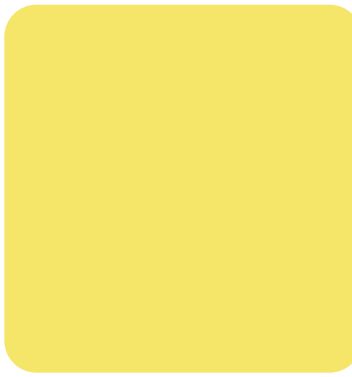
PROCESSES



PARTNERSHIPS

3 Develop a nimble, adaptive, and collaborative culture that allows us to carry out our mission as a trusted and valued member of the ERO Enterprise.

1. Focus on advanced methods for identifying, assessing, and actively mitigating new and emerging risks to the BPS and ensure resources are deployed appropriately.
2. Lead and support ERO transformation efforts.
3. Expand collaborative relationships with federal, state, and provincial regulators, independent system operators, industry leadership, and the broader reliability and security ecosystem.
4. Ensure security and confidentiality of our partners' data and information.
5. Increase capability to support mitigation of increasing frequency and sophistication of cyber risks for corporate and industry (ransomware, phishing, vulnerabilities, etc.).
6. Be a trusted leader in providing premier and cutting-edge outreach to our stakeholders.



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