

WHY ARE WE HERE

**Thomas Teafatiller, Principal Engineer,
Engineering and System Performance**

RF Protection System Workshop

Aug. 7, 2024



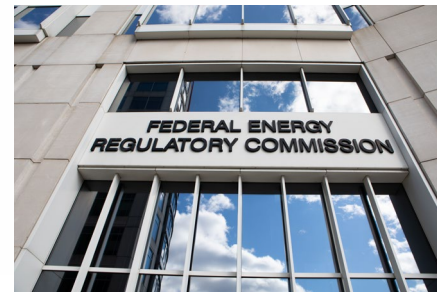
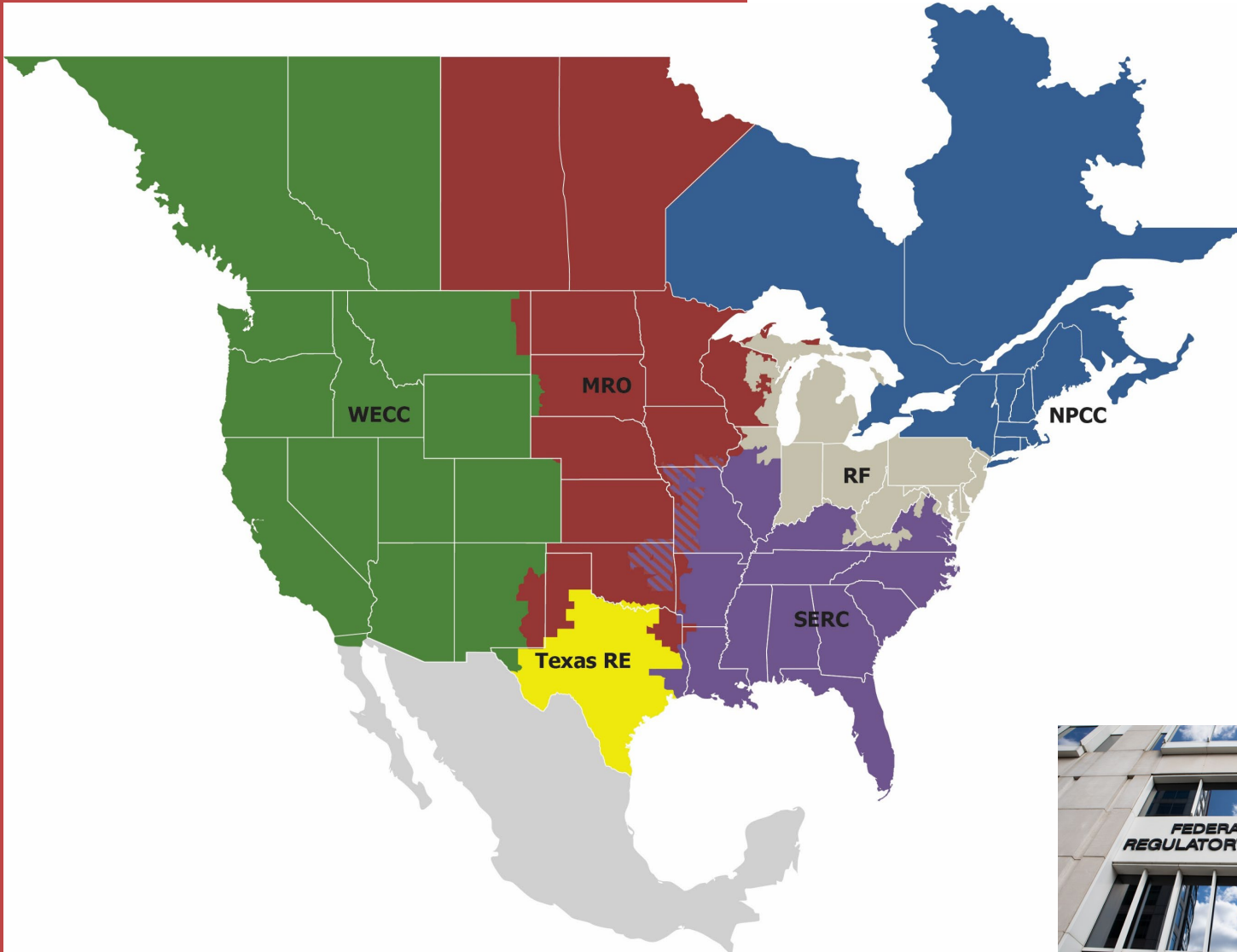
RELIABILITY FIRST

OVERVIEW

- Review RF misoperation performance across the Electric Reliability Organization (ERO) Enterprise
- Analyze the misoperation performance of RF in 2023 and discuss performance trends
- Provide update on capacitor misoperations
- Analyze human performance misoperations

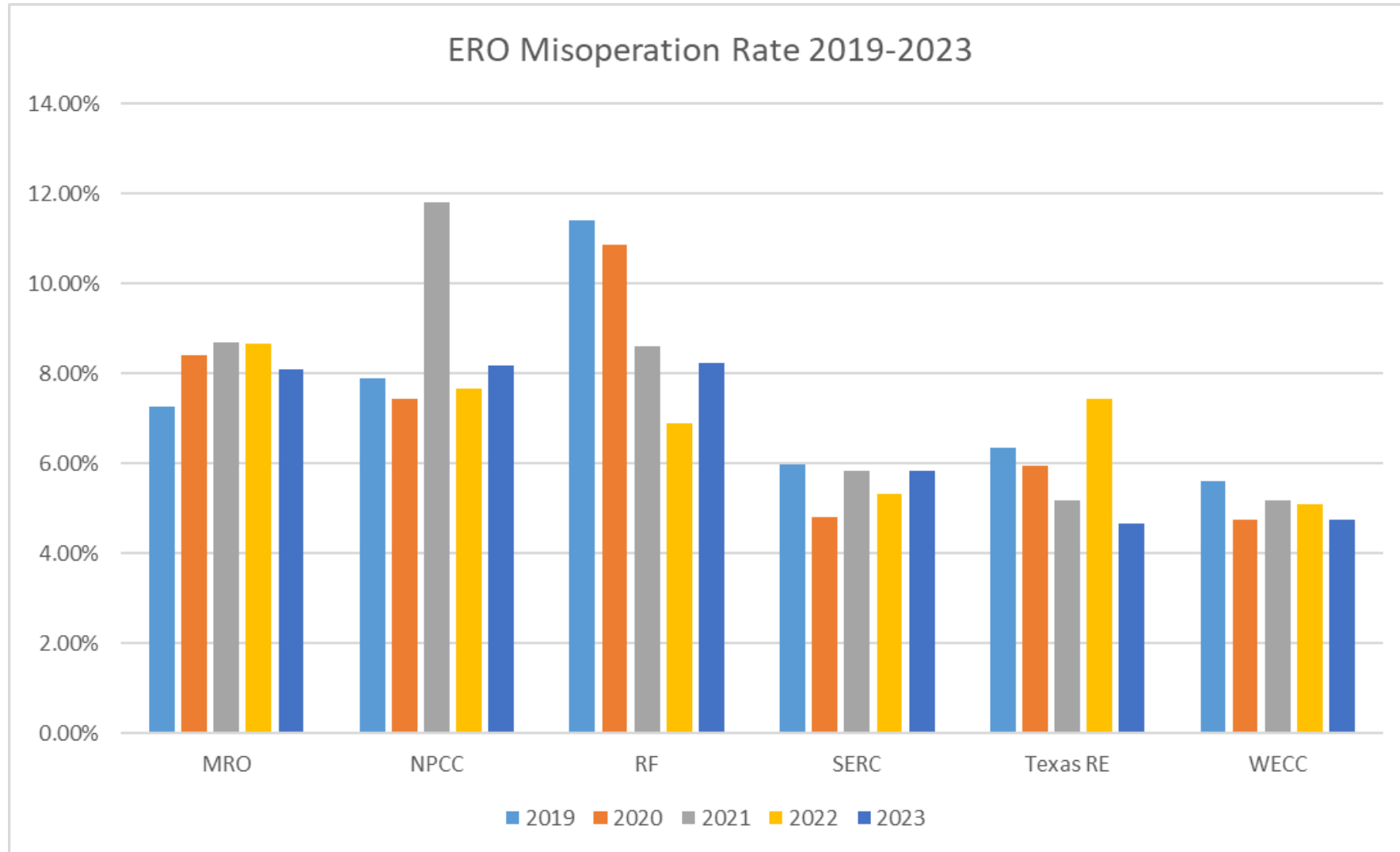
ELECTRIC RELIABILITY ORGANIZATION

- ERO consists of NERC and six (6) Regional Entities
- Regional Entities are the Compliance Enforcement Authority (CEA) for their respective footprints

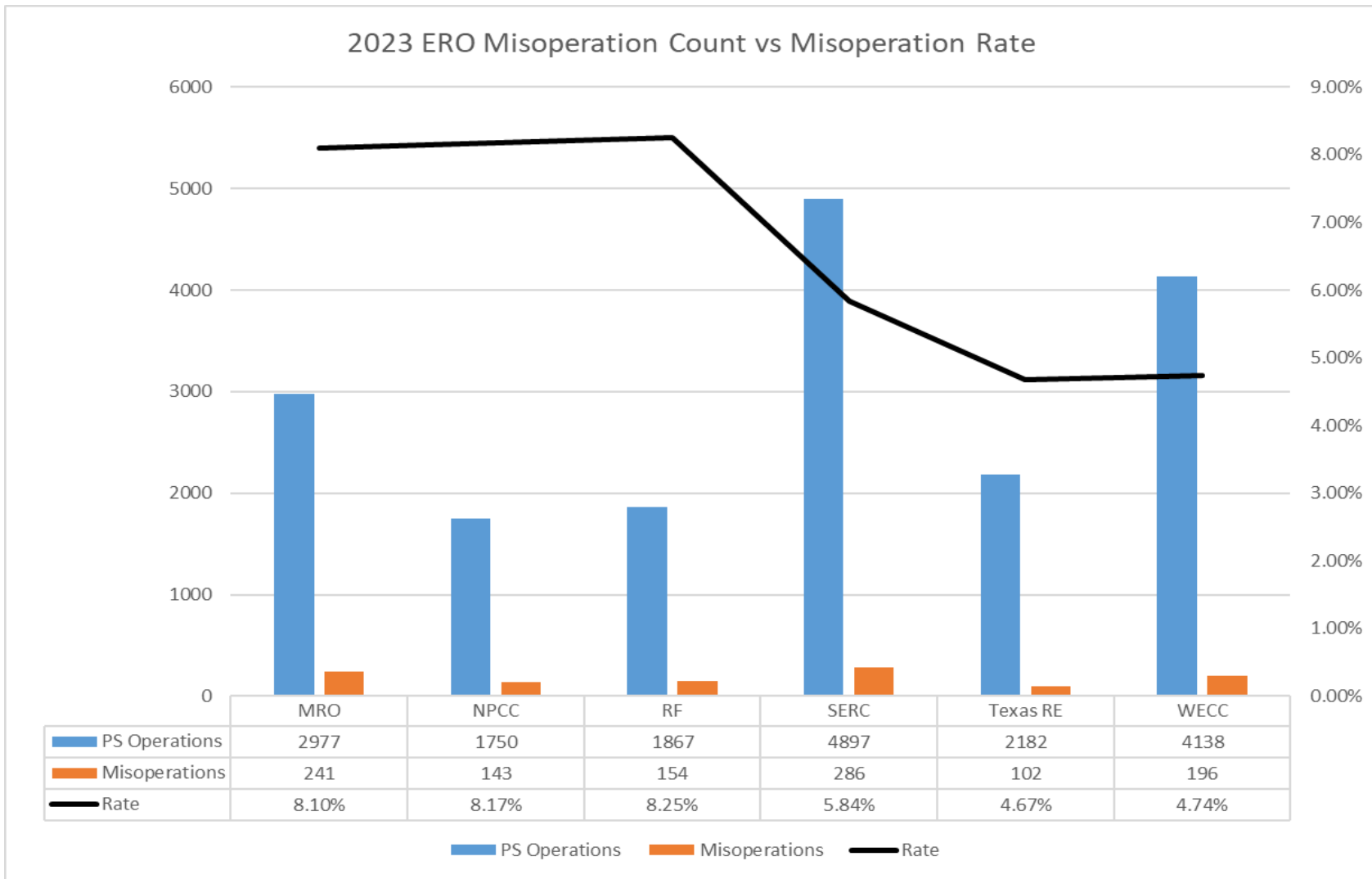


NERC
NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

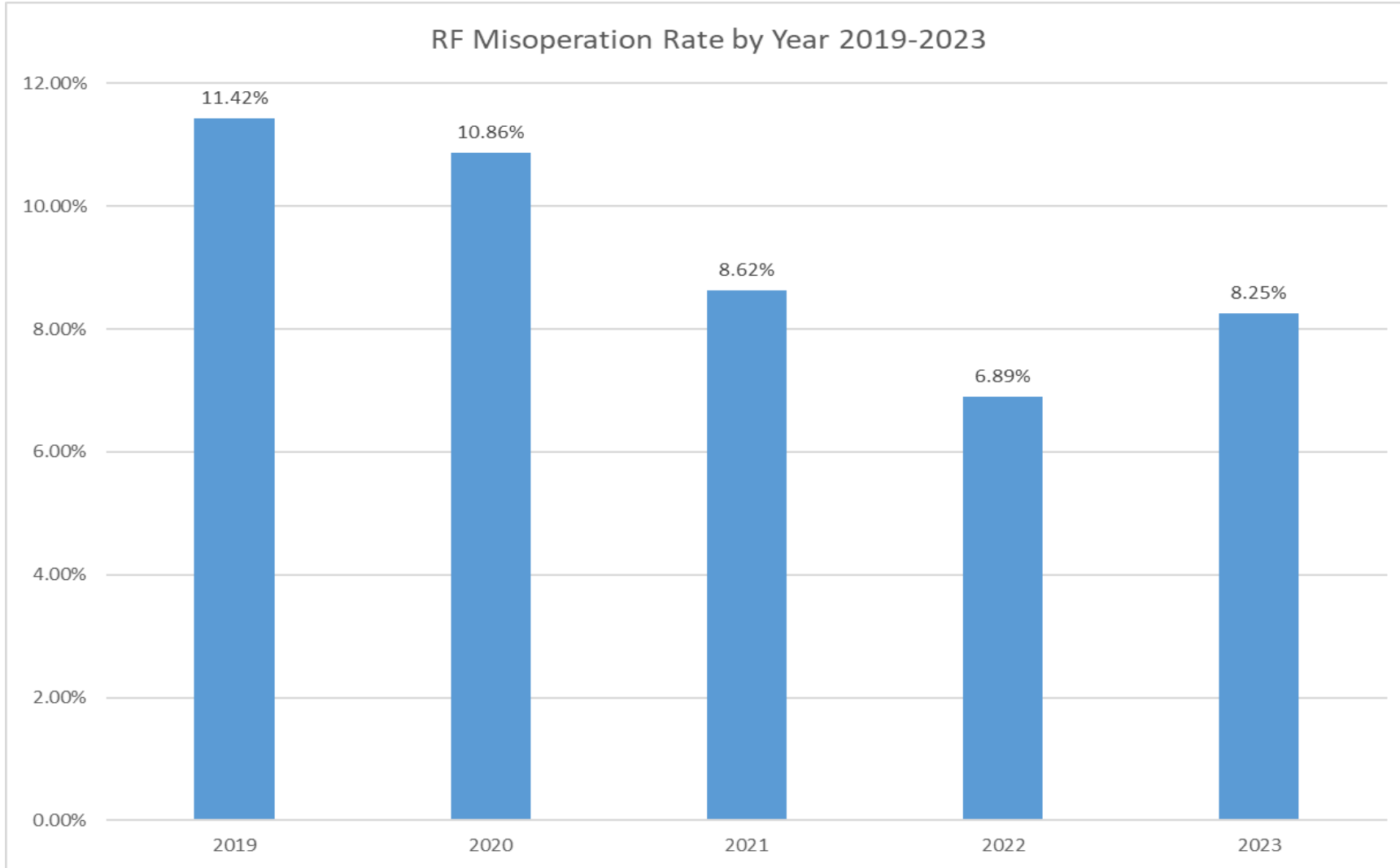
ERO MISOPERATIONS



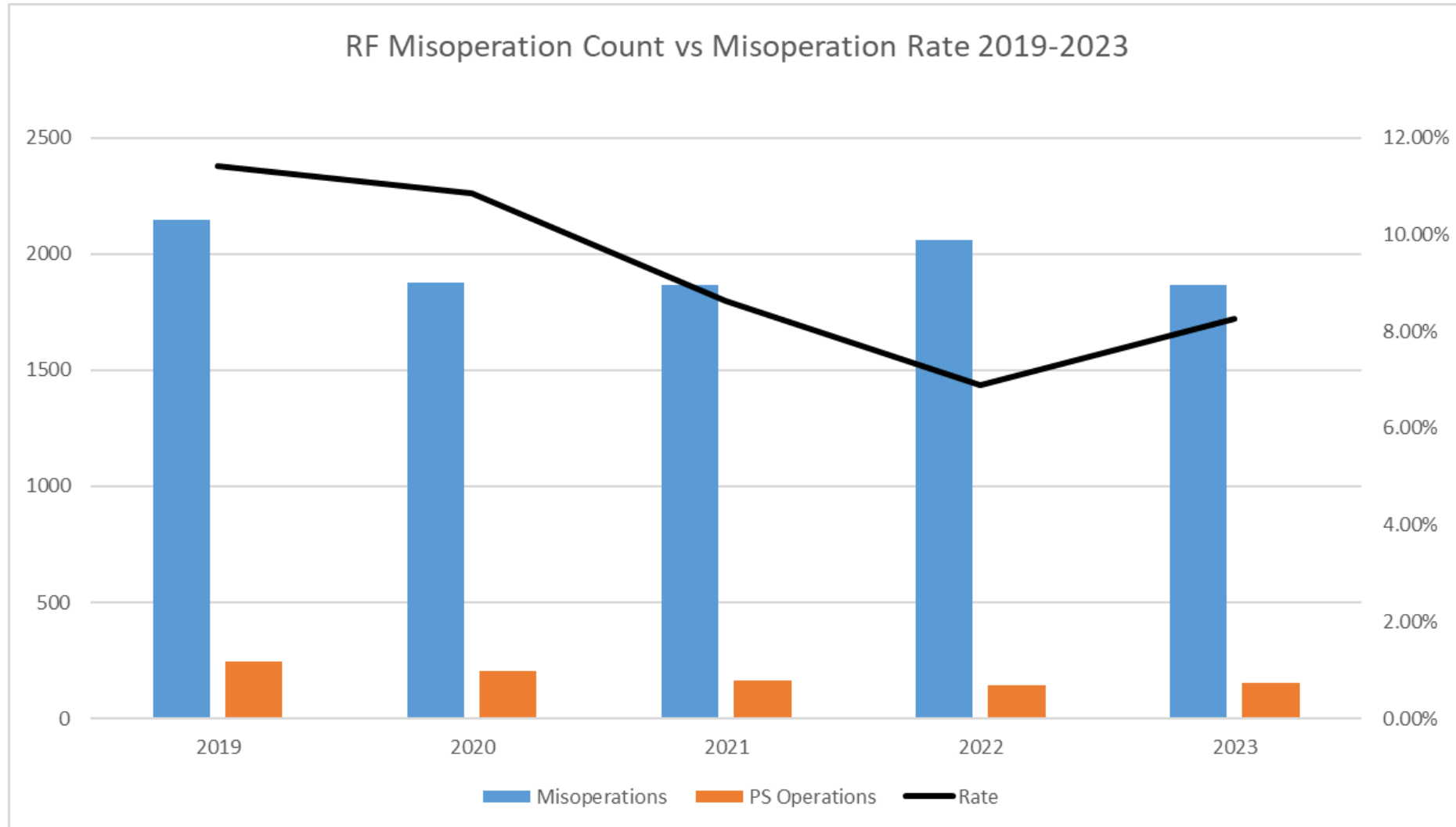
ERO MISOPERATIONS



RF MISOPERATIONS

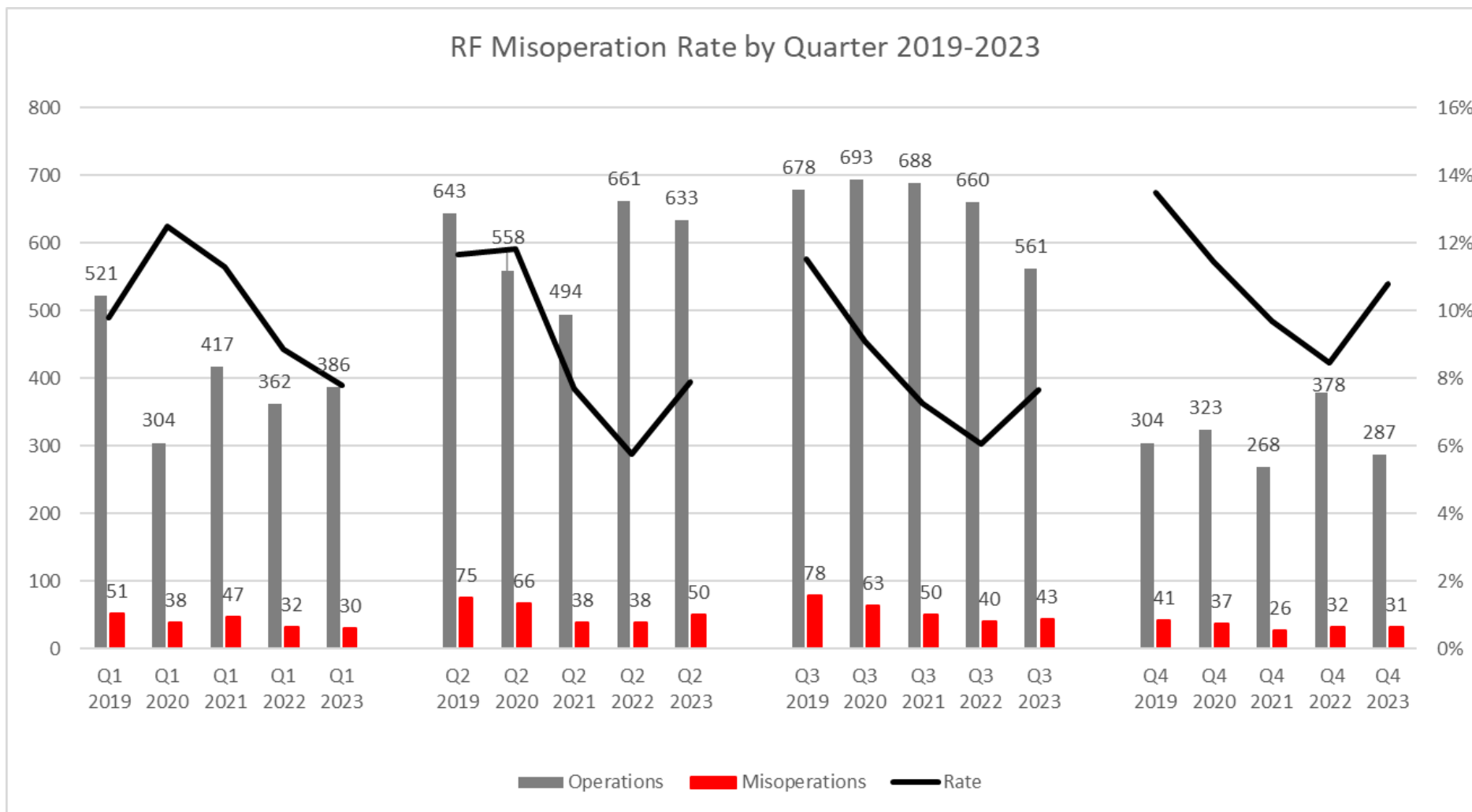


RF MISOPERATIONS

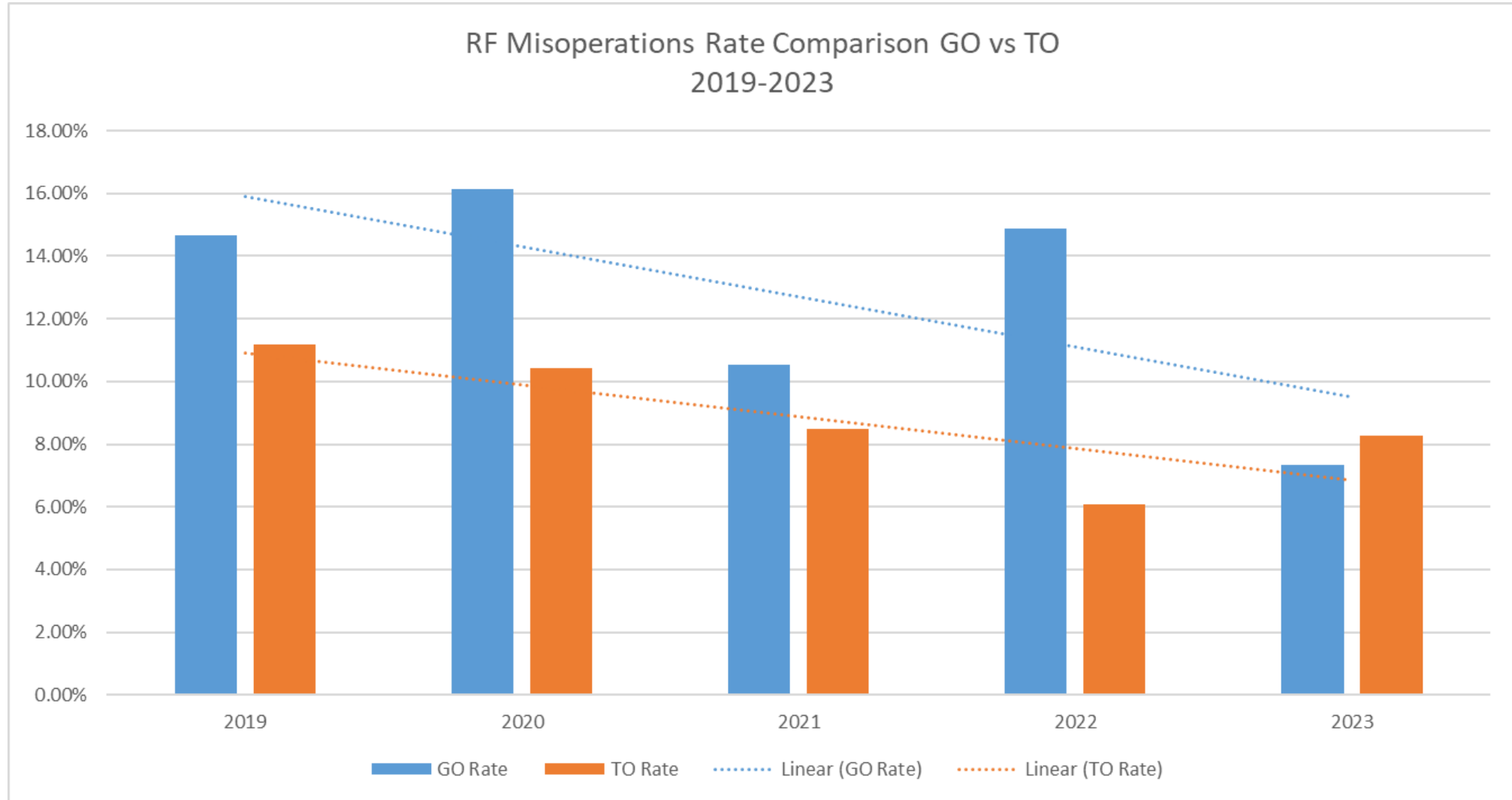


RF MISOPERATIONS

RF Misoperation Rate by Quarter 2019-2023

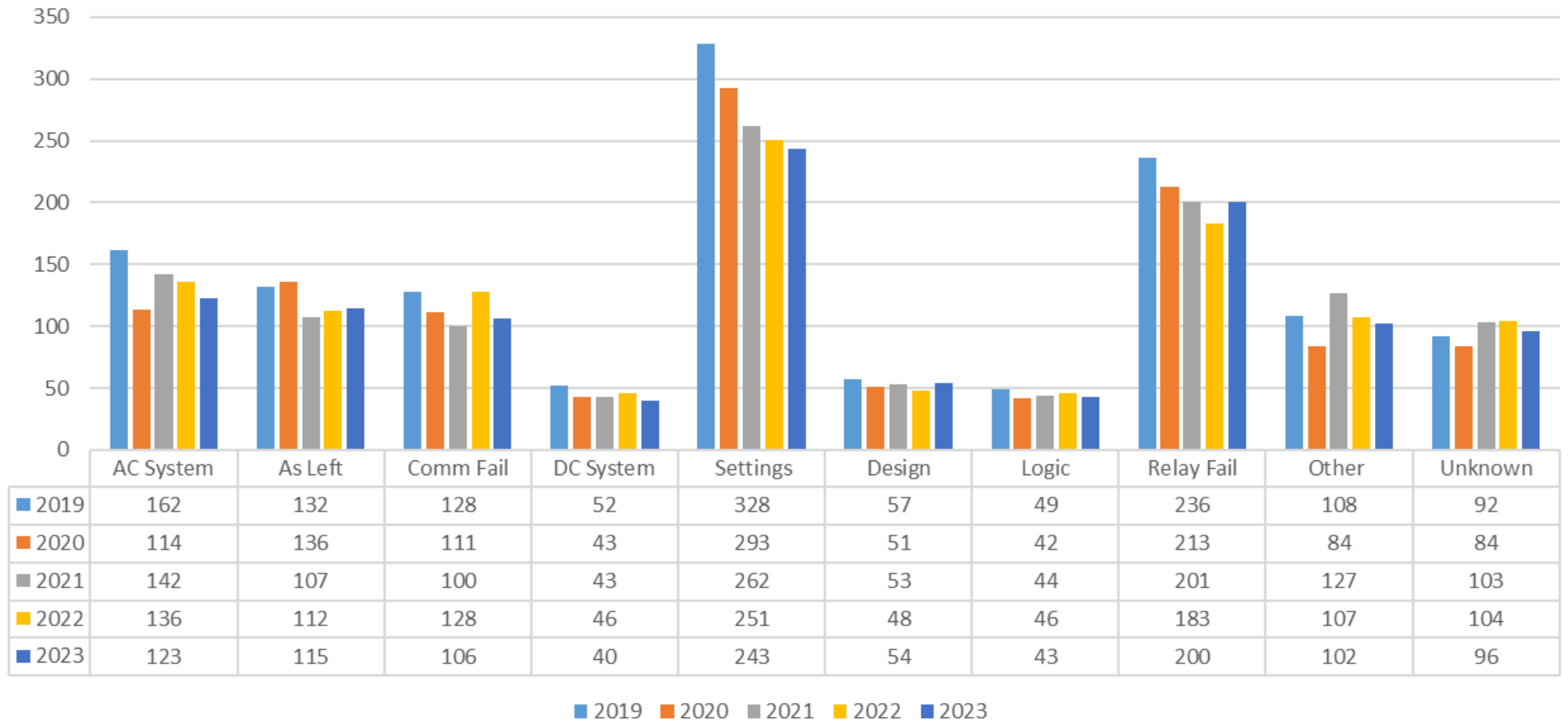


RF GENERATOR OWNER (GO) VS TRANSMISSION OWNER (TO) 2019-2023



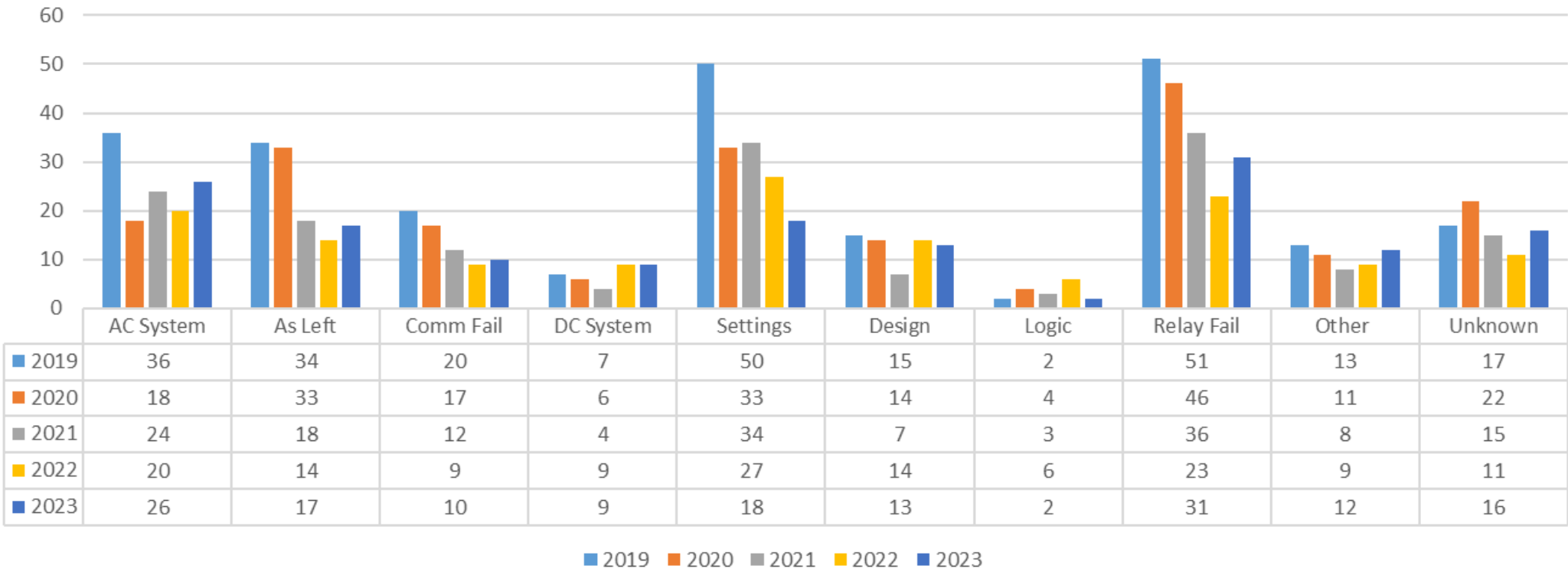
ERO MISOPERATIONS

ERO Misoperation Count by Cause
2019-2023



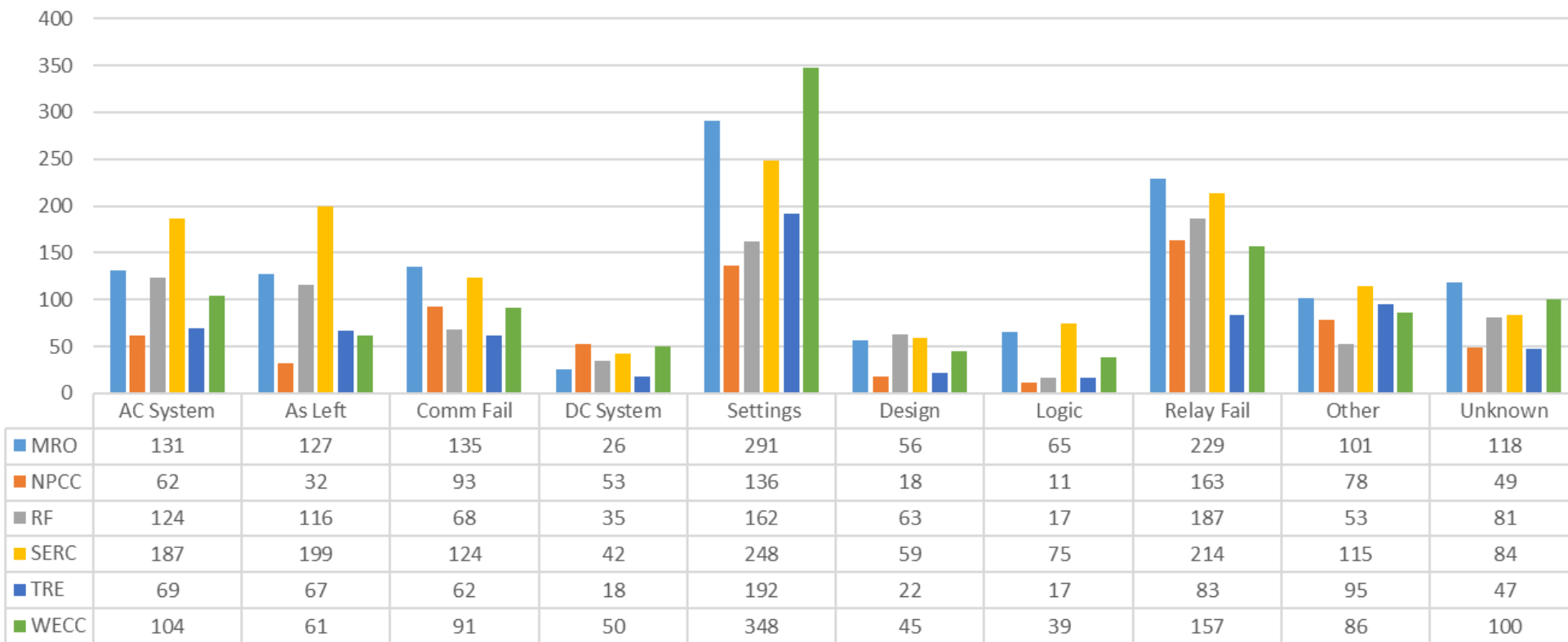
RF MISOPERATIONS

RF Misoperation Count by Cause
2019-2023



ERO MISOPERATIONS

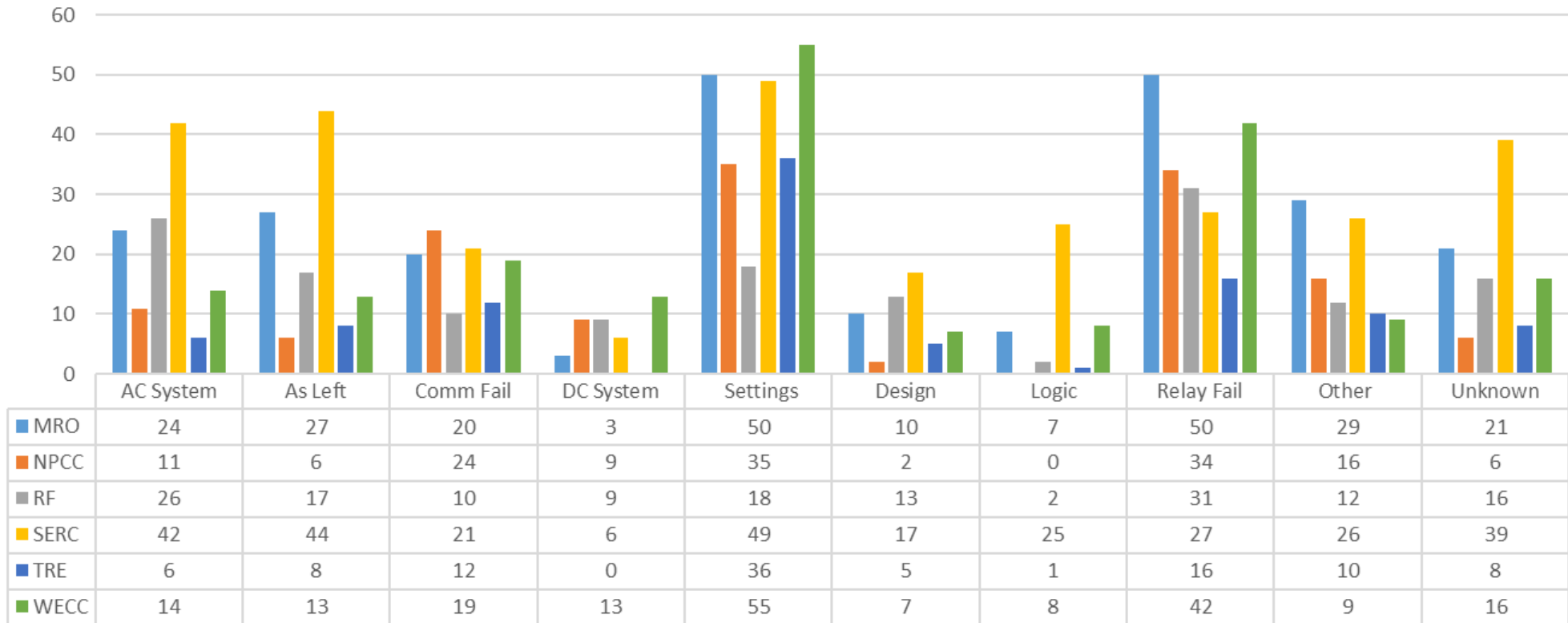
ERO Misoperations by Cause and Region
2019-2023



■ MRO ■ NPCC ■ RF ■ SERC ■ TRE ■ WECC

ERO MISOPERATIONS

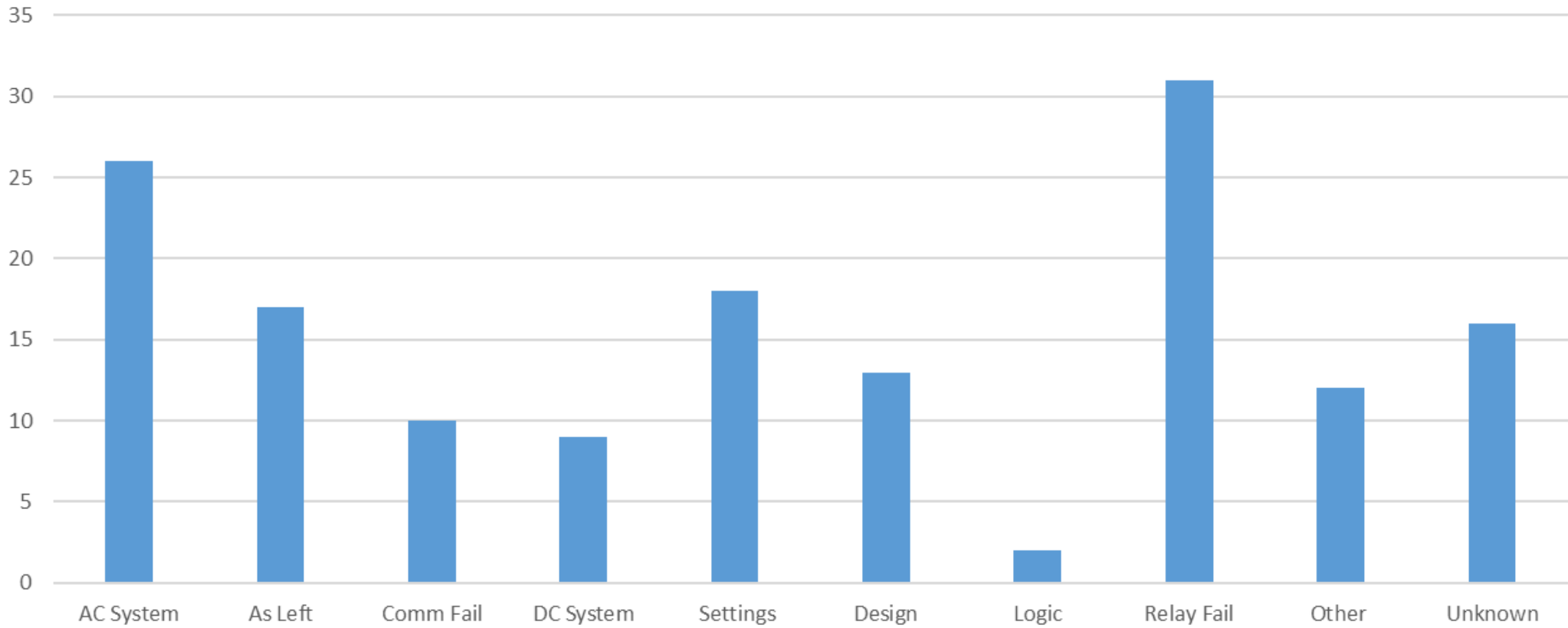
ERO Misoperations by Cause and Region
2023



■ MRO ■ NPCC ■ RF ■ SERC ■ TRE ■ WECC

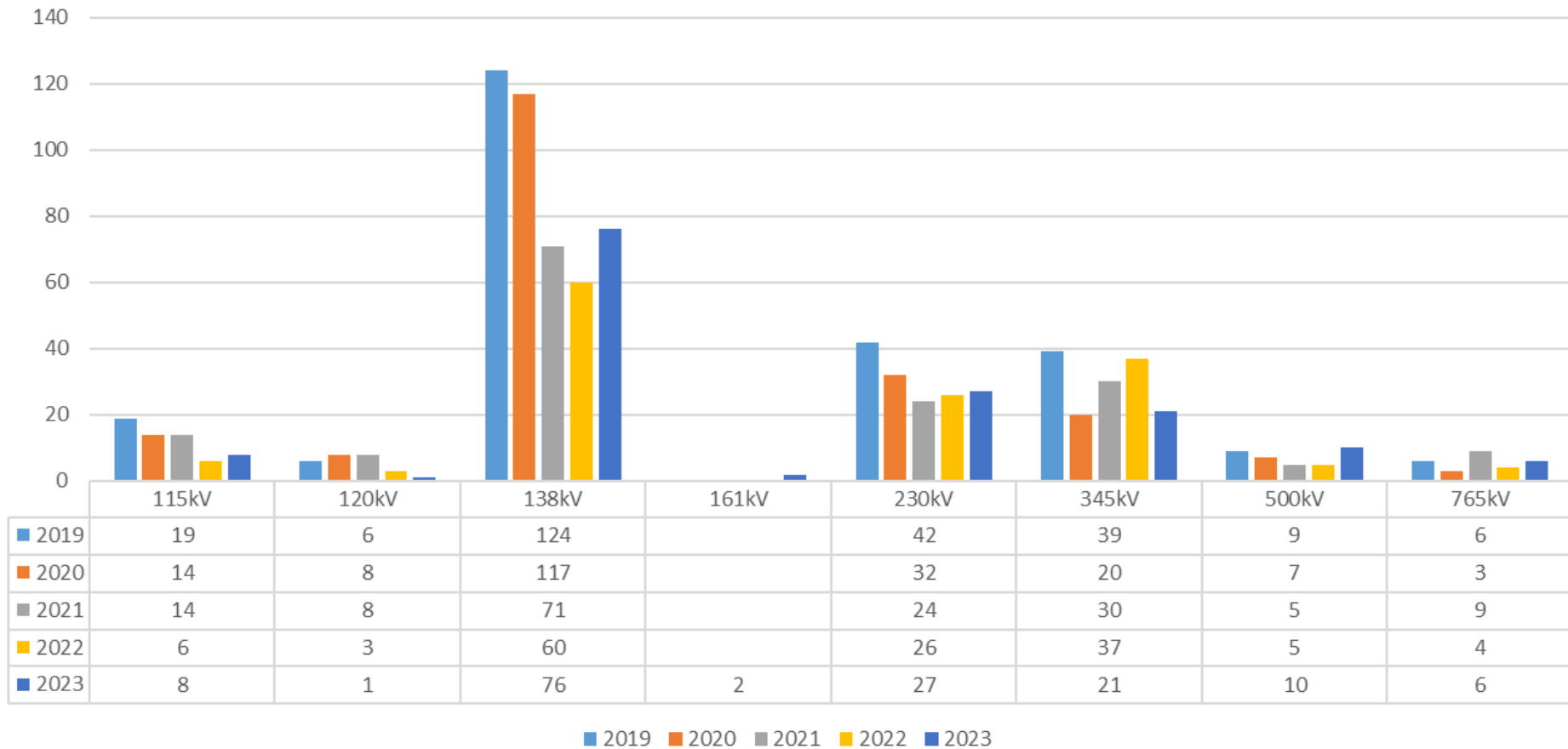
RF MISOPERATIONS

RF Misoperations by Cause
2023

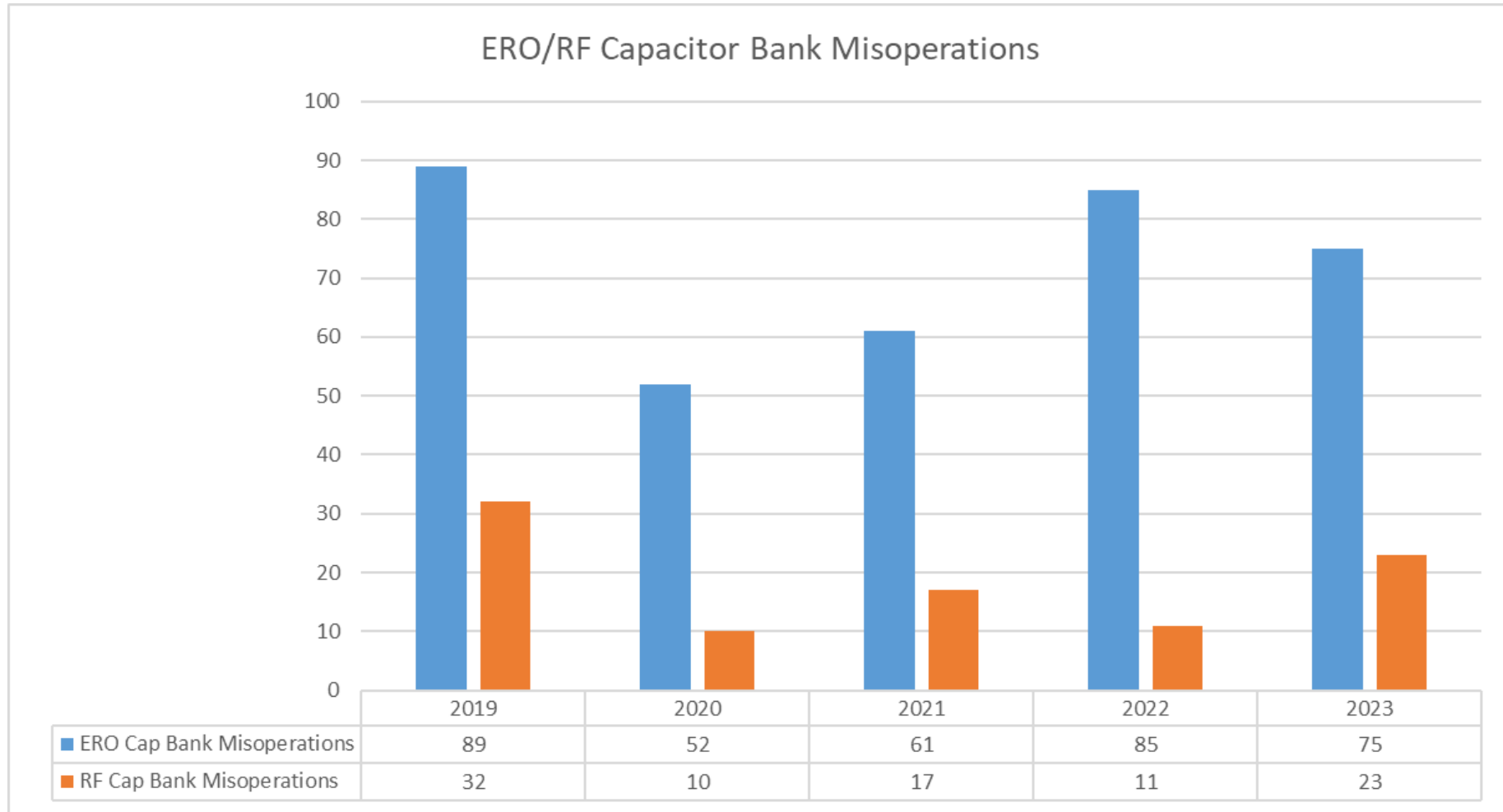


RF MISOPERATIONS

Misoperations Count by Voltage and Year

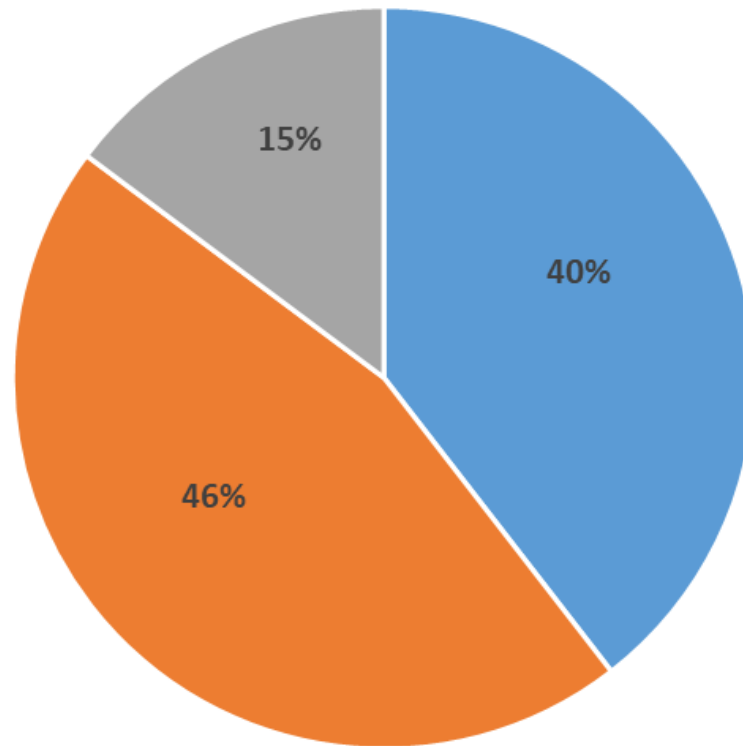


CAPACITOR BANK MISOPERATIONS



RF MISOPERATIONS

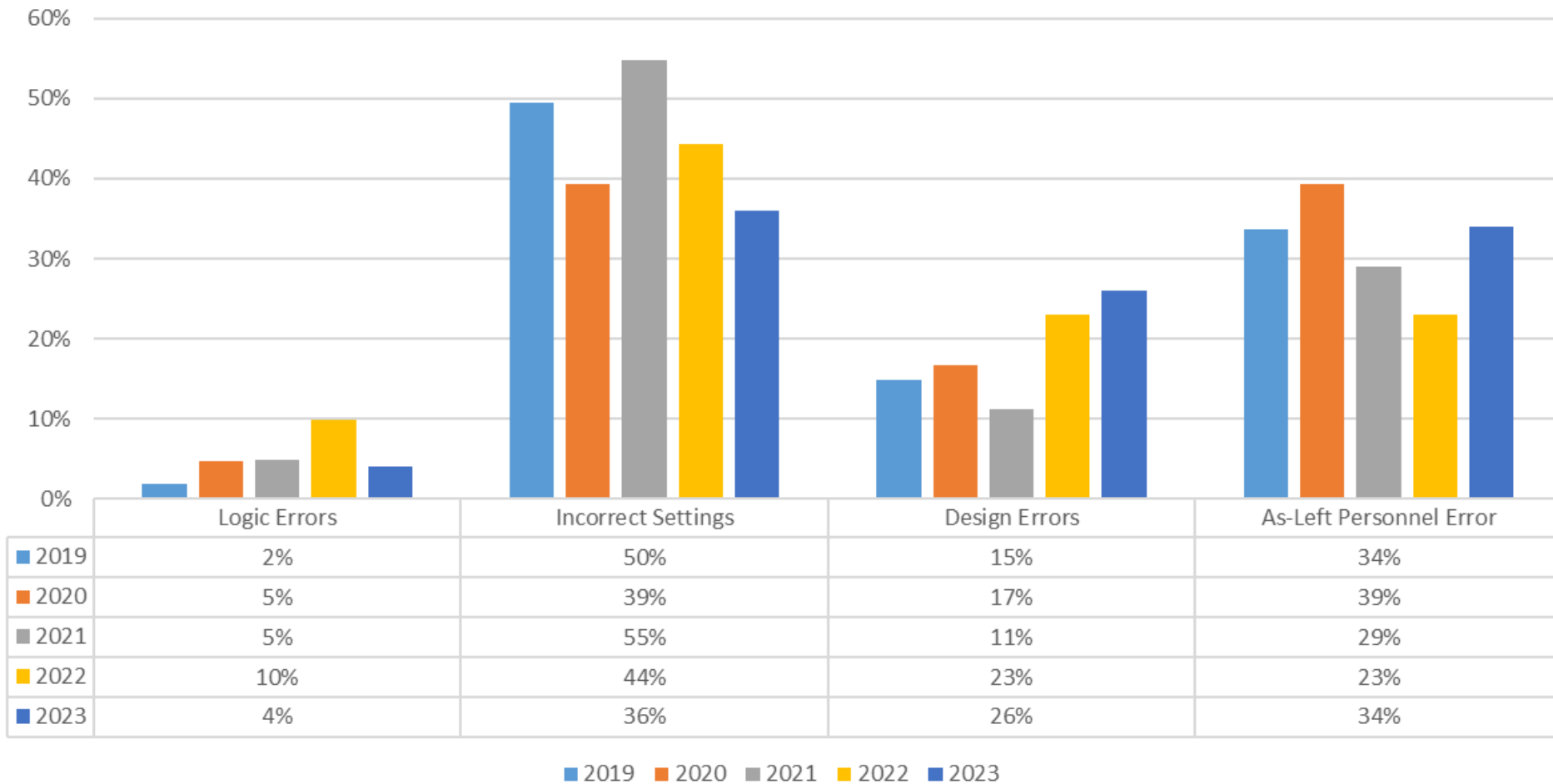
RF Misoperations Causes Human Performance/Equipment Failure
2019-2023



■ Human Performance ■ Equipment Failure ■ Unknown/Other

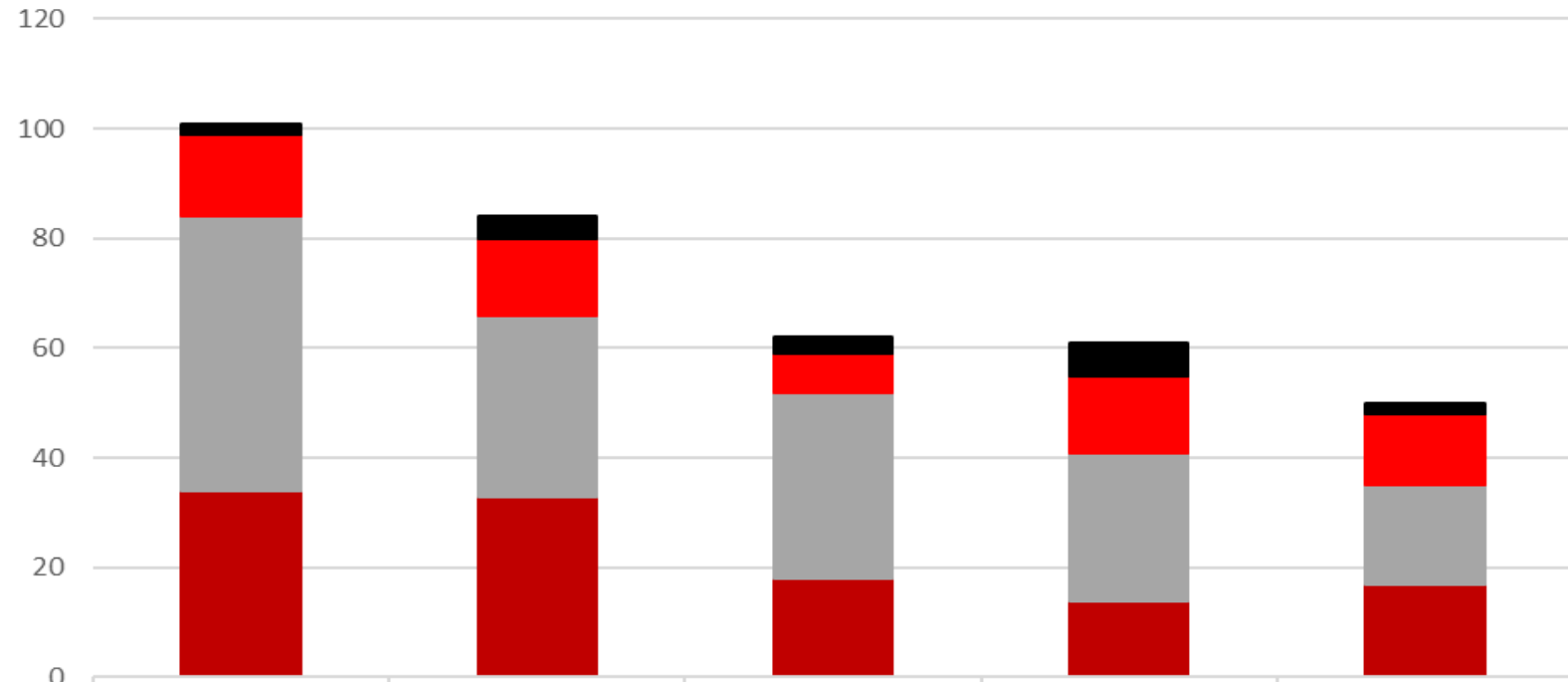
RF MISOPERATIONS

Causes of Human Performance Misoperations
2019-2023



RF MISOPERATIONS

RF Misoperation Count by Cause and Year
2019-2023



	2019	2020	2021	2022	2023
Logic Errors	2	4	3	6	2
Design Errors	15	14	7	14	13
Incorrect Settings	50	33	34	27	18
As-Left Personnel Error	34	33	18	14	17

As-Left Personnel Error Incorrect Settings Design Errors Logic Errors

SUMMARY

- RF misoperation rate had been on a downward trend in recent years, but 2023 rates returned to the 2021 rates near 8%
- RF misoperation counts have continued their overall downward trend
- Both GO and TO misoperation rates have continued downward
- Capacitor bank misoperations have increased in 2023, we will watch how this trends going forward
- Incorrect setting misoperations have been on a downward trend since 2021, design errors have been on an upward trend during that same time period

Technical Talk with RF

- Save the date for our next event:
Monday, Aug. 19, 2-3:30 p.m.
- August's Tech Talk will be an "un-Tech Talk," as we delve into the human performance side of electric grid reliability - [see our website](#) for more details.



No Registration Required
[Calendar Reminder](#)

Fall Reliability & Security Summit 2024

Monday, Sept. 16, 5-8 p.m.

Tuesday, Sept. 17, 8:30 a.m. – 5 pm

Wednesday, Sept. 18, 8:30 a.m. – 1 p.m.

Location: Conrad Indianapolis Hotel,
50 W. Washington St., Indianapolis, IN 46204



The poster features the Reliability First logo at the top left. The main title is 'FALL RELIABILITY & SECURITY SUMMIT'. Below the title, it lists the dates 'SEPT. 16-18, 2024' and the location 'INDIANAPOLIS'. A calendar icon is next to the dates, and a location pin icon is next to the city name. A photograph of the Indianapolis skyline is on the right. Below the main text, it says 'Featuring an energy policy legislator panel with:' followed by four circular headshots of the panelists: Brian Feldman (Maryland State Senator), Stephanie Hansen (Delaware State Senator), Eric Koch (Indiana State Senator), and Dick Stein (Ohio State Representative).

Join RF in Indianapolis for the 2024 Fall Reliability & Security Summit. We'll dive into the intersection of energy policy with reliability and security, as we navigate the challenges of a changing generation mix. Find additional agenda details and registration information on the [event page on our website](#).

Please encourage your coworkers, staff, and stakeholders to sign-up to attend.

[**REGISTRATION LINK**](#)



QUESTIONS & ANSWERS

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