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| **NOGRR Number** | [**245**](https://www.ercot.com/mktrules/issues/NOGRR245) | **NOGRR Title** | **Inverter-Based Resource (IBR) Ride-Through Requirements** |

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| **Date** | March 26, 2024 |

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| **Submitter’s Information** | |
| **Name** | Stephen Solis |
| **E-mail Address** | stephen.solis@ercot.com |
| **Company** | ERCOT |
| **Phone Number** | 512-248-6772 |
| **Cell Number** | 512-426-4721 |
| **Market Segment** | Not applicable |

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| **Comments** |

ERCOT submits these comments in response to the 3/22/24 comments filed by the Joint Commenters 2 (Joint Commenters). These comments reiterate ERCOT’s concern regarding the reliability risk associated with Inverter-Based Resources’ (IBRs’) failure to ride through system disturbances and addresses the Joint Commenters’ misrepresentations of ERCOT’s proposed language.

**The ERCOT System Faces a Real, Significant Reliability Risk**

The risk of IBR ride-through failures is the ***most significant risk*** to the ERCOT System. In a situation with high IBR generation output during a lightning storm, a very large number of IBRs that do not have sufficient ride-through capabilities could be lost, resulting in a system disturbance and ***instantaneous and catastrophic*** ***failure*** of the ERCOT System.

***This is not a theoretical risk***; the ERCOT System has already experienced multiple large events and others that could have been catastrophic if they had occurred at higher IBR output levels. No less than ***38*** North American system events involving IBRs’ failure to ride-through a system disturbance have occurred *since 2016* - nine of those events were in the ERCOT Region. Three of the largest are: (i) the Odessa 1 event in 2021 (1,340 MWs); (ii) Panhandle event in 2022 (765 MWs); and (iii) the Odessa 2 event in 2022 (2,555 MWs). The other six have occurred over the last few years – one in October 2022 involving the loss of 541 MWs; one in October 2022 involving 246 MWs; one in November 2024 involving 108 MWs; one in December 2024 involving 31 MWs; one in January 2024 involving 106 MWs; and one in March 2024 involving 219 MWs.

**ERCOT Made Many Concessions to Address Joint Commenter Concerns**

ERCOT spent more than 18 months drafting and revising NOGRR 245, conducting requests for information and other inquiries, considering stakeholder and manufacturer input, and arriving at the most accommodating version of language that is:

* Technically feasible;
* Allows sufficient time for implementation; and
* Provides for exceptions and extensions as needed.

ERCOT’s proposal strikes the right balance between system reliability and financial impacts to Resources.

**Joint Commenters Continue to Propose Only Voluntary Compliance**

The one significant concession Joint Commenters made is agreeing software and parameter changes would be deemed “commercially reasonable.” However, Joint Commenters continue to propose that any other reliability improvements would take place solely at the Resource Entity’s discretion and the date to implement such improvements would occur far in the future. For more than 10 years, IBR owners have not voluntarily mitigated ride-through risk and they continue to seek to reduce ERCOT’s ability to protect system reliability. Joint Commenters state they and ERCOT desired to find the “right balance” between reliability and cost. To be clear, Joint Commenters’ proposal does ***not*** strike a “balance;” it prioritizes their financial desires over ERCOT System reliability. The billions of dollars of harm a catastrophic event would cause far outweighs the potential costs for IBR owners to meet ride-through requirements (which ERCOT’s comments hold to reasonable levels).

To accommodate Joint Commenters’ concerns about NOGRR245, ERCOT met with them on many, many occasions throughout this process. In addition to numerous phone calls and emails, the parties met on 11 different occasions: 11/29/23, 1/29/24, 1/30/24, 1/31/24, 2/5/24, 2/19/24, 2/22/24, 3/7/24, 3/12/24, 3/19/24, and 3/20/24.

Ultimately, ERCOT agreed to significant concessions after filing the original version of NOGRR245 in January 2023, including:

Commercially Reasonable Concept

The most significant concession is the “commercially reasonable” concept. ERCOT agreed to allow a Resource Entity to consider the commercial impact on its facility in connection with upgrades to meet the improved ride-through requirements. Nonetheless, ERCOT could not – for reliability reasons – leave this issue solely in the hands of Resource Entities. Thus, ERCOT created the exemption/extension processes and leaves itself the authority to implement operational restrictions if needed to ensure reliability.

Effective Date

Developers have known *for years* IBRs had to improve ride-through capabilities.[[1]](#footnote-2) As such, ERCOT believes its originally-proposed date of 1/1/23 was reasonable. Nonetheless, to accommodate Joint Commenters, ERCOT agreed to move the effective date of the changes from 1/1/23 to 6/1/23.[[2]](#footnote-3)

Exemptions and Extensions

ERCOT understands *some* IBRs may not be able to completely meet the improved ride-through requirements. Thus, ERCOT proposes exemption and extension processes to allow it to assess a Resource’s risk to system reliability before granting an exemption or extension.

Removing Rate-of-Change-of-Frequency (“ROCOF”), Phase Angle Jump and Multiple Excursion Language

ERCOT acknowledged that issues surrounding ROCOF, phase angle jump and multiple excursions require further analysis and proposes postponing those issues to a future NOGRR.

IEEE 2800-2022 Table 13

Removing references regarding meeting Table 13 of the IEEE 2800-2022 standard.

Start of Time Period to Implement Mitigation Activities

ERCOT agreed to require implementation of mitigation activities only after a modification becomes commercially available.

Accommodation for Co-Located Load

ERCOT’s proposal contains language adding co-located Load per paragraph (1)(c) of Planning Guide Section 5.2.1, Applicability, does not require the IBR to meet or exceed the requirements in proposed Section 2.9.1.1, Preferred Voltage Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs), or the IEEE 2800-2022 standard unless the converters, inverters, supplemental dynamic reactive devices, or other equipment that alters frequency or voltage ride-through capability are materially modified or replaced to meet any reliability requirement due to the co-located Load.

**Joint Commenters Significantly Misrepresent ERCOT’s Proposed Language**

While ERCOT worked diligently to address Joint Commenters’ concerns, ERCOT could not accommodate Joint Commenters on some issues due to reliability risk. In its 3/20/24 comments, ERCOT identified those areas. ERCOT is disappointed to see Joint Commenters’ misrepresentations regarding the content of ERCOT’s proposed language and continued characterization of ERCOT, in its roles as *Reliability Coordinator* and *Control Area Authority*, as unreasonable.

* On page six of their comments, Joint Commenters claim they agreed to “removal of grandfathering provisions for existing WGRs.” That is not correct. The current Operating Guides do not “grandfather” existing Wind-powered Generation Resources (WGRs). In fact, paragraph (2) of Section 2.9 provides, “…*each Generation Resource* shall not, during and following a transient voltage disturbance, cease providing real or reactive power….” (emphasis added) That language contains no exemptions.[[3]](#footnote-4)
* On page seven, Joint Commenters state, “ERCOT’s proposal would require that an existing IBR/WGR ride through *any* ROCOF and *any* phase angle jump in either a fault or non-fault scenario, as long as the voltage and frequency measured at the POI are within the no-trip zones,” which, they claim, is stricter than the IEEE 2800-2022 standard. That is simply wrong. Paragraph (2) of Section 2.9, Voltage Ride-Through Requirements for Generation Resources, requires ride through only during the conditions outlined in preceding paragraph (1) not “any ROCOF” or “any phase angle jump” as Joint Commenters claim.
* On page eight, Joint Commenters claim ERCOT’s position would require existing IBRs/WGRs to perform “at a higher standard than new IBRs and “without the prospect of an exemption where no commercially reasonable modification exists.” This is wrong in two ways. First, as indicated above, the existing requirements require ride-through only during certain conditions (same as the IEEE 2800-2022 standard). Second, ERCOT’s proposal *allows for exemptions* where necessary.
* On page nine, Joint Commenters claim ERCOT expresses a desire to insert language in NOGRR245 to provide it “broad authority to disconnect IBRs/WGRs from the ERCOT Transmission Grid for an indefinite amount of time outside of emergency conditions.” They also claim ERCOT’s proposal *suggests* permanent disconnections for Type 1 and Type 2 WGRs and IBRs if ERCOT does not grant an exemption. Make no mistake, an IBR and Type 1/Type 2 WGR failure to ride-through routine system disturbances threatens loss of additional generation and Load up to complete system blackout. However, Joint Commenters’ attempt to influence the outcome on NOGRR245 by raising the issue of “resource adequacy” is a red herring. Of course, ERCOT understands the significance of ensuring it has sufficient Resources to meet system demand. ERCOT *wants and needs* Resources to meet demand and is in the best position to assess the benefit from generation against the risk of catastrophic system failure. ERCOT would disconnect a Resource only as a “last resort” when needed to protect system reliability and only for a temporary period to address a specific reliability issue. ERCOT does not intend to permanently disconnect *any* Resource.
* Joint Commenters claim ERCOT could make, “arbitrary decisions” to disconnect non-compliant Resources. First, ERCOT has not included *any* language in NOGRR245 giving it such authority because ERCOT *already has* the authority to protect grid reliability under the Public Utility Regulatory Act (PURA), North American Electric Reliability Corporation (NERC) Reliability Standards, Public Utility Commission of Texas (PUCT) Rules and the ERCOT Protocols.[[4]](#footnote-5) Next, no language in NOGRR245 gives ERCOT authority to remove IBRs/WGRs from the grid, “for an indefinite amount of time outside of emergency conditions.” In fact, no such language exists in ERCOT’s proposal at all. Lastly, if a Market Participant considers an ERCOT action “arbitrary,” it can appeal to the Commission pursuant to P.U.C. Proc. R. 22.251, Review of Electric Reliability Council of Texas (ERCOT) Conduct.
* Also on page nine, Joint Commenters take the position that disconnecting a non-compliant Resource from the grid, “is a departure from current practice.” That is not accurate. ERCOT has the authority to take all actions necessary to protect the grid and, in fact, ERCOT *has* disconnected Resources posing a threat to reliability when it absolutely had to do so, making it clear it is ***not***a “departure from current practice.”
* Also on page nine, Joint Commenters state, “[i]f disconnection authority extends to the Transmission Operator, as well as ERCOT, it would directly implicate 16 TAC § 25.272….” Nothing in ERCOT’s version of NOGRR245 gives Transmission Service Providers the right to disconnect a Resource.
* Also on page nine, Joint Commenters state, “no entity should be unilaterally authorized to require long-term disconnection of an existing resource.” First, ERCOT already has the authority to disconnect a Resource posing a threat to grid reliability. Additionally, *nothing* in ERCOT’s proposed language indicates any Resource is subject to “long-term disconnection.” In fact, a Resource Entity would have complete control over how long its Resource remains disconnected – it could mitigate the deficiency quickly (through software or hardware upgrades or installing supplemental equipment) and return to the grid quickly.

In light of the foregoing, ERCOT strongly urges TAC to adopt the ERCOT comments submitted on 3/20/24 and present a version of NOGRR245 to the ERCOT Board that goes to the heart of ERCOT’s mission and conforms to ERCOT’s overall mission – ERCOT System reliability.

1. In June 2017, NERC issued its recommendation entitled, “[Loss of Solar Resources during Transmission Disturbances due to Inverter Settings](https://www.nerc.com/pa/rrm/bpsa/Alerts%20DL/NERC%20Alert%20Loss%20of%20Solar%20Resources%20during%20Transmission%20Disturbance.pdf).” In May 2018, NERC issued, “[Loss of Solar Resources during Transmission Disturbances due to Inverter Settings – II](https://www.nerc.com/pa/rrm/bpsa/Alerts%20DL/NERC_Alert_Loss_of_Solar_Resources_during_Transmission_Disturbance-II_2018.pdf).” In September 2018, NERC issued, “[Reliability Guideline - BPS-Connected Inverter-Based Resource Performance](https://www.nerc.com/comm/RSTC_Reliability_Guidelines/Inverter-Based_Resource_Performance_Guideline.pdf).” In March 2022, NERC issued, “[Industry Recommendation Inverter-Based Resource Performance Issues](https://www.nerc.com/pa/rrm/bpsa/Alerts%20DL/NERC%20Alert%20R-2023-03-14-01%20Level%202%20-%20Inverter-Based%20Resource%20Performance%20Issues.pdf).” In its 2021 report regarding Odessa 1, NERC recommended, “ERCOT should ensure that the recommendations contained within the NERC reliability guidelines are comprehensively reviewed and adopted to ensure mitigating actions are put in place to prevent these types of issues in the future. Many of the performance issues in this event could have been mitigated if appropriate performance requirements were established for these resources and interconnection studies were performed to ensure conformance with those requirements.” [↑](#footnote-ref-2)
2. Joint Commenters wish to move that date to 6/1/24, which would allow 20-30 MWs of new IBRs to avoid complying with the improved ride-through requirements. [↑](#footnote-ref-3)
3. Intermittent Renewable Resources (IRRs), including WGRs, are “Generation Resources” per the ERCOT Protocols and § 2.9 applies to them. Additionally, Operating Guides § 2.9.1(4) provides, “[e]ach IRR shall remain interconnected during three-phase faults on the ERCOT System for a voltage level as low as zero volts with a duration of 0.15 seconds as measured at the Point of Interconnection Bus (POIB)….”

   Next, Operating Guides § 2.9.1(7) provides, “[v]oltage ride-through requirements may be met by the performance of the generators; by installing additional reactive equipment behind the Point of Interconnection (POI); or by a combination of generator performance and additional equipment behind the POI….” This language makes it clear IRRs must meet the voltage ride-through requirements.

   Lastly, § 2.9.1(8) provides, “[i]f an IRR fails to comply with the clearing time or recovery voltage ride-through requirement, then the IRR and the interconnecting TSP shall be required to investigate and report to ERCOT on the cause of the IRR trip, identifying a reasonable mitigation plan and timeline.” [↑](#footnote-ref-4)
4. Texas Utility Code § 39.151; NERC Reliability Standards TOP-001, R1 and IRO-001, R1; PUCT Rules 25.361(b) and (b)(4); and Protocols 6.5.1.1(1) [↑](#footnote-ref-5)