

KEY METRICS

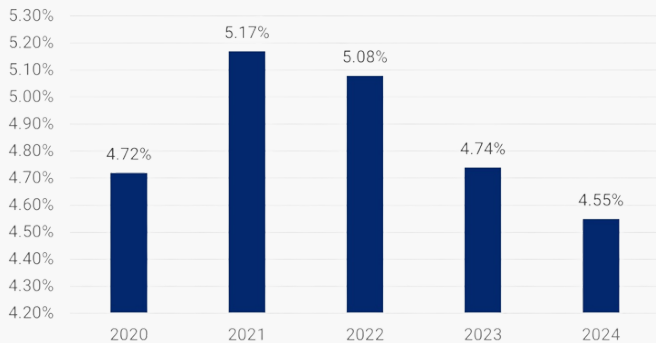
The WECC Protection and Control Subcommittee's (PCS) 2024 Misoperations Report is a summary of system performance in 2024 related to misoperations, including the misoperations rate, top causes, and recommended practices for mitigating misoperations.

Protection system misoperations remain a critical reliability concern for the Bulk Electric System, given their potential to cascade into significant events that could lead to load loss.

Protection systems remove faults from the system and limit exposure of high fault currents to sensitive equipment. Misoperations occur when these systems do not perform as desired, leading to unnecessary outages of generation and transmission. Their correct operation is a key measure of system performance.

In the Western Interconnection, the misoperations rate in 2024 was 4.55%, the lowest in five years. This continues a decade-long decline in misoperations resulting from a collaborative effort between WECC and industry, led by the PCS.

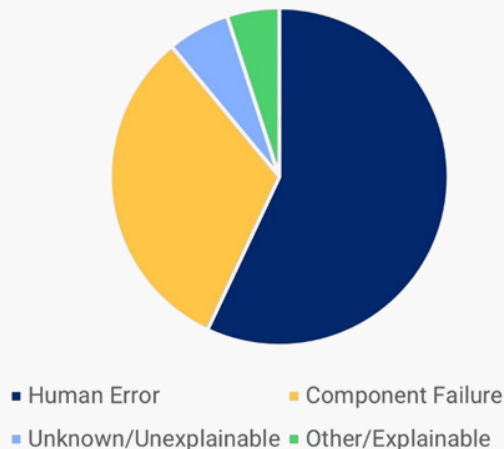
MISOPERATIONS RATE



TOP CAUSES:

- Incorrect Settings was the leading cause, accounting for 41% of incidents.
- Incorrect Settings increased nearly 60% between 2023 and 2024.
- Relay Failures/Malfunctions was responsible for 14% of incidents, the second-leading cause.
- These two categories have consistently been the leading contributors to incidents over the last five years.

ROOT CAUSE CLASSIFICATION



RECOMMENDED PRACTICES

- Standardize documentation and settings-verification procedures
- Enhance peer review and training
- Adopt satellite-synchronized testing for communications-assisted schemes
- Use synchrophasor data and digital fault recorders for post-event analysis
- Conduct comprehensive in-service and primary injection checks
- Implement commissioning checklists and quality-assurance protocols
- Apply time delays to mitigate communication noise
- Establish firmware management processes to ensure compatibility and test validity

CONCLUSION

By embracing rigorous commissioning and maintenance strategies, refining engineering practices, and using data-driven diagnostics, entities across the Western Interconnection can continue to improve reliability and reduce the impact of misoperations.

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