NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

# Industry Outreach

## Project 2022-02 Modifications to TPL-001 and MOD-032

### DER Definition

September 20, 2024

RELIABILITY | RESILIENCE | SECURITY




# NERC Antitrust

- It is NERC's policy and practice to obey the antitrust laws and to avoid all conduct that unreasonably restrains competition. This policy requires the avoidance of any conduct that violates, or that might appear to violate, the antitrust laws. Among other things, the antitrust laws forbid any agreement between or among competitors regarding prices, availability of service, product design, terms of sale, division of markets, allocation of customers or any other activity that unreasonably restrains competition. It is the responsibility of every NERC participant and employee who may in any way affect NERC's compliance with the antitrust laws to carry out this commitment.

# Agenda

- Draft 3 being from the original project SAR
- Drafting Team (DT)
- Draft 3 of proposed Reliability Standard MOD-032-2
- Distributed Energy Resource proposed definition
- Implementation Plan
- Contact Information
- Q&A

# Drafting Team

| Name | Organization/ Company |
|---|---|
| John Schmall (Chair) | ERCOT |
| Jonathan Hayes (Vice Chair) | Southwest Power Pool |
| Mohit Singh | Exelon |
| Josie Daggett | Western Area Power Administration |
| Hassan Baklou | SDG&E |
| Zach Mansell | Tennessee Valley Authority |
| Qiushi (Cho) Wang | The AES Corporation |
| Patrick Dalton | Midcontinent Independent System Operator (MISO) |
| Alexander Stewart | Bonneville Power Administration |
| Joshua Pierce | Southern Company Services |
| Steve Wendling | American Transmission Company LLC |

# Drafting Team

| Name | Organization/ Company |
|---|---|
| Andrea Pinceti | Dominion Energy |
| Huzaifa Karimjee | Florida Power & Light |
| Hayden Maples | Evergy |
| Ejovi Ovhori | Duke Energy Carolinas |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

# Draft 3 SAR

- This posting affects Phase I of the project for proposed Reliability Standard MOD-032-2 with a scope focused on adding the term Distributed Energy Resource (DER) to the NERC Glossary of Terms, as well as introducing DER data exchange requirements.
- This posting does not contemplate the SAR related to FERC Order No. 901; Milestone 3, Part 1, which focuses on modeling and data exchange requirements for Inverter-Based Resources (IBR) more broadly.
- ***Draft 3 relationship to FERC Order No. 901***
  - FERC Order No. 901, Milestone 3, Part 1 SAR is an addition to the current Project 2022-02, expanding the scope of this project to include a uniform modeling framework for IBR and elevating the project to **high priority** with a **Regulatory Deadline of November 4, 2025**.

# MOD-032-2 Draft 3

- Draft 3 of MOD-032-2 addresses the SAR, MOD-032-1 Data for Power System Modeling and Analysis, originally submitted by NERC SPIDERWG on December 15, 2021, and includes the following changes from Draft 2 based on industry feedback:
  - "Aggregate" was added before all references to DER in Attachment 1, to clarify the modeling expectations are not at the individual facility level.
  - Transmission Owner (TO) was removed as the primary entity responsible for reporting DER data in Attachment 1.
  - Footnotes 4 and 5 were consolidated to remove any "pass through" requirement and to clarify that the Distribution Provider (DP) is the responsible entity for reporting DER data under currently available entity registration, while recognizing that DER data collection efforts may generally involve DP and TO coordination.
  - Replaced "generator type" with "DER type" and included additional example in Attachment 1 description of Aggregate DER data to clarify.

# Modifications to MOD-032 Attachment 1

## steady-state

9. Aggregate Distributed Energy Resource (DER) data[4] [DP, ~~TO where DER is directly connected to the TO system and not through a DP~~].[5]
    a. Location (bus from item 1)
    b. Real power capability
    c. ~~Generator~~ DER type (solar, battery, diesel generator, etc.)
    d. DER capabilities related to ride-through, voltage control and/or frequency control or information that can be used to infer those capabilities for modeling purposes.

## dynamics

5. Aggregate Demand[2] [DP]

10. Aggregate Distributed Energy Resource (DER) data including whether DER is subject to tripping in conjunction with UFLS and/or UVLS[4] [DP, ~~TO where DER is directly connected to the TO system and not through a DP~~]

[4] ~~The joint PC/TP modeling data requirements and reporting procedures developed per R1 will specify data flow processes and the required level of aggregation. The PC or TP may need to coordinate with the DP or TO to determine appropriate equivalent distribution system impedance.~~ For purposes of this item, the Distribution Provider to which DER is connected is responsible for reporting DER data, generally through coordination with the Transmission Owner, in accordance with PC/TP modeling data requirements and data reporting procedures developed under Requirement R1. The PC or TP may need to coordinate with the DP or TO to determine appropriate equivalent distribution system impedance.

[5] ~~Where DER is connected to an unregistered Distribution Provider, the next closest electrically connected registered entity (DP or TO) shall request DER data and pass through available information. An unregistered Distribution Provider is an unregistered entity meeting the NERC Glossary of Terms definition of Distribution Provider. This footnote is also applicable to item 10 under the "dynamics" column.~~

# Distributed Energy Resource (DER) Definition

**Distributed Energy Resources (DER):**

Generators and energy storage technologies connected to the Distribution Provider's system, including those connected behind the meter of an end use customer, that are capable of providing Real Power in non-isolated parallel operation with the Bulk ~~Electric~~ Power System.

- Distribution Provider refers to the NERC glossary definition, rather than an entity meeting the NERC registration criteria ~~not the NERC registered entity~~.

## Changes from Draft 2:

1. Clarified that DER includes technologies connected behind the meter of end use customers.
2. Clarified the usage of "Distribution Provider" to more clearly point to NERC Glossary of Terms definition, rather than the NERC registration criteria.

***Distribution Provider:***
*Provides and operates the "wires" between the transmission system and the end-use customer. For those end-use customers who are served at transmission voltages, the Transmission Owner also serves as the Distribution Provider. Thus, the Distribution Provider is not defined by a specific voltage, but rather as performing the distribution function at any voltage.*

NERC, Glossary of Terms Used in NERC Reliability Standards, updated December 1, 2023. Available at: https://www.nerc.com/pa/Stand/Glossary%20of%20Terms/Glossary_of_Terms.pdf

# SAR Scope

- The Standards Committee assembled the DT with the intent of considering a DER definition, which is explicitly in the SAR scope
- Excerpt from approved SAR:

| Project Scope (Define the parameters of the proposed project): |
| --- |
| The proposed scope of this project is as follows:<br>a. The table in Attachment 1 should be updated to include DER in the steady-state and dynamics columns. Details of the changes to be considered by the Standard Drafting Team are included in the "Detailed Description" below. Revision to requirements should also be considered if necessary.<br>b. Based on item a.) and the detailed description below, the SDT should consider whether including a definition for "Distributed Energy Resource (DER)" in the NERC Glossary of Terms is necessary. |

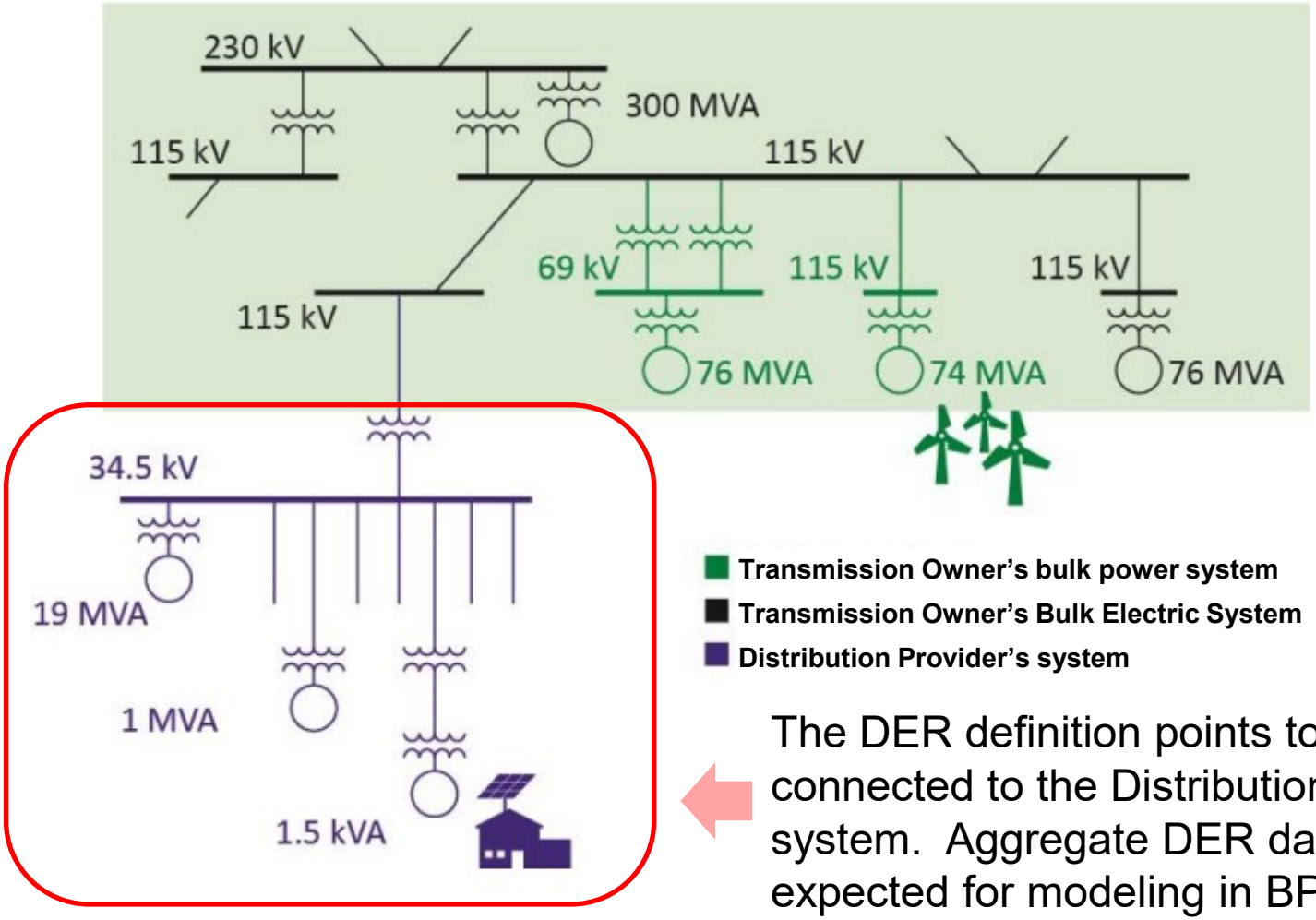
# DER Definition Objective

- What does a DER definition do?
  - Defines a class of resources that can be referenced throughout NERC standards where applicable
- What does a DER definition not do?
  - Define applicability of specific standards to DER
  - Define DER as connected to specific voltage class or below a specific size threshold
  - Create compliance obligations
  - Make DER part of the BES
  - Require detailed model data for every individual DER installation
- As outlined in the technical rationale, the DT incorporated many ideas from existing DER definitions but determined that a separate definition would better serve MOD-032 and other standards that may use the definition. On the following slides, the DT has provided a few examples of why existing DER definitions were not suitable without modification.

# DER Definition Technical Rationale

- The language “generator and storage technologies” is intended to exclude sources that may only transiently inject Real Power.
- The language “connected to the Distribution Provider’s system” is intended to avoid ambiguities associated with defining a distribution system while leveraging a term currently defined in the NERC Glossary of Terms.
- The language “providing Real Power” is intended to include only those facilities that may be exporting power to the power system or offsetting load.
- The language “in non-isolated parallel operation with the Bulk-Power System” is intended to exclude facilities that will not have an impact to the BES (because they are not electrically connected to the BPS) and therefore are not of interest from a BPS-reliability perspective (e.g. back-up generation that only operates when a facility is disconnected from the grid).

# DER Definition Illustration

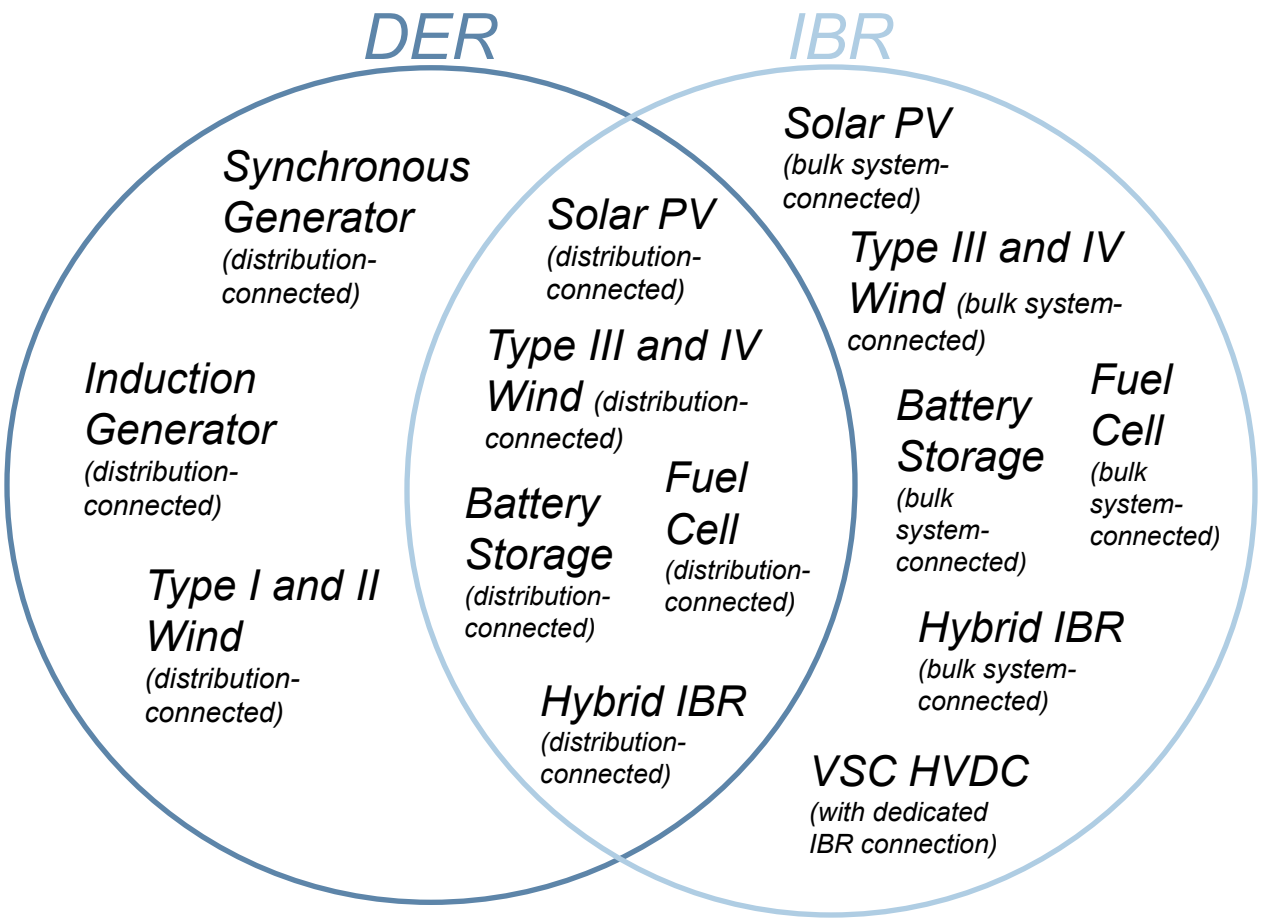



- Transmission Owner's bulk power system
- Transmission Owner's Bulk Electric System
- Distribution Provider's system

The DER definition points to resources connected to the Distribution Provider's system. Aggregate DER data exchange is expected for modeling in BPS studies.

Note: The Distribution Provider's system is not defined by voltage class but rather by function.
For those end-use customers who are served at transmission voltages, the Transmission Owner also serves as the Distribution Provider.

# DER and IBR definitions




Draft DER and IBR definitions are compatible, with some IBR classified as a DER.

Notes: For the purposes of this slide, “distribution-connected” is shorthand for connected to the Distribution Provider’s system. “Bulk system-connected” refers to resources connected to the transmission system.
The resources listed as IBR is from the draft definition in Project 2020-06.

# Consideration of Existing DER Definitions

- The DT utilized the SPIDERWG and IEEE 1547-2018 definitions as an initial basis for the distributed energy resource definition for the NERC Glossary of Terms and adjusted as necessary*.
- The DER definition is intended to align with the SPIDERWG working definition and clarify what is in scope and out of scope with respect to where DER is connected rather than the technology type.
- DER is not defined by voltage connection level or size (MVA values).
- The DER definition is intended to be utilized within the context of Reliability Standards, as necessary.

*Other sources reviewed included: FERC Energy Primer, the NARUC definition, NERC DERTF definition, and the CA PUC. The determined that each reviewed DER definition required refinement to be most suitable for DT application in MOD-032 and future reliability standards more broadly. See the technical rationale for additional details of this review.

# SPIDERWG & IEEE 1547-2018 DER Definitions

The DT incorporated the main concepts from existing DER definitions in broad use, suggesting minor changes for the NERC Glossary of Terms application.

*NERC SPIDERWG*

**Distributed Energy Resource (DER)*:** Any Source of Electric Power located on the Distribution System

**Note: Loads and Demand Response do not produce electric power and are therefore not included in the definition of DER.*

**Source of Electric Power:** Resources that inject or exchange power4 (e.g., Distributed Generation and Energy Storage Facilities)

**Distribution System:** The electrical facilities that are located behind a transmission-distribution transformer that serves multiple end-use customers.

*IEEE 1547-2018*

**distributed energy resource (DER):** A source of electric power that is not directly connected to a bulk power system. DER includes both generators and energy storage technologies capable of exporting active power to an EPS. An interconnection system or a supplemental DER device that is necessary for compliance with this standard is part of a DER.



The DT proposed definition was developed with consideration of broader NERC standards application.

# Needed Refinements to Existing Industry Definitions

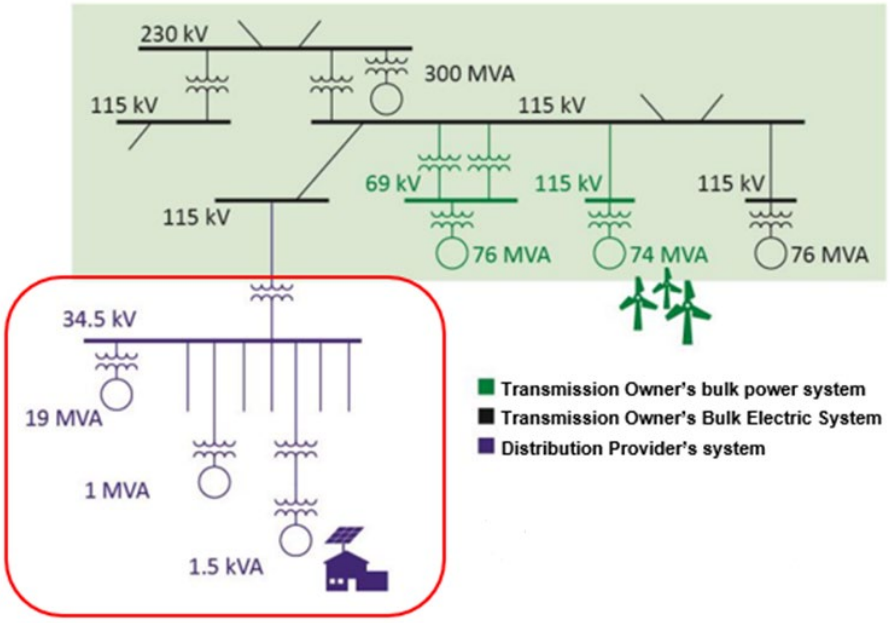
***Minor refinements to the SPIDER WG definition addressed perceived deficiencies of other definitions for Glossary of Terms use.***

| Source | Identified need for modification | DT Proposed approach |
|---|---|---|
| **NERC SPIDERWG** | **1. Includes transient types of DER power beyond generation and storage;**<br>**2. Points to a SPIDERWG-specific defined term for "distribution systems"; and**<br>**3. Includes sources of back-up power that would have no potential grid impacts.** | **1. Refer to generator and storage technology specifically.**<br>**2. Use defined "Distribution Provider" to define system.**<br>**3. Non-isolated parallel operation term excludes back-up power.** |
| **IEEE 1547-2018** | Includes "not directly connected to a bulk power system" which is potentially ambiguous and "exporting active power to an EPS" that could exclude resources of interest. | Use defined "Distribution Provider" to define system (#2) and use "providing Real Power" instead of "exporting". |
| **FERC Energy Primer** | Includes of load resources (e.g., energy efficiency, demand response) which is not suitable for intended use. | Refer to generator and storage technology specifically (#1). |
| **NARUC** | Includes of load resources (e.g., energy efficiency, demand response) which is not suitable for intended use. | Refer to generator and storage technology specifically (#1). |
| **NERC DERTF** | Appears to exclude distributed energy storage, a technology necessary for inclusion in the DT definition. | Refer to generator and storage technology specifically (#1). |
| **CPUC** | Includes of load resources (e.g., energy efficiency, demand response) which is not suitable for intended use. | Refer to generator and storage technology specifically (#1). |
| **NYISO** | Considers only market-qualifying resources as DER, excluding DER participating in retail arrangements. | Refer to generator and storage technology specifically (#1). |

# DER Definition Application

Adopting the IEEE 1547-2018 DER definition without modification could exclude resources of interest.

- Using a definition that specifies “exporting active power to an EPS” is potentially at odds with a need for data on aggregated DER. If the IEEE-1547-2018 definition were used, some or all of the aggregated DER in the red box may not be considered “in scope” if it doesn’t export and only offsets load.



# DER Definition Application

Adopting the SPIDERWG DER Definition without modification could include additional resources and require additional defined terms.

- Proceeding with the SPIDERWG DER definition would mean that active power sources, such as isolated backup generators used at residential or commercial locations, could be in scope for MOD-032 data collection.
- Additionally, using the SPIDERWG DER definition would introduce a new definition for “distribution system,” that would have to be clarified by the DT. The DT consensus was that it was better to leverage the existing “Distribution Provider” definition rather than introduce another new defined term.

# Implementation Plan

| | | Date |
|---|---|---|
| FERC approval/NERC Board Approval | | TBD |
| Definition Effective Date | +2 years from FERC approval | TBD |
| Definition Effective Date (Without Gov Authority) | +2 years from NERC Board Approval | TBD |
| MOD 032 Req 2,3,4 | +1 year from the effective date | TBD |
| MOD 032 Effective Date (Gov Authority) | +2 years from FERC approval | TBD |
| MOD 032 (Without Gov authority) | +2 years from NERC board approval | TBD |

# Implementation Plan

## Initial Performance Dates

- Entities shall not be required to comply with Requirements R2, R3, and R4 relating to revised Planning Coordinator/Transmission Planner data requirements and reporting procedures developed under MOD-032-2 Requirement R1 and Attachment 1 until 12 months after the effective date of Reliability Standard MOD-032-2.
- Entities shall continue to comply with Requirements R2, R3, and R4 related to Planning Coordinator/Transmission Planner data requirements and reporting procedures developed under MOD-032-1 Requirement R1 and Attachment 1 during the phased-in compliance period for MOD-032-2.
- No substantive change from draft 2: An explanation was added to the Implementation Plan describing that TOs and DPs would be expected to participate in PC/TP processes to change data reporting requirements related to DER developed during the 24 months prior to the effective date of R1 and should be able to start working on data collection processes and methods more than 12 months prior to the effective dates of R2, R3, and R4.

# Next Steps

- August 27, 2024 – 45-day additional comment period with 10-day ballot.
- October 10, 2024 – Ballot closes at 8:00 p.m. Eastern.
- Subsequent to the ballot closing, the DT will meet to review comments received and to determine next steps.

# Questions & Answers

- Informal Discussion
  - Via the Questions and Answers feature.
  - Respond to stakeholder questions.
- Other
  - Some questions may require future DT consideration.
  - Please reference slide number, standard section, etc., if applicable.
  - DT will address as many questions as possible.
  - Webinar and chat comments are not a part of the official project record.
  - Questions regarding compliance with existing Reliability Standards should be directed to ERO Enterprise compliance staff, not the DT.

# Project 2023-03 INSM Contact Information

- Point of Contact
  - Laura Anderson, Senior Standards Developer
    - laura.anderson@nerc.net or call 404-782-1870
- Webinar Slides and Recording Posting
  - Within 24-72 hours of Webinar completion.
  - Link will be available in the Standards, Compliance, and Enforcement Bulletin.

# Questions and Answers