Sierra Club 091123	Noted it largely supports the 9/5/23 Southern Power comments, 9/4/23 Invenergy comments and 9/5/23 NextEra comments on existing Resources but believes that the June 1, 2026 date is unreasonable and suggests a date of June 1, 2024 for any Resource with a signed and executed SGIA of that date or later with a compliance date of June 1, 2026 for new Resources with the new IBR standards
NextEra 091323	Proposed revisions to partially conform with the 8/18/23 ERCOT comments, clarified "behind the meter" co-located discussion at ROS, refined the reporting requirements, and incorporated the 9/5/23 GE Vernova comments
RWE 091323	Supported bifurcating NOGRR245 into two NOGRRs to retain more IBRs and deliver better ride through performance from existing Resources; rather than a NOGRR approved with the limited information available at this time
NextEra 091323	Responded to the 9/6/23 ERCOT comments and requested that the actual reliability risk and data be fully considered before implementing a performance-based standard for WGRs that have been reliably serving Texans for many years
Siemens Gamesa Renewable Energy 092223	Raised objections to retroactively applying new standard requirements and provided a preliminary assessment of Siemens Gamesa Renewable Energy's legacy turbines ability to meet the proposed requirements reflected in the 8/18/23 ERCOT comments
ERCOT 092423	Requested NOGRR245 be tabled to provide ERCOT sufficient time to update the Impact Analysis and gather information from Resource Entities and OEMs
Avangrid Renewables 092523	Supported 9/13/23 NextEra comments incorporated into the 9/14/23 ROS Report and suggested bifurcating the issues in NOGRR245 to separately address requirements for existing and new IBRs
ERCOT 092923	Provided information contained in the ERCOT-issued requests for information sent to Resource Entities and questions submitted to OEMs on September 27, 2023
Tesla 101623	Supported NOGRR245 as recommended for approval by ROS in the 9/14/23 ROS Report
ERCOT 102323	Proposed alternative schedule for developing an Impact Analysis and noted ERCOT intended to complete the Impact Analysis prior to the December 4, 2023 TAC meeting
Advanced Power Alliance 102323	Noted concerns and questions related to ERCOT's 9/29/23 RFI to IBR owners and questions issued by ERCOT to OEMs
Siemens Gamesa Renewable Energy 103023	Provided a summary of WGRs on the ERCOT System manufactured by Siemens Gamesa and its comments in response to ERCOT's 9/29/23 RFI

Vestas 110123	Presented Vesta's findings from the evaluation of its turbines' ability to meet the NOGRR245 requirements as outlined in ERCOT's 9/29/23 RFI
GE Vernova 110723	Presented results from its preliminary assessment of its wind turbines' ability to meet the NOGRR245 requirements as outlined in ERCOT's 9/29/23 RFI
ERCOT 120223	Summarized the 12/2/23 Revised Impact Analysis and highlighted ERCOT's concern that NOGRR245 as recommended for approval by ROS in the 9/14/23 ROS Report prioritizes commercial consideration over reliability impacts
ERCOT 010824	Reiterated ERCOT's concerns with NOGRR245 as recommended for approval by ROS in the 9/14/23 ROS Report, proposed language revisions restoring key elements intended to mitigate reliability risk while accounting for technical feasibility based on information received from OEMs and Resource Entities in response to ERCOT's 9/29/23 RFI
Texas RE 011124	Encouraged ERCOT stakeholders to move forward with enhancing the reliability and security of the ERCOT System by adopting improved IBR ride through standards along the lines of the 1/8/24 ERCOT comments as soon as possible
GE Vernova 011924	Proposed revisions modifying language in the 1/8/24 ERCOT comments reinstating a specific frequency ride-through exception, eliminating paragraph (7) of Section 2.9.1.2 until specific criteria can be provided by TSPs, and added the wording "or if required based on physical limitations of IBR unit" in paragraph (4) of Sections 2.9.1.1 and 2.9.1.2
Advanced Power Alliance 012324	Supported NOGRR245 as recommended for approval by ROS in the 9/14/23 ROS Report and expressed concern the 1/8/24 ERCOT comments will increase costs for customers and discourage generation capacity investment in the ERCOT Region
Joint Commenters 012324	Proposed revisions to the language contained in the 1/8/24 ERCOT comments to address their concern that the new technical requirements will cause IBR owners to incur significant capital investments
Avangrid Renewables 012324	Agreed with the concerns outlined in the 1/23/24 Joint Commenters comments and suggested a phased-in approach for implementation of new requirements and exceptions for legacy IBRs where solutions are technically infeasible or commercially unreasonable
ERCOT 021224	Requested TAC continue to table NOGRR245 to provide additional time for discussions between ERCOT and the Joint Commenters
ERCOT 032024	Proposed revisions to the language contained in the 1/8/24 ERCOT comments to address certain concerns expressed by Joint Commenters during discussions

Joint Commenters 2 032224	Proposed revisions to the language contained in the 1/8/24 ERCOT comments reflecting convergence on issues and summarized remaining differences between Joint Commenters 2 and ERCOT positions
ERCOT 032624	Reiterated concerns regarding the reliability risk associated with IBRs' failure to ride through system disturbances and responded to the 3/22/24 Joint Commenters 2 comments
Joint Commenters 041524	Described how NOGRR245 as recommended for approval by TAC in the 3/27/24 TAC Report contains the most rigorous ride-through requirements on IBRs in the country to date; provides Market Participants, investors, OEMs, and regulators with clearly defined rules; safeguards private property and due process rights of Resource owners; bolsters the reliability and stability of the ERCOT System
Elevate Energy Consulting 041524	Supported NOGRR245 as recommended for approval by TAC in the 3/27/24 TAC Report; and offered alternatives
ERCOT 041524	Highlighted concerns with NOGRR245 as recommended for approval by TAC in the 3/27/24 TAC Report and proposed revised guide language that would address critical reliability risk
ERCOT 060524	Proposed revisions to the language contained in the 5/22/24 TAC Report that focused on being responsive to stakeholder concerns identified at recent TAC meetings and sentiments expressed by the ERCOT Board and PUCT
Luminant 060624	Proposed revisions to the 6/5/24 ERCOT comments replacing "respectively" with "as appropriate" in paragraph 3 of Section 2.9.1
Joint Commenters 2 060624	Proposed revisions to the language contained in the 5/22/24 TAC Report to allow for immediate implementation of standards consistent with the IEEE2800-2022 standard for new Resources, maximize the ride-through capabilities for existing Resources that can be accomplished with software modifications, and decouple software and hardware ride-through considerations
Joint Commenters 2 061024	Opposed the TAC recommendation in the 6/7/24 TAC Report and commented the language imposes arbitrary costs on existing Generation Resources and unlawfully gives ERCOT authority to indefinitely shutter existing operational IBRs/WGRs; urged the ERCOT Board to either adopt the Joint Commenters' 6/6/24 comments or make the edits proposed in these comments
Delilah Solar Energy 061124	Opposed the TAC recommendation in the 6/7/24 TAC Report and commented the language imposes arbitrary costs on existing Generation Resources and unlawfully gives ERCOT authority to indefinitely shutter existing operational IBRs/WGRs; urged the ERCOT Board to either adopt the Joint Commenters' 6/6/24 comments or make the edits proposed in these comments

Delilah Solar Energy II 061124	Opposed the TAC recommendation in the 6/7/24 TAC Report and commented the language imposes arbitrary costs on existing Generation Resources and unlawfully gives ERCOT authority to indefinitely shutter existing operational IBRs/WGRs; urged the ERCOT Board to either adopt the Joint Commenters' 6/6/24 comments or make the edits proposed in these comments
Desert Sky Wind Farm 061124	Opposed the TAC recommendation in the 6/7/24 TAC Report and commented the language imposes arbitrary costs on existing Generation Resources and unlawfully gives ERCOT authority to indefinitely shutter existing operational IBRs/WGRs; urged the ERCOT Board to either adopt the Joint Commenters' 6/6/24 comments or make the edits proposed in these comments
Goldthwaite Wind Energy 061124	Opposed the TAC recommendation in the 6/7/24 TAC Report and commented the language imposes arbitrary costs on existing Generation Resources and unlawfully gives ERCOT authority to indefinitely shutter existing operational IBRs/WGRs; urged the ERCOT Board to either adopt the Joint Commenters' 6/6/24 comments or make the edits proposed in these comments
Gunsight Mountain Wind Energy 061124	Opposed the TAC recommendation in the 6/7/24 TAC Report and commented the language imposes arbitrary costs on existing Generation Resources and unlawfully gives ERCOT authority to indefinitely shutter existing operational IBRs/WGRs; urged the ERCOT Board to either adopt the Joint Commenters' 6/6/24 comments or make the edits proposed in these comments
Invenergy Energy Management 061124	Opposed the TAC recommendation in the 6/7/24 TAC Report and commented the language imposes arbitrary costs on existing Generation Resources and unlawfully gives ERCOT authority to indefinitely shutter existing operational IBRs/WGRs; urged the ERCOT Board to either adopt the Joint Commenters' 6/6/24 comments or make the edits proposed in these comments
Invenergy Renewables 061124	Opposed the TAC recommendation in the 6/7/24 TAC Report and commented the language imposes arbitrary costs on existing Generation Resources and unlawfully gives ERCOT authority to indefinitely shutter existing operational IBRs/WGRs; urged the ERCOT Board to either adopt the Joint Commenters' 6/6/24 comments or make the edits proposed in these comments
McAdoo Wind Energy 061124	Opposed the TAC recommendation in the 6/7/24 TAC Report and commented the language imposes arbitrary costs on existing Generation Resources and unlawfully gives ERCOT authority to indefinitely shutter existing operational IBRs/WGRs; urged the ERCOT Board to either adopt the Joint Commenters' 6/6/24 comments or make the edits proposed in these comments

Miami Wind 061124	Opposed the TAC recommendation in the 6/7/24 TAC Report and commented the language imposes arbitrary costs on existing Generation Resources and unlawfully gives ERCOT authority to indefinitely shutter existing operational IBRs/WGRs; urged the ERCOT Board to either adopt the Joint Commenters' 6/6/24 comments or make the edits proposed in these comments
Samson Solar Energy II 061124	Opposed the TAC recommendation in the 6/7/24 TAC Report and commented the language imposes arbitrary costs on existing Generation Resources and unlawfully gives ERCOT authority to indefinitely shutter existing operational IBRs/WGRs; urged the ERCOT Board to either adopt the Joint Commenters' 6/6/24 comments or make the edits proposed in these comments
Samson Solar Energy III 061124	Opposed the TAC recommendation in the 6/7/24 TAC Report and commented the language imposes arbitrary costs on existing Generation Resources and unlawfully gives ERCOT authority to indefinitely shutter existing operational IBRs/WGRs; urged the ERCOT Board to either adopt the Joint Commenters' 6/6/24 comments or make the edits proposed in these comments
Santa Rita East Wind 061124	Opposed the TAC recommendation in the 6/7/24 TAC Report and commented the language imposes arbitrary costs on existing Generation Resources and unlawfully gives ERCOT authority to indefinitely shutter existing operational IBRs/WGRs; urged the ERCOT Board to either adopt the Joint Commenters' 6/6/24 comments or make the edits proposed in these comments
Scurry County Wind 061124	Opposed the TAC recommendation in the 6/7/24 TAC Report and commented the language imposes arbitrary costs on existing Generation Resources and unlawfully gives ERCOT authority to indefinitely shutter existing operational IBRs/WGRs; urged the ERCOT Board to either adopt the Joint Commenters' 6/6/24 comments or make the edits proposed in these comments
Scurry County Wind II 061124	Opposed the TAC recommendation in the 6/7/24 TAC Report and commented the language imposes arbitrary costs on existing Generation Resources and unlawfully gives ERCOT authority to indefinitely shutter existing operational IBRs/WGRs; urged the ERCOT Board to either adopt the Joint Commenters' 6/6/24 comments or make the edits proposed in these comments
Stanton Wind Energy 061124	Opposed the TAC recommendation in the 6/7/24 TAC Report and commented the language imposes arbitrary costs on existing Generation Resources and unlawfully gives ERCOT authority to indefinitely shutter existing operational IBRs/WGRs; urged the ERCOT Board to either adopt the Joint Commenters' 6/6/24 comments or make the edits proposed in these comments

Trent Mesa Wind Energy Farm 061124	Opposed the TAC recommendation in the 6/7/24 TAC Report and commented the language imposes arbitrary costs on existing Generation Resources and unlawfully gives ERCOT authority to indefinitely shutter existing operational IBRs/WGRs; urged the ERCOT Board to either adopt the Joint Commenters' 6/6/24 comments or make the edits proposed in these comments
Turkey Track Wind Energy 061124	Opposed the TAC recommendation in the 6/7/24 TAC Report and commented the language imposes arbitrary costs on existing Generation Resources and unlawfully gives ERCOT authority to indefinitely shutter existing operational IBRs/WGRs; urged the ERCOT Board to either adopt the Joint Commenters' 6/6/24 comments or make the edits proposed in these comments
ERCOT 061624	Requested the ERCOT Board table NOGRR245 and express support for not delaying the preferred ride-through requirements for IBRs with an SGIA executed on or after 8/1/24 and a Board Priority Revision Request focusing on hardware upgrades targeted for consideration at the December 2024 ERCOT Board meeting
ERCOT 081224	Proposed language revisions to address Joint Commenter concerns and the bifurcation of the hardware modification requirements, removed redundant language, corrected errors and made clarifying edits
ERCOT 081624	Proposed incremental revisions to the 8/12/24 ERCOT comments that introduced the "notice of intent to request an exemption" concept into the exemption process and clarified language related to memory upgrades associated with maximizing equipment ride-through capabilities
Joint Commenters 2 081624	Stated the Joint Commenters do not oppose the 8/16/24 ERCOT comments and memorialized the collaboration between the Joint Commenters and ERCOT since the 6/18/24 ERCOT Board meeting

Market Rules Notes

Administrative changes to the language were made and authored as "ERCOT Market Rules."

Please note the baseline Nodal Operating Guide language in the following sections have been updated to reflect the incorporation of the following NOGRRs into the Nodal Operating Guides:

- NOGRR196, Related to NPRR973, Add Definitions for Generator Step-Up and Main Power Transformer (unboxed 2/1/23)
    - Section 2.9
- NOGRR204, Related to NPRR989, BESTF-1 Energy Storage Resource Technical Requirements (partially unboxed 4/1/24)

- Section 2.9
- Section 2.9.1

Revised Proposed Guide Language

2.6.2 Frequency Ride-Through Requirements for Generation Resources~~Generators~~ and Energy Storage Resources

(1) Except for Generation Resources and Energy Storage Resources (ESRs) subject to Sections 2.6.2.1, Frequency Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs), ~~and~~ Type 1 Wind-Powered Generation Resources and Type 2 ~~Wind-Powered Generation Resources (~~WGRs~~)~~ or 2.6.2.2~~1~~, Frequency Ride-Through Requirements for Distribution Generation Resources (DGRs) and Distribution Energy Storage Resources (DESRs), if under-frequency relays are installed and activated to trip the Generation Resource or ESR, these relays shall ~~be set~~perform such that the automatic removal of ~~individual Generation~~the Resources ~~or Energy Storage Resources (ESRs)~~ from the ERCOT System meets or exceeds the following requirements:

Frequency Range	Delay to Trip
Above 59.4 Hz	No automatic tripping (~~C~~continuous operation)
Above 58.4 Hz up to a~~A~~nd including 59.4 Hz	Not less than 9 minutes
Above 58.0 Hz up to a~~A~~nd including 58.4 Hz	Not less than 30 seconds
Above 57.5 Hz up to a~~A~~nd including 58.0 Hz	Not less than 2 seconds
57.5 Hz or below	No time delay required

(2) Except for Generation Resources subject to Sections 2.6.2.1 or 2.6.2.2, if over-frequency relays are installed and activated to trip the ~~unit~~~~Generation~~ Resource ~~or ESR~~, ~~then~~ the Resource~~they~~ shall ~~be set~~perform such that the automatic removal of the ~~individual Generation~~ Resources ~~or ESRs~~ from the ERCOT System meets or exceeds the following requirements:

Frequency Range	Delay to Trip
Below 60.6 Hz down to and including 60 Hz	No automatic tripping (c~~C~~ontinuous operation)
Below 61.6 Hz down to and including 60.6 Hz	Not less than 9 minutes
Below 61.8 Hz down to and including 61.6 Hz	Not less than 30 seconds
61.8 Hz or above	No time delay required

(3) If frequency protection schemes are installed and activated to trip a Generation Resource or ESR, theya~~All instantaneous frequency protections schemes~~ shall use filtered quantities or add sufficient time delays to prevent misoperations while providing the desired equipment protection. Protection schemes shall not trip a Generation Resource or ESR based on an instantaneous frequency measurement. ~~This Operating Guide is not intended to conflict with the plant operator's responsibility to protect Generation Resources and ESRs from potentially damaging operating conditions.~~

(4) This ~~Operating Guide~~Section shall not affect the Resource Entity's responsibility to protect Generation Resources or ESRs from damaging operating conditions. The Resource Entity for a Generation Resource or ESR ~~that is~~ subject to paragraphs (1) and (2) above that is unable to remain reliably connected to the ERCOT System as set forth in paragraphs (1) and (2) ~~above~~, shall immediately provide to ERCOT the reason(s) for the Resource's limitation~~for that inability~~, including available study results or manufacturer recommendations~~advice~~, and ~~. The limitation description shall include~~ the ~~Generation~~ Resource's ~~or ESR's~~ frequency ride-through capability in the format shown in the tables in paragraphs (1) and (2) above. ~~The Resource Entity that owns Generation Resources that are unable to comply shall provide to ERCOT an explanation of the limitations including, but not limited to, study results or manufacturer's advice.~~

2.6.2.1- Frequency Ride-Through Requirements for Transmission-Connected~~-~~ Inverter-Based Resources (IBRs), ~~and~~ Type 1 Wind-Powered Generation Resources (WGRs) and Type 2 ~~Wind-Powered Generation Resources (~~WGRs~~)~~

(1) This Section applies to ~~A~~all IBRs, ~~and~~ Type 1 Wind-powered Generation Resources (WGRs) and Type 2 ~~Wind-powered Generation Resources (~~WGRs~~)~~ ~~inter~~connected to the ERCOT Transmission Grid. Such Resources shall ride through the frequency conditions at the ~~IBR's~~Resource's Point of Interconnection Bus (POIB) specified in the following table:

Frequency (f) in (Hz)	Minimum Ride-Through Time (seconds)
f > 61.8	May ride-through or trip~~No ride-through requirement~~
61.6 < f ≤ 61.8	299
61.2 < f ≤ 61.6	540
58.8 ≤ f ≤ 61.2	continuous
58.4 ≤ f < 58.8	540
57.0 ≤ f < 58.4	299
f < 57.0	May ride-through or trip~~No ride-through requirement~~

(2) Nothing in paragraph (1) above shall be interpreted to require an IBR, ~~or~~ Type 1 WGR or Type 2 WGR to trip for frequency conditions beyond those for which ride-through is required.

(3) If protection systems (including, but not limited to protection for over-/under-frequency, rate-of-change-of-frequency, anti-islanding, and phase angle jump) are installed and activated to trip the IBR, ~~or~~ Type 1 WGR or Type 2 WGR, ~~The Resource Entity for an IBR shall set~~ they~~all protection systems (including, but not limited to protection for over-/under-frequency, rate-of-change of frequency, anti-islanding, and phase angle jump) ve over-/under-frequency relays~~ shall ~~be set to~~ enable the Resource~~IBR or Type 1 WGR or Type 2 WGR~~ to ride through frequency conditions beyond those defined in paragraph (1) above to the maximum ~~extent~~level the equipment allows~~possible consistent with IBR capability~~. ~~An IBR or Type 1 WGR or Type 2 WGR shall ride through frequency excursions during which ride-through is required and the absolute rate-of-change of frequency magnitude does not exceed 5.0 Hz/second. The rate-of-change of frequency shall be considered the average rate of change of frequency over a period of at least 0.1 seconds unless ERCOT or the interconnecting Transmission Service Provider (TSP) specifies otherwise.~~

(4) An IBR, ~~or~~ Type 1 WGR or Type 2 WGR shall inject electric current when required to ~~during all periods requiring~~ ride-through frequency conditions ~~pursuant to paragraphs (1) and (3) above~~. Except when caused by reductions associated with intermittent primary energy source availability (e.g., wind speed or solar irradiance), an IBR, Type 1 WGR or Type 2 WGR shall not reduce active current injection during frequency conditions requiring ride-through unless allowed pursuant to paragraph (4) of Section 2.9.1.1, Preferred Voltage Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs) or paragraph (4) of Section 2.9.1.2, Legacy Voltage Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs), Type 1 Wind-Powered Generation Resources (WGRs) and Type 2 WGRs) or to provide appropriate frequency response.

(5) IBR, Type 1 WGR and Type 2 WGR ~~An An IBR or Type 1 WGR or Type 2 WGR's Resource Entity shall not enable any protections, pP~~plant controls, turbine controls and~~,~~/or inverter controls ~~(including, but not limited to protection for rate-of-change of frequency (ROCOF), anti-islanding, and phase angle jump) thatshall not disconnect theof an IBR or Type 1 WGR or Type 2 WGR~~ shall not disconnect the plant or any individual inverter/turbine, or prevent current exchange between the Resource ~~from~~ and the ERCOT ~~System~~Transmission Grid ~~or reduce IBRitsthe Resource's output~~ during frequency conditions where ride-through is required. ~~IBR, Type 1 WGR and Type 2 WGR plant controls, turbine controls, and/ or inverter controls shall not reduce the Resource output during frequency conditions requiring ride-through unless necessary for providing appropriate frequency response.unless necessary for proper operation of the IBR, for providing appropriate frequency response., or to preventing equipment damage. If an IBR or Type 1 WGR or Type 2 WGR requires any setting that would prevent it from riding through the frequency conditions required in paragraph (1) above, ERCOT may~~

~~restrict its operations unless a documented technical exception provides the basis for such setting as set forth in paragraph (8) below. If an IBR requires any setting that would prevent it from riding through the frequency conditions as required in paragraph (1) above, the IBR operation shallmay be restricted as set forth in paragraph (8) below.If an IBR requires ROCOF protection to prevent equipment damage, it shall not disconnect the IBR for frequency excursions having an absolute ROCOF magnitude less than or equal to 5.0 Hz/second. The ROCOF shall be the average rate of change of frequency over a period of at least 0.1 seconds unless ERCOT or the interconnecting Transmission Service Provider (TSP) specifies otherwise.~~

(6) The Resource Entity or IE ~~for each~~of an IBR, ~~or~~ Type 1 WGR or Type 2 WGR, ~~with a Standard Generation Interconnection Agreement (SGIA) executed prior to June 1, 2024363, must make commercially reasonable efforts to~~shall ensure the Resource's ~~sits~~ frequency ride-through capability is set to the maximum level the equipment allows to meet or exceed the requirements of paragraphs (1) through (5) above as soon as practicable but no later than December 31, 2025 or at the time of its synchronization with the ERCOT Transmission Grid for new IBRs synchronizing after December 31, 2025.~~with all available and known commercially reasonable upgrades as set forth in Section 2.11, Commercially Reasonable Efforts.but no later than December 31, 2025 but no later than December 31, 2025. Such IBRs or Type 1 WGR or Type 2 WGR shall comply with the frequency ride-through requirements specified in Section 2.6.2.1.1, Temporary Frequency Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs) and Type 1 and Type 2 Wind-Powered Generation Resources (WGRs), until the IBR or Type 1 WGR or Type 2 WGR implements changes to comply with paragraphs (1) through (5) above.Such IBRs shall comply with the frequency ride-through requirements specified in Section 2.6.2.1.1, Temporary Frequency Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs). until the IBR implements changes to comply with paragraphs (1) through (5).An IBR with a Standard Generation Interconnection Agreement (SGIA) executed prior to January 1, 2023, must comply with the frequency ride-through requirements in effect immediately prior to the effective date of this paragraph until December 31, 20243, at which time the IBR must comply with this Section.~~ The Resource Entity must inform ERCOT (in a manner prescribed by ERCOT) of the date on which the IBR, Type 1 WGR or Type 2 WGR has fully maximized its ride-through capability to equipment limits. To establish ride-through capabilities to the maximum extent the equipment allows as used throughout Section 2.6.2, Frequency Ride-Through Requirements for Generation Resources and Energy Storage Resources, means making software, settings, firmware, and parameterization changes, which includes any memory upgrades to accommodate such changes that do not involve modifying other Resource equipment or components, to maximize the frequency ride-through capabilities of the Resource in accordance with Good Utility Practice.~~but no later than December 31, 2025 but no later than December 31, 2025. Such IBRs or Type 1 WGR or Type 2 WGR shall comply with the frequency ride-through requirements specified in Section 2.6.2.1.1,~~

Temporary Frequency Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs) and Type 1 and Type 2 Wind-Powered Generation Resources (WGRs), until the IBR or Type 1 WGR or Type 2 WGR implements changes to comply with paragraphs (1) through (5) above.Such IBRs shall comply with the frequency ride-through requirements specified in Section 2.6.2.1.1, Temporary Frequency Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs). until the IBR implements changes to comply with paragraphs (1) through (5).An IBR with a Standard Generation Interconnection Agreement (SGIA) executed prior to January 1, 2023, must comply with the frequency ride-through requirements in effect immediately prior to the effective date of this paragraph until December 31, 20243, at which time the IBR must comply with this Section.

[NOGRR245: Replace paragraph (6) above with the following on January 1, 2026.]

(6) The Resource Entity or IE for each IBR or Type 1 WGR or Type 2 WGR with a Standard Generation Interconnection Agreement (SGIA) executed prior to June 1, 2023, shall ensure its frequency ride-through capability is set to the maximum level the equipment allows to meet or exceed the requirements of paragraphs (1) through (5) above as soon as practicable but no later than December 31, 2025.

[NOGRR245: Replace paragraph (6) above with the following on January 1, 2026.]

(6) The Resource Entity or Interconnecting Entity (IE) for an IBR with a Standard Generation Interconnection Agreement (SGIA) executed prior to June 1, 2023 that cannot comply with Section 2.6.2.1 paragraphs (1) through (5) shall, by March 1, 2024, submit to ERCOT a report and supporting documentation containing the following:

(a) The current and potential future IBR frequency ride-through capability (including any associated adjustments to improve frequency ride-through capability) in a format similar to the table in paragraph (1) above;

(b) The proposed modifications to maximize the IBR frequency ride-through capability and/or allow the IBR to comply with the frequency ride-through requirements in Section 2.6.2.1 paragraphs (1) through (5);

(c) A schedule for implementing those modifications as soon as practicable but no later than December 31, 2025; and

(d) Any limitations on the IBR's frequency ride-through capability making it technically infeasible to meet the requirements in Section 2.6.2.1 paragraphs (1) through (5).

Based on the information provided by the Resource Entity or Interconnecting Entity, if ERCOT determines in its sole and reasonable discretion that an IBR cannot comply with all applicable

~~frequency ride-through requirements, the IBR operation may be restricted as set forth in paragraph (8) below.~~

(7) If ~~The Resource Entity or Interconnecting Entity (IE) for aneach~~ an IBR, ~~or~~ Type 1 WGR or Type 2 WGR with an SGIA executed prior to ~~June~~August 1, 2024~~3~~63 ~~that~~ cannot comply with paragraphs (1) through (~~5~~6) above by December 31, 2025, ~~the requirements of this Section by December 31, 2024~~3the Resource Entity or IE shall,~~,~~ by ~~February~~April 1, 2025~~JuneMarchJune 1~~December 31, 2024 ~~(or later as part of the interconnection process for any project not approved to energize as of February 1, 2025)~~, submit an Initial Frequency Ride-Through Capability Report ("IFRTCR") ~~request an exemption as set forth in~~pursuant to Section 2.1~~2~~1.1, ~~Ride-Through Reporting Requirements for Transmission-Connected Inverter-Based Resources (IBRs), Type 1 Wind-Powered Generation Resources (WGRs) and Type 2 WGRs~~ Initial Frequency Ride-Through Capability Documentation and Reporting Requirements, and submit an extension request or notice of intent to request an exemption ~~or extension~~ pursuant to Section 2.12.1, Exemptions and Extensions Process.~~, for all IBRs for Type 1 WGRs or Type 2 WGRs with an SGIA executed after January 16, 2014 or by December 1, 2024 for all remaining IBRs or Type 1 WGRs or Type 2 WGRs (or as part of the interconnection process)3, submit to ERCOT a report and provide to ERCOT a schedule for modifying the IBR to comply with this Section's requirements or a written explanation of the IBR's inability to comply with the requirements, with supporting documentation containing the following and in each case, only to the extent such information is reasonably available from the original equipment manufacturers and other parties:~~

~~(a) The current and potential futureand potential future IBR's or Type 1 WGR or Type 2 WGR frequency ride-through capability (including any associated adjustments to improve frequency ride-through capability)as of January 1, 2023 (including any associated adjustments to improve frequency ride-through capability) in a format similar to the table in paragraph (1) above;~~

~~(b) Any known technical limitations onThe proposed modifications that maximize the IBR or Type 1 WGR or Type 2 WGR frequency ride-through capability in paragraphs (1) through (5) above, to the extent the Resource Entity can reasonably identity them. Such limitations may include general limitations from the manufacturers or other parties;~~

~~(c) The proposed commercially reasonable modifications to maximize the IBR or Type 1 WGR or Type 2 WGR's maximum frequency ride-through capability and allow the IBR or Type 1 WGR or Type 2 WGR to increase the level of compliance or to comply with the frequency ride-through requirements in paragraphs (1) through (5) above. any associated settings to attempt to meet this Section's requirements; and~~

~~ERCOT may allow an exception to the highest and lowest frequency ride-through bands where an existing IBR or Type 1 WGR or Type 2 WGR with an SGIA executed before June 1, 20236, provides documented evidence from the original equipment manufacturer~~

(or subsequent inverter/turbine vendor support company if original equipment manufacturer is no longer in business) stating no engineering, replacement, or retrofit solutions exist to fully meet the required duration of the lowest and highest frequency ride-through bands in paragraph (1) above if, after maximizing its frequency ride-through capabilities, it can ride through the frequency ride-through band between 57.0 Hz and 58.4 Hz for at least ten seconds and the frequency ride-through band between 61.6 Hz and 61.8 Hz for at least thirty seconds;

(cdc) A schedule for implementing those modifications as soon as practicable but no later than December 31, 20265as soon as practicable but no later than December 31, 2027 with documentation supporting the need for the extensioncommercially reasonable; and

(d) Any documented technical limitations for the IBR or Type 1 WGR or Type 2 WGR frequency ride-through capability making it technically infeasible to meet any requirements in paragraphs (1) through (5) above with documentation from the IBR or Type 1 WGR or Type 2 WGR original equipment manufacturer (or subsequent inverter/turbine vendor support company if the original equipment manufacturer is no longer in business) attesting there are no technically feasible solutions that do not require replacement or major retrofits to achieve, if applicable. Major retrofits include any hardware and labor that costs more than 20% of the cost of installing new, comparable replacement equipment on a per turbine or per inverter basis; and

(e) Evidence that all models provided to ERCOT represent any documented technical limitation. The Resource must comply with the frequency ride-through requirements in effect on May 1, 2024 until the Resource maximizes its frequency ride-through capability as set forth in paragraph (6) above. (cde) As contemplated in paragraph (2) of Section 2.6.4, Commercially Reasonable Efforts, the Resource Entity shall update this evaluation by June 1 of each year if there have been any material changes, or alternatively submit an attestation signed by an officer or executive with authority to bind the Resource Entity.Any known limitations on the IBR's frequency ride-through capability making it technically infeasible to meet the requirements in paragraphs (1) through (5) abovethis Section's requirements.

(8) If an IBR, or Type 1 WGR or Type 2 WGR fails to complyperform in accordance with the applicable frequency ride-through requirements, of this Section, the IBR operation may be restricted as set forth in paragraph (8) below. Additionally, ERCOT may restrict the IBR or Type 1 WGR or Type 2 WGR operation as set forth in paragraph (10) below. Additionally, the Resource Entity shall take the actions described in Section 2.134, Actions Following an Transmission-Connected Inverter-Based Resource (IBR), Type 1 Wind-Powered Generation Resource (WGR) or Type 2 WGR Apparent Failure to Ride-Through. In its sole and reasonable discretion, ERCOT may allow a documented technical exception to an existing IBR or Type 1 WGR or Type 2 WGR with an SGIA

executed prior to June 1, 2023, that provides documented evidence from the original equipment manufacturer (or subsequent inverter/turbine vendor support company if original equipment manufacturer is no longer in business) of a technical limitation identified in paragraph (7)(d) above. Evidence from paragraph (7) above must sufficiently demonstrate that the ride-through capability has been maximized, can meet the ride-through curves specified in Section 2.6.2.1.1, Temporary Frequency Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs) and Type 1 and Type 2 Wind-Powered Generation Resources (WGRs), does not create any risk of instability, uncontrolled separation or cascading outages for the ERCOT System, and the limitation is accurately represented in models provided to ERCOT. Any exceptions will expire when the IBR implements a modification as described in paragraph (1)(c) of Planning Guide Section 5.2.1, for which a Generator Interconnection or Modification (GIM) was initiated or when ERCOT is notified that the technical limitation no longer exists. Software and parameterization changes needed to achieve the required performance are required and not allowed for an exception. Exceptions are not allowed that would effectively be lower than the current frequency ride-through requirements in effect as of December 1, 2023. For any IBR or Type 1 WGR or Type 2 WGR that receives a documented technical exception, the documented maximum capabilities that do not meet the capabilities in paragraphs (1) through (5) above will become the new performance requirements until the exception is removed.Based on the information provided by the Resource Entity or IEInterconnecting Entity, if ERCOT determines in its sole and reasonable discretion that an IBR cannot comply with all applicable one or more of the frequency ride-through requirements of this Section, ERCOT shallmay the IBR operation may be restricted as set forth in paragraph (8) below. grant a temporary exemption from such requirements until December 31, 20254, or an earlier date, if ERCOT determines that earlier compliance is possible, provided that such an exemption will not affect any Resource Entity's duty to comply with frequency ride-through requirements in effect before the effective date of this paragraph. During any temporary exemption period, the Resource Entity for the IBR shall implement any technically feasible modifications to achieve the IBR's maximum frequency ride-through capability as soon as practicable but no later than December 31, 20254. All temporary exemptions from this requirement to allow for IBR modifications shall terminate no later than December 31, 20254.

[NOGRR245: Replace paragraph (8) above with the following on January 1, 2026.]

(8) In its sole and reasonable discretion, ERCOT may allow a documented technical exception to an existing IBR or Type 1 WGR or Type 2 WGR with an SGIA executed prior to June 1, 2023, that provides documented evidence from the original equipment manufacturer (or subsequent inverter/turbine vendor support company if original equipment manufacturer is no longer in business) of a technical limitation identified in paragraph (7)(d) above. Evidence from paragraph (7) above must sufficiently demonstrate that the ride-through capability has been maximized and does not create any

risk of instability, uncontrolled separation or cascading outages for the ERCOT System, and the limitation is accurately represented in models provided to ERCOT. Any exceptions will expire when the IBR implements a modification as described in paragraph (1)(c) of Planning Guide Section 5.2.1, for which a Generator Interconnection or Modification (GIM) was initiated or when ERCOT is notified that the technical limitation no longer exists. Software and parameterization changes needed to achieve the required performance are required and not allowed for an exception. Exceptions are not allowed that would effectively be lower than the current frequency ride-through requirements in effect as of December 1, 2023. For any IBR or Type 1 WGR or Type 2 WGR that receives a documented technical exception, the documented maximum capabilities that do not meet the capabilities in paragraphs (1) through (5) above will become the new performance requirements until the exception is removed.

(79) If an IBR or Type 1 WGR or Type 2 WGR fails to complyperform in accordance with the applicable frequency ride-through requirements of this Section, the IBR operation may be restricted as set forth in paragraph (8) below. Additionally, ERCOT may restrict the IBR or Type 1 WGR or Type 2 WGR operation as set forth in paragraph (10) below. Additionally, the Resource Entity for the IBR or Type 1 WGR or Type 2 WGR and the interconnecting TSP shall investigate the event and report to ERCOT the cause of the IBR's failure. All impacted TSPs shall provide available information to ERCOT to assist with event analysis. The Resource Entity for each IBR not meeting the frequency ride-through requirements shall install, if not already installed, phasor measurement units orand digital fault recorders at locations identified by ERCOT as soon as practicable but no later than 18 months after notification.

(810) In its sole and reasonable discretion, ERCOT may restrict, or not permit to operate,This Section shall not affect the Resource Entity's responsibility to protect IBRs or Type 1 WGRs or Type 2 WGRs from damaging operating conditions. The Resource Entity for an IBR or Type 1 WGR or Type 2 WGR subject to paragraph (1) above that is unable to remain reliably connected to the ERCOT System as set forth in paragraph (1), shall provide to ERCOT the reason(s) for that inability, including study results or manufacturer advice. The limitation description shall include the Generation Resource's or ESR's frequency ride-through capability in the format shown in the table in paragraph (1) above. Aany such IBR or Type 1 WGR or Type 2 WGR that cannot comply with thehas one or more performance failures to the applicable frequency ride-through requirements. ERCOT shall assess the risk of the performance failure in determining whether to implement any restriction. If the assessment determines that any one of the below criteria is met, ERCOT may impose such restrictions on the Resource or portions of the Resource that experienced the performance failure:may be restricted or may not be permitted to operate on the ERCOT System unless ERCOT, in its sole and reasonable discretion, allows it to do so. Any IBR that cannot comply with the frequency ride-through requirements after December 31, 2024 shall not be permitted to operate on the ERCOT System unless ERCOT issues the IBR a Reliability Unit Commitment (RUC) or Verbal

Dispatch Instruction (VDI). Each Qualified Scheduling Entity (QSE) shall, for each applicable IBR not permitted to operate, reflect in its Current Operating Plan (COP) and Real-Time telemetry a Resource Status of OFF, OUT, or EMR in accordance with Protocol Sections 3.9.1, Current Operating Plan (COP) Criteria, and 6.5.5.1, Changes in Resource Status, as appropriate. If the Resource Entity can implement IBR modifications to resolve the technical limitations or performance failures preventing compliance with theseapplicable frequency ride-through requirements, the Resource Entity shall submit to ERCOT a report and supporting documentation containing the following:

(a) The current technical limitations and IBR frequency ride-through capability in a format similar to the table in paragraph (1) above;

(b) The proposed modifications and frequency ride-through capability allowing the IBR to comply with the frequency ride-through requirements in a format similar to the table in paragraph (1) above; and

(c) A schedule for implementing those modifications.

In its sole and reasonable discretion, ERCOT may accept the proposed modification plan. Upon completion of the accepted modification plan, ERCOT will remove the restrictions placed on the IBR unless the IBR experiences additional unresolved technical limitations or performance failures. ERCOT may allow the IBR to operate at reduced output prior to the implementation of an accepted modification plan if the reduced output allows the IBR to comply with the applicable ride-through requirements.must evaluate commercially reasonable efforts needed to comply with the requirements or increase the IBR's frequency ride-through capabilities as described in Section 2.6.4, Commercially Reasonable Efforts.

(a) The actual or potential severity of the event on the ERCOT System is greater than the most severe single contingency. To determine potential severity, ERCOT will utilize: (i) nameplate capacity for PhotoVoltaic Generation Resources (PVGRs) and ESRs; and (ii) the greater of the pre-disturbance output of the WGR or 50% of its nameplate capacity;

(b) The cause of the performance failure cannot be mitigated (i.e., fully implemented corrective actions) within 90 calendar days;

(c) The location of the performance failure did affect or has the potential to materially affect known stability limitations on the ERCOT System;

(d) The IBR or Type 1 WGR or Type 2 WGR experienced one or more previous failures in the prior 36 calendar months; or

(e) The performance failure presents an imminent safety or equipment risk on the ERCOT System.

(11) Each Qualified Scheduling Entity (QSE) shall, for each IBR or Type 1 WGR or Type 2 WGR not permitted to operate, reflect in its Current Operating Plan (COP) and Real-Time telemetry a Resource Status of OFF, OUT, or EMR in accordance with Protocol Sections 3.9.1, Current Operating Plan (COP) Criteria, and 6.5.5.1, Changes in Resource Status, as appropriate. If the Resource Entity can implement IBR or Type 1 WGR or Type 2 WGR modifications to resolve the technical limitations or performance failures, it shall submit to ERCOT a report and supporting documentation containing the following:

(a) The current technical limitations and frequency ride-through capability in a format similar to the table in paragraph (1) above;

(b) The proposed modifications and frequency ride-through capability allowing the IBR or Type 1 WGR or Type 2 WGR to comply with the applicable frequency ride-through requirements in a format similar to the table in paragraph (1) above; and

(c) A schedule for implementing those modifications.

(12) In its sole and reasonable discretion, ERCOT may accept the proposed modification plan submitted in paragraph (11) above. Upon completion of the accepted modification plan, ERCOT will remove the restrictions on the IBR or Type 1 WGR or Type 2 WGR unless it experiences additional unresolved technical limitations or performance failures. ERCOT may allow the IBR or Type 1 WGR or Type 2 WGR to operate at reduced output prior to the implementation of an accepted modification plan if the reduced output allows the IBR or Type 1 WGR or Type 2 WGR to comply with the applicable ride-through requirements. ERCOT may also temporarily lift operational restrictions for any IBR or Type 1 WGR or Type 2 WGR to prevent or mitigate an actual or anticipated emergency condition. During such instances, ERCOT shall inform each affected QSE that the restrictions have been temporarily lifted as well as the start time and proposed end time. Each QSE shall update the COP, Outage Scheduler, and Real-time telemetry to appropriately reflect the IBR's or Type 1 WGR's or Type 2 WGR's availability and capability during the timeframe for which the restriction was lifted.

(9) An IBR or Type 1 WGR or Type 2 WGR is not required to comply with these requirements if doing so would cause it to violate its Subsynchronous Resonance (SSR) Mitigation plan developed to comply with Protocol Section 3.22.1.2, Generation Resource or Energy Storage Resource Interconnection Assessment.

(10) The addition of a co-located Load that results in the initiation of a Generator Interconnection or Modification (GIM) on or after June 1, 2026 or an amendment to an SGIA on or after June 1, 2026 shall not trigger a change in frequency ride-through requirements. In those cases, the Resource Entity shall continue to be subject to paragraph (6) aboveof Section 2.6.2.1, Frequency Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs), using the SGIA date applicable before the amendment.

2.6.2.1.1 Temporary Frequency Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs), ~~and~~ Type 1 Wind-Powered Generation Resources (WGRs) and Type 2 ~~Wind-Powered Generation Resources (~~WGRs~~)~~

(1) This Section applies to ~~only certain~~ IBRs, ~~and~~ Type 1 WGRs and Type 2 WGRs with an SGIA executed prior to ~~June~~August 1, 202~~34~~ that have not implemented modifications to satisfy paragraphs (1) through (5)~~in accordance with paragraph (6)~~ of Section 2.6.2.1, Frequency Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs), ~~and~~ Type 1 Wind-Powered Generation Resources (WGRs) and Type 2 ~~Wind-Powered Generation Resources (~~WGRs~~)~~.

(2) Such Resources~~IBRs and Type 1 WGRs and Type 2 WGRs~~ shall ride through the frequency conditions at the POIB specified in the following table:

Frequency Range	**Delay to Trip**
61.8 Hz or above	No time delay required
Below 61.8 Hz down to and including 61.6 Hz	Not less than 30 seconds
Below 61.6 Hz down to and including 60.6 Hz	Not less than 9 minutes
Above 59.4 Hz up to 60.6 Hz	No automatic tripping (continuous operation)
Above 58.4 Hz up to and including 59.4 Hz	Not less than 9 minutes
Above 58.0 Hz up to and including 58.4 Hz	Not less than 30 seconds
Above 57.5 Hz up to and including 58.0 Hz	Not less than 2 seconds
57.5 Hz or below	No time delay required
~~**Frequency Range**~~	~~**Delay to Trip**~~
~~Above 59.4 Hz~~	~~No automatic tripping (continuous operation)~~
~~Above 58.4 Hz up to and including 59.4 Hz~~	~~Not less than 9 minutes~~
~~Above 58.0 Hz up to and including 58.4 Hz~~	~~Not less than 30 seconds~~
~~Above 57.5 Hz up to and including 58.0 Hz~~	~~Not less than 2 seconds~~
~~57.5 Hz or below~~	~~No time delay required~~

~~(3) IBRs and Type 1 WGRs and Type 2 WGRs shall ride through the frequency conditions at the POIB specified in the following table:~~

~~Frequency Range~~	~~Delay to Trip~~
~~Below 60.6 Hz down to and including 60 Hz~~	~~No automatic tripping (continuous operation)~~
~~Below 61.6 Hz down to and including 60.6 Hz~~	~~Not less than 9 minutes~~
~~Below 61.8 Hz down to and including 61.6 Hz~~	~~Not less than 30 seconds~~
~~61.8 Hz or above~~	~~No time delay required~~

(43) This Section shall not affect the Resource Entity's responsibility to protect equipment from damaging operating conditions. The Resource Entity for an IBR, ~~or~~ Type 1 WGR or Type 2 WGR subject to paragraph~~s~~ (2) ~~and (3)~~ above that is unable to remain reliably connected to the ERCOT ~~System~~Transmission Grid as set forth in paragraph~~s~~ (2) ~~and (3)~~, shall provide to ERCOT the information required in Section 2.11, Ride-Through Reporting Requirements for Transmission-Connected Inverter-Based Resources (IBRs), Type 1 Wind-Powered Generation Resources (WGRs) and Type 2 WGRs.~~reason(s) for the Resource's limitationthat inability, including available study results and equipment or manufacturer recommendations, and the Resource's advice. The limitation description shall include the IBR or Type 1 WGR or Type 2 WGR frequency ride-through capability in the format shown in the tables in paragraphs (2) and (3) above. The limitation description is independent of any obligations required in paragraph (6) of Section 2.6.2.1.~~

~~[NOGRR245: Delete Section 2.6.2.1.1 above on January 1, 2026.]~~

~~2.6.2.1.1 Temporary Frequency Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs)~~

~~(1) This Section applies only to certain IBRs with an SGIA executed prior to June 1, 2023 in accordance with paragraph (6) of Section 2.6.2.1, Frequency Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs).~~

~~(2) If under-frequency relays are installed and activated to trip the Generation Resource or ESR, the relays shall perform such that the automatic removal of individual Generation Resources or ESRs from the ERCOT System meets or exceeds the following requirements:~~

~~Frequency Range~~	~~Delay to Trip~~
~~Above 59.4 Hz~~	~~No automatic tripping (continuous operation)~~
~~Above 58.4 Hz up to and including 59.4 Hz~~	~~Not less than 9 minutes~~
~~Above 58.0 Hz up to and including 58.4 Hz~~	~~Not less than 30 seconds~~
~~Above 57.5 Hz up to and including 58.0 Hz~~	~~Not less than 2 seconds~~
~~57.5 Hz or below~~	~~No time delay required~~

~~(3) If over-frequency relays are installed and activated to trip the Generation Resource or ESR, they shall perform such that the automatic removal of individual Generation Resources or ESRs from the ERCOT System meets or exceeds the following requirements:~~

~~Frequency Range~~	~~Delay to Trip~~
~~Below 60.6 Hz down to and including 60 Hz~~	~~No automatic tripping (continuous operation)~~
~~Below 61.6 Hz down to and including 60.6 Hz~~	~~Not less than 9 minutes~~
~~Below 61.8 Hz down to and including 61.6 Hz~~	~~Not less than 30 seconds~~
~~61.8 Hz or above~~	~~No time delay required~~

~~(4) This Section shall not affect the Resource Entity's responsibility to protect Generation Resources or ESRs from damaging operating conditions. The Resource Entity for a Generation Resource or ESR subject to paragraphs (2) and (3) above that is unable to remain reliably connected to the ERCOT System as set forth in paragraphs (2) and (3), shall provide to ERCOT the reason(s) for that inability, including study results or manufacturer advice. The limitation description shall include the Generation Resource's or ESR's frequency ride-through capability in the format shown in the tables in paragraphs (2) and (3) above.~~

~~*[NOGRR245: Delete Section 2.6.2.1.1 above on January 1, 2026.]*~~

2.6.2.2~~1~~ Frequency Ride-Through Requirements for Distribution Generation Resources (DGRs) and Distribution Energy Storage Resources (DESRs)

(1) For any short-circuit fault or open-phase condition that occurs on the circuit to which the DGR or DESR is connected, the DGR or DESR will cease to energize and trip offline, and this will take priority over the frequency ride-through function.

(2) DGRs and DESRs must have over-/under-frequency relays set to ride through frequency conditions as specified in the following table:

Frequency (Hz)	Ride-Through Mode	Minimum Ride-through Time (seconds)
f > 61.8	No ride-through requirements	
61.2 < f ≤ 61.8	Mandatory Operation	299
58.8 ≤ f ≤ 61.2	Continuous Operation	continuous
57.0 ≤ f < 58.8	Mandatory Operation	299
f < 57.0	No ride-through requirements	

(3) Any Resource Entity with a DGR or DESR utilizing inverter-based generation that achieved Initial Synchronization before April 1, 2020 that is not capable of complying with the requirements of paragraph (2) above may request an exemption from those requirements. Such a request shall be submitted by November 2, 2020 and shall include documentation that demonstrates the DGR's or DESR's frequency ride-through capability to ERCOT's satisfaction. If, after reviewing the request and documentation, ERCOT determines the DGR or DESR is not capable of complying with the requirements of paragraph (2), then the DGR or DESR shall be exempt from those requirements, but shall be required to comply with those requirements to the greatest degree possible within its capability, as determined in writing by ERCOT. Upon replacement or retirement of the inverter, the DGR or DESR shall no longer be exempt and shall at that time be required to comply with the requirements of paragraph (2) or other applicable requirement.

(4) Section 2.13~~2~~, Procedures for Frequency and Voltage Ride-Through Exemptions, Extensions and Appeals for Transmission-Connected Inverter-Based Resources (IBRs), Type 1 Wind-Powered Generation Resources (WGRs) and Type 2 WGRs, does not apply to exemptions to frequency ride-through requirements for DGRs and DESRs.

~~**2.6.4 Commercially Reasonable Efforts**~~

~~(1) Any references to commercially reasonable efforts in Section 2, System Operations and Control Requirements, is a reference to this Section 2.6.4, Commercially Reasonable Efforts.~~

~~(2) Beginning June 1, 2024, a Resource Entity that must consider commercially reasonable efforts to increase the level of compliance with the voltage and frequency ride-through requirements of Section 2, System Operations and Control Requirements, must submit a detailed report as described in paragraph (3) of Section 2.9.1, Voltage Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs), and paragraph (6) of Section 2.6.2.1, Frequency Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs), regarding its evaluation of its facilities and what modifications, if any, can be made to its equipment. No later than June 1 of each subsequent year, such Resource Entities must update this evaluation if there have been any material changes, or alternatively submit an attestation signed by an officer or executive with authority to bind the Resource Entity that there have been no material changes since the prior submission.~~

~~(3) When considering commercially reasonable efforts, the Resource Entity may consider factors such as the availability and/or cost of firmware or hardware, whether those improvements are technically feasible, the depreciated value of the facility, the cost of capital, the availability of capital, the expected profitability for the remainder of the facility's expected lifespan, whether the modifications would cause the Resource to be out of compliance with other ERCOT requirements, or any other relevant factor.~~

~~(4) If commercially reasonable efforts to increase compliance involve repowering a facility, then ERCOT must make reasonable efforts to reduce the time required for interconnection of the new facility when it is possible to do so.~~

~~(5) If a Resource Entity upgrades a Resource to increase its level of compliance, but does not fully comply, those efforts may be considered when evaluating additional modifications. ERCOT, in its sole discretion, may determine that a particular Resource has achieved a sufficient level of compliance so that ongoing commercially reasonable efforts evaluation are no longer necessary.~~

~~(6) If ERCOT has evidence that a Resource Entity has not identified commercially reasonable compliance plans, it may refer the Resource Entity to the Reliability Monitor. Evidence may include the filings of other similarly situated Resource Entities, data provided by original equipment manufacturers, or other similar information. Nothing herein requires ERCOT to run its own financial analysis on what is considered a good investment or commercially reasonable. Prior to a referral to the Reliability Monitor, ERCOT shall offer the Resource Entity 45 days to provide any additional relevant information. When ERCOT provides any evidence it used to make a determination to the Reliability Monitor, it must also provide it to the Resource Entity.~~

~~(7) All information provided to ERCOT about commercially reasonable efforts or analysis shall be considered as Confidential Information.~~

2.9 Voltage Ride-Through Requirements for Generation Resources and Energy Storage Resources

(1) Except for Generation Resources and Energy Storage Resources (ESRs) subject to Sections 2.9.1, Voltage Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs), ~~and~~ Type 1 Wind-Powered Generation Resources (WGRs), ~~and~~ Type 2 ~~Wind-Powered Generation Resources (~~WGRs and Type 3 WGRs~~)Intermittent Renewable Resources and Energy Storage Resources Connected to the ERCOT Transmission Grid~~, ~~and~~ or 2.9.2, Voltage Ride-Through Requirements for Distribution Generation Resources (DGRs) and Distribution Energy Storage Resources (DESRs), each Generation Resource ~~and~~or ~~Energy Storage Resource (~~ESR~~)~~ must ~~be designed, and its voltage relays must be set, to~~ remain reliably connected to the ERCOT ~~t~~Transmission ~~system~~Grid during the following ~~operating conditions~~:

(a) Generator or inverter terminal voltages are within 5% of the rated design voltage and volts per hertz are less than 105% of generator rated design voltage and frequency;

(b) Generator or inverter terminal voltage deviations exceed 5% but are within 10% of the rated design voltage and persist for less than ten seconds;

(c) Generator or inverter volts per hertz conditions are less than 116% of rated design voltage and frequency and last for less than 1.5 seconds; and

(d) A transmission system fault (three-phase, single-phase or phase-to-phase), but not a unit bus fault, is cleared by the protection scheme coordinated between the Resource Entity and the Transmission Service Provider (TSP) on any line connected to the Resource's Point of Interconnection (POI), provided such lines are not connected to induction generators described in paragraph (12) of Protocol Section 3.15, Voltage Support.

(2) In the case of a unit bus fault or a primary transmission system relay failure, the unit protective relaying may clear the unit independent of the operation of any transmission protective relaying.

(3) During operating conditions listed in paragraph (1) above, each Generation Resource and~~or~~ ESR subject to paragraph (1) shall not, during and following a transient voltage disturbance, cease providing real or ~~r~~Reactive ~~p~~current~~Power~~ except to the extent needed to provide frequency support or aid in voltage recovery. Each ESR, if ~~it is~~ consuming active power from the ERCOT System when operating in the charging mode, shall reduce or cease power consumption as necessary to aid in voltage recovery during and following transient voltage disturbances.

(4) Synchronous Generation Resources required to provide Voltage Support Service (VSS) shall have and maintain the following capability:

(a) Over-excitation limiters shall be provided and coordinated with the thermal capability of the generator field winding and protective relays in order to permit short-term reactive capability that allows at least 80% of the unit design standard (ANSI C50.13-1989), as follows:

Time (seconds)	10	30	60	120
Field Voltage %	208	146	125	112

After allowing temporary field current overload, the limiter shall operate through the automatic AC voltage regulator to reduce field current to the continuous rating. Return to normal AC voltage regulation after current reduction shall be automatic. The over-excitation limiter shall be coordinated with the over-excitation protection so ~~that~~ over-excitation protection ~~only~~ operates only for failure of the voltage regulator/limiter.

(b) Under-excitation limiters shall be provided and coordinated with loss-of-field protection to eliminate unnecessary generating unit disconnection as a result of operator error or equipment malfunction.

(5) Generation Resources and ESRs shall have protective relaying necessary to protect ~~their~~ equipment from abnormal conditions and~~s well as to~~ be consistent with protective relaying criteria described in Section 6.2.6.3.4, ~~Generation Resource~~Generator and Energy Storage Resource Protection and Relay Requirements.

(6) The voltage ride-through requirements, including Section 2.9.1, do not apply to faults ~~that occur~~ at or behind the Point of Interconnection (POI)~~, or~~ when clearing the fault effectively disconnects the Generation Resource from the ERCOT System.

(7)~~.~~ A Generation Resource or ESR may be tripped Off-Line or curtailed after the fault clearing period if ~~this action is~~ part of an approved Remedial Action Scheme (RAS).

(8) The ~~owner~~Resource Entity of ~~E~~each Generation Resource ~~and~~or ESR shall provide to ERCOT technical documentation of voltage ride-through~~VRT~~ capability ~~to ERCOT~~ upon request.

2.9.1 Voltage Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs), ~~and~~ Type 1 Wind-Powered Generation Resources (WGRs), ~~and~~ Type 2 ~~Wind-powered Generation Resources (~~WGRs and Type 3 WGRs~~) Intermittent Renewable Resources Connected to the ERCOT Transmission Grid

(1) ~~Except as specified below, A~~All Inverter-Based Resources (IBRs) and Type 1 Wind-powered Generation Resources (WGRs) and Type 2 WGRs interconnected to the ERCOT Transmission Grid shall comply with voltage ride-through requirements as follows:

(a) Section 2.9.1.1, Preferred ~~Preferred~~ Voltage Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs) shall apply to:

(i) An IBR~~s~~ with a Standard Generation Interconnection Agreement (SGIA) executed on or after ~~June~~August 1, 202~~36~~34; and~~.~~

(ii) An IBR~~s~~ that implements any modification, as described in paragraph (1)(c) of Planning Guide Section 5.2.1, Applicability, for which upgrades or facilities under a Generator Interconnection or Modification (~~Generator Interconnection or Modification (~~GIM)~~)~~ was initiated on or after ~~June~~August 1, ~~2023~~202~~63~~34, unless the modification was fully implemented prior to January 1, 2028.

(~~iii~~b) ~~Any other~~Section 2.9.1.2, Legacy Voltage Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs), ~~and~~ Type 1 Wind-Powered Generation Resources (WGRs) and Type 2 WGRs ~~Wind-Powered Generation Resources (WGRs),~~ shall apply to IBRs not subject to Section 2.9.1.1, ~~or~~and Type 1 WGRs ~~or~~and Type 2 WGRs~~, subject to paragraph (3) below~~. ~~Certain IBRs after December 31, 2027 in accordance with paragraph (8) of Section 2.9.1.2 (8), Legacy Voltage Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs).~~

~~(b) Section 2.9.1.2 shall apply to IBRs not subject to Section 2.9.1.1.~~

(2) ~~-~~ An IBR~~s: (i)~~ with an SGIA executed on or ~~(ii)~~ after ~~June~~August ~~3~~1, 202~~43~~63 or ~~(ii)~~ that implements ~~a~~any modification, as described in paragraph (1)(c) of Planning Guide Section 5.2.1~~, Applicability,~~ for which a ~~Generator Interconnection or Modification (~~GIM~~)~~ was initiated on or after ~~June~~August 1, 202~~43~~63, shall meet or exceed the capability and performance requirements in the following sections of Institute of Electrical and Electronics Engineers (IEEE) 2800-2022, Standard for Interconnection and Interoperability of Inverter-Based Resources (IBRs) Interconnecting with Associated Transmission Electric Power Systems ("IEEE 2800-2022 standard")~~ or any successor IEEE standard~~, including any intra-standard cross references or definitions, unless otherwise clarified, modified, or exempted in the ~~ERCOT~~ Protocols, these Operating Guides, or the Planning Guide:

(a) ~~-~~ Section 5, Reactive power-voltage control requirements within the continuous operation region;

(b) Section 7, Response to TS abnormal conditions; and

(c) Section 9, Protection.

(3) ~~-~~ All IBR plant requirements and ~~all~~ IBR unit requirements described in the IEEE 2800-2022 standard ~~are to be applied~~apply at the Point of Interconnection Bus (POIB) and the individual ~~inverter based resource~~IBR unit terminal, ~~respectively~~as appropriate,

unless otherwise clarified, modified, or exempted in the ~~ERCOT~~ Protocols, these Operating Guides, or the Planning Guide.

(4) An IBR~~s and~~ Type 1 WGR ~~and~~or Type 2 WGR~~s~~ with an original SGIA executed before ~~June~~August 1, 202~~3~~4, that implements modifications complying with Section 2.9.1.2 prior to January 1, 2028, ~~are~~is not required to meet or exceed the capability and performance requirements in sections 5, 7 and 9 of the IEEE 2800-2022 standard ~~standard or any successor IEEE standard that are not required in the Protocols, these Operating Guides, or Planning Guide~~. Any IBR modifications implemented on or after January 1, 2028 do not qualify for this exception.

(5) ~~In its sole and reasonable discretion, ERCOT may allow limited exceptions to the voltage ride-through requirements in Table 11 of the IEEE 2800-2022 standard or successor IEEE standard for~~If a Type 3 WGR~~s that have~~with an original SGIA executed before ~~June~~August 1, 202~~3~~4, cannot fully meet the requirements in Table 11 of the IEEE 2800-2022 standard and implements a modification as described in paragraph (1)(c) of Planning Guide Section 5.2.1, for which upgrades to equipment or facilities under a GIM are completed prior to January 1, 2028, the Resource Entity may submit a notice of intent to request an exemption from meeting the voltage ride-through requirements in Table 11 of the IEEE 2800-2022 standard ~~consistent with~~pursuant to Section 2.12~~3~~, Procedures for Frequency and Voltage Ride-Through Exemptions, Extensions and Appeals for Transmission-Connected Inverter-Based Resources (IBRs), Type 1 Wind-Powered Generation Resources (WGRs) and Type 2 WGR~~s for which a GIM was initiated. The Resource Entity or Interconnecting Entity (IE) must provide documented evidence of technical infeasibility from its original equipment manufacturer (or subsequent inverter/turbine vendor support company if the original equipment manufacturer is no longer in business) that it maximized its voltage ride-through capability with the best converter upgrade available along with any modification and demonstrates it meets most of the low voltage ride-through curve portions in Table 11 of the IEEE 2800-2022 standard or successor IEEE standard as part of the modification.~~was initiated. ~~The Resource Entity or Interconnecting Entity (IE) must provide documented evidence of technical infeasibility from its original equipment manufacturer (or subsequent inverter/turbine vendor support company if the original equipment manufacturer is no longer in business) that it maximized its voltage ride-through capability with the best converter upgrade available along with any modification and demonstrates it meets most of the low voltage ride-through curve portions in Table 11 of the IEEE 2800-2022 standard or successor IEEE standard as part of the modification.~~

(6) ~~In its sole and reasonable discretion, ERCOT may allow a temporary extension for~~If an IBR~~s~~ with an SGIA executed on or after ~~June~~August 1, 202~~3~~4, cannot~~to~~ meet or exceed the capability and performance requirements in sections 5, 7 and 9 of the IEEE 2800-2022 standard by its synchronization date, ~~or any successor IEEE standard if~~ the Resource Entity or IE may request a temporary extension to meet ~~or exceed the capability and performance requirements in sections 5, 7, and 9 of the IEEE 2800-2022 standard~~those requirements by submitting an extension request ~~as described by~~pursuant

to Section 2.132.~~provides documented evidence of technical infeasibility from its original equipment manufacturer (or subsequent inverter/turbine vendor support company if original equipment manufacturer is no longer in business) along with the modifications and the schedule for implementing those modifications.~~ provides documented evidence of ~~technical infeasibility from its original equipment manufacturer (or subsequent inverter/turbine vendor support company if original equipment manufacturer is no longer in business) along with the modifications and the schedule for implementing those modifications. During any temporary extension, the Resource Entity or IE shall maximize its ride-through capability within its known equipment limitations as soon as practicable.~~ Any temporary extensions shall be minimized and not extend beyond December 31, 2028 or 24 months after the Commercial Operations Date, whichever is earlier.

~~(7) An In its sole and reasonable discretion, ERCOT may allow a limited exception for new IBRs with an SGIA executed on or after June 1, 20234 with a Commercial Operations Date prior to January 1, 2026 may request an exemption from that provides documented evidence from the original equipment manufacturer (or subsequent inverter/turbine vendor support company if original equipment manufacturer is no longer in business) of a technical limitation in meeting the capability and performance requirements in sections 5, 7 and 9 of the IEEE 2800-2022 standard if the Resource Entity or IE submits an exemption request as described by Section 2.13. ERCOT will not grant an exemption as described by this paragraph that substantially lowers the frequency or voltage ride-through requirements below those in effect on June 1, 2024 or any successor IEEE standard. Evidence must sufficiently demonstrate that the ride-through capability has been maximized, that the limitation is accurately represented in all models provided to ERCOT, that the limitation does not create any risk of instability, uncontrolled separation or cascading outages for the ERCOT System, and an attestation that there are no technically feasible solutions that do not require replacement or major retrofits to achieve the required performance and capabilities. Major retrofits include any hardware and labor that costs more than 20% of the cost of installing new, comparable replacement equipment on a per turbine or per inverter basis. Any exceptions will expire when the IBR implements a modification as described in paragraph (1)(c) of Planning Guide Section 5.2.1, for which a GIM was initiated or when ERCOT is notified that the technical limitation no longer exists. Software and parameterization changes needed to achieve the required performance are required and not allowed for an exception. Exceptions are not allowed that would effectively be lower than the current voltage ride-through requirements in effect as of December 1, 2023. For any IBR that receives a documented technical exception, the documented maximum capabilities that do not meet the required capabilities will become the new performance requirements until the exception is removed.~~

(~~8~~7) ~~Existing~~ Type 1 and Type 2 WGRs are not required to meet or exceed the capability and performance requirements in sections 5, 7 and 9 of the IEEE 2800-2022 standard ~~or any~~

~~successor IEEE standard~~ but must meet or exceed the capability and performance requirements in Section 2.9.1.2 unless an extension or exemption applies under this Section or Section 2.13~~2~~.~~exceptions are allowed for documented technical limitations as identified in paragraph (9) of Section 2.9.1.2.~~

(8) The Resource Entity or IE for each IBR shall maximize the performance of its protection systems, controls, and other plant equipment (within equipment limitations) to meet and, if possible, exceed the capability and performance set forth in sections 5, 7 and 9 of the IEEE 2800-2022 standard. If an IBR with an SGIA executed prior to August 1, 2024~~[DATE]~~ cannot fully meet the requirements of sections 5, 7, and 9 of the IEEE 2800-2022 standard, the Resource Entity shall maximize the performance of its protection systems, controls, and other plant equipment (within equipment limitations) to achieve, as close as reasonably possible, the capability and performance set forth in sections 5, 7 and 9 of the IEEE 2800-2022 standard as soon as practicable but no later than December 31, 2025 or by its Commercial Operations Date, whichever is later. The Resource Entity must inform ERCOT (in a manner prescribed by ERCOT) of the date on which the IBR, Type 1 WGR, Type 2 WGR or Type 3 WGR has fully maximized its capability with respect to the specified IEEE 2800-2022 requirements. To establish capabilities to the maximum extent the equipment allows as used throughout this Section means the Resource Entity must make software, settings, firmware, and parameterization changes, which includes any memory upgrades to accommodate such changes that do not involve modifying other Resource equipment or components, to maximize capabilities of the Resource with respect to the specified IEEE 2800-2022 requirements in accordance with Good Utility Practice.

~~(9) ERCOT and the interconnecting TSP may exemptallow a documented technical exception for an IBR from Ssection 7.2.2.3.5, including Table 13, of the IEEE 2800-2022 standard when studies indicate a slower response time may beis required or if the IBR may not be able to meet response times noted in Table 13 for certain system conditions, or when meeting the requirements in Table 13 would negatively impact other performance requirements of greater importance. If so, greater response time and settling time are allowed with mutual agreement among an IBR owner, ERCOT and the interconnecting TSP. ERCOT may not grant tThis exception may not be provided in instances where when the IBR must meet both Table 13 performance and other performance needs requirements such as Subsynchronous Resonance (SSR) Mitigation plans for reliability.~~

(9~~10~~) The addition of co-located Load as a modification, as described in paragraph (1)(c) of Planning Guide Section 5.2.1, for which a GIM was initiated, shall not trigger a change in ~~voltage~~ ride-through requirements so long as the IBR, ~~or~~ Type 1 WGR or Type 2 WGR has ~~with~~ an original SGIA executed prior to ~~June~~August 1, 202~~3~~4 unless the converters,

inverters, supplemental dynamic reactive devices, or any other equipment that alters frequency or voltage ride-through capability are materially modified or replaced to meet any reliability requirements because of the co-located ~~does not have to be modified or replaced to accommodate the~~ Load, in which case~~,~~ the Resource Entity shall continue to be subject to Section 2.9.1.2.

~~(3) An IBR or Type 1 WGR or Type 2 WGR with an SGIA executed prior to June 1, 2026 must make commercially reasonable efforts to comply with paragraphs (1) through (8) of Section 2.9.1.1, Voltage Ride-Through Requirements for Transmission-Connected IBRs, as soon as practicable.~~

~~The Resource Entity or Interconnecting Entity (IE) for an IBR or Type 1 WGR or Type 2 WGR with an SGIA executed prior to June 1, 2026 that cannot comply with the voltage ride-through requirements above shall, by June 1, 2024 for IBRs or Type 1 or Type 2 WGRs with an SGIA executed after January 16, 2014, or by December 1, 2024 for all remaining IBRsS or Type 1 WGRs or Type 2 WGRs (or as part of the interconnection process), submit to ERCOT a report and supporting documentation containing the following, and in each case, only to the extent such information is reasonably available from the manufacturers or other parties:~~

~~(a) The current and potential future IBR or Type 1 WGR or Type 2 WGR voltage ride-through capability (including any associated adjustments to improve voltage ride-through capability) in a format specified by ERCOT;~~

~~(b) Any known technical limitations on the IBR or Type 1 WGR or Type 2 WGR's voltage ride-through capability, to the extent the Resource Entity can reasonably identify them. Such limitations may include general limitations from the manufacturer and other parties;~~

~~(cb) The proposed commercially reasonable modifications, if any, to maximize the IBR or Type 1 WGR or Type 2 WGR voltage ride-through capability and allow the IBR or Type 1 WGR or Type 2 WGR into increase the level of compliance or to comply with the voltage ride-through requirements abovein Section 2.9.1, Voltage Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs), and Section 2.9.1.1, Voltage Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs);~~

~~(dc) A schedule for implementing those modifications as soon as commercially reasonable. no later than December 31, 2026; and~~

~~(e) As contemplated in paragraph (2) of Section 2.6.4, Commercially Reasonable Efforts, the Resource Entity shall update this evaluation onby June 1 of each subsequent year if there have been any material changes, or alternatively submit an attestation signed by an officer or executive with authority to bind the Resource Entity that there have been no material changes since the prior submission.~~

(d) Any known limitations on the IBR's voltage ride-through capability making it technically infeasible to meet the requirements above.

(4) An IRR that interconnects to the ERCOT Transmission Grid pursuant to a SGIA (i) executed on or before January 16, 2014 and (ii) under which the IRR provided all required financial security to the TSP on or before January 16, 2014, is not required to meet any high voltage ride-through requirement greater than 1.1 per unit voltage unless the interconnected IRR includes one or more turbines that differ from the turbine model(s) described in the SGIA (including any attachment thereto), as that agreement existed on January 16, 2014. Notwithstanding the foregoing, if the Resource Entity that owns or operates an IRR that was interconnected pursuant to an SGIA executed before January 16, 2014, under which the IRR provided all required financial security to the TSP on or before January 16, 2014, demonstrates to ERCOT's satisfaction that the high voltage ride-through capability of the IRR is not lower than the capability of the turbine model(s) described in the SGIA (including any attachment thereto), as that agreement existed on January 16, 2014, that IRR is not required to meet the high voltage ride-through requirement in this Section.

(5) An IRR that interconnects to the ERCOT System pursuant to an SGIA executed prior to November 1, 2008 is not required to meet voltage ride-through requirements presented in this Section. However, any Wind-powered Generation Resource (WGR) that is installed on or after November 1, 2008 and that initially synchronizes with the ERCOT System, pursuant to an SGIA (i) executed on or before January 16, 2014, and (ii) under which the IRR provided all required financial security to the TSP on or before January 16, 2014 (except for an IRR installed pursuant to an SGIA executed before November 1, 2008) shall be voltage ride-through capable in accordance with the low voltage ride-through requirements in this Section and high voltage requirements in this Section up to 1.1 per unit voltage unless the interconnected IRR includes one or more turbines that differ from the turbine model(s) described in the SGIA (including any attachment thereto), as that agreement existed on January 16, 2014 in which case the IRR shall also be required to comply with the high voltage ride-through requirements of this Section, subject to the exemption described in paragraph (a), above.

(6) This Section shall not affect the Resource Entity's responsibility to protect IBRs or Type 1 WGRs or Type 2 WGRs from damaging operating conditions. The Resource Entity for an IBR or Type 1 WGR or Type 2 WGR unable to remain reliably connected to the ERCOT System as set forth in Section 2.9.1.1, including those subject to paragraphs (43) and (54) above, shall provide to ERCOT the reason(s) for that inability, including study results or manufacturer advice. The limitation description shall include the Generation Resource or ESR voltage ride-through capability in the format specified by ERCOT. Any such IBR or Type 1 WGR or Type 2 WGR that cannot comply with the applicable voltage ride-through requirements must evaluate commercially reasonable efforts needed to comply with the requirements or increase voltage ride-through capabilities as described in Section 2.6.4, Commercially Reasonable Efforts.

~~(7) An IBR or Type 1 WGR or Type 2 WGR is not required to comply with the voltage-ride through requirements above if doing so would cause it to violate its Subsynchronous Resonance (SSR) Mitigation plan developed to comply with Protocol Section 3.22.1.2, Generation Resource or Energy Storage Resource Interconnection Assessment.~~

~~(8) The addition of co-located load that results in the initiation of a Generator Interconnection or Modification (GIM) on or after June 1, 2026 or an amendment to a SGIA on or after June 1, 2026 shall not trigger a change in voltage ride-through requirements. In those cases, the Resource Entity shall continue to be subject to paragraph (3) of above, using the SGIA date applicable before the amendment.~~

2.9.1.1 Preferred ~~Preferred~~ Voltage Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs)

(1) All IBRs subject to ~~All~~Tthis Section ~~applies to all IBRs interconnected to the ERCOT Transmission Gridsubject to this Section in accordance with paragraph (1) of Section 2.9.1, Voltage Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs) and Type 1 and Type 2 Wind-powered Generation Resources (WGRs). All IBRs and WGRs,~~ shall ride through the root-mean-square voltage conditions in Tables A or B below, as applicable, ~~and the instantaneous phase voltage conditions in Table BC below,~~ as measured at the IBR's ~~Point of Interconnection Bus (~~POIB~~)~~:

Table A: Applicable to ~~Wind-powered Generation Resource (WGR)~~ IBRs

Root-Mean-Square Voltage (p.u. of nominal)	Minimum Ride-Through Time (seconds)
V > 1.20	~~No ride-through requirement~~May ride-through or trip
1.10 < V ≤ 1.20	1.0
0.90 ≤ V ≤ 1.10	continuous
0.70 ≤ V < 0.90	3.0
0.50 ≤ V < 0.70	2.5
0.25 ≤ V < 0.50	1.2
0.005625 ≤ V < 0.25	~~0.16~~(V+0.084375)/0.5625
V < 0.005625	0.16

Table B: Applicable to PhotoVoltaic Generation Resources (PVGRs) and ESR IBRs

Root-Mean-Square Voltage (p.u. of nominal)	Minimum Ride-Through Time (seconds)
V > 1.20	May ride-through or trip
1.10 < V ≤ 1.20	1.0
0.90 ≤ V ≤ 1.10	continuous
0.70 ≤ V < 0.90	6.0

0.50 ≤ V < 0.70	3.0
0.25 ≤ V < 0.50	1.2
0.095625 ≤ V < 0.25	~~0.32~~(V+0.084375)/0.5625
V < 0.095625	0.32

The minimum ride-through time in Tables A and B for voltage below the continuous operating range is inclusive of any amount of time the POIB voltage is below the specified voltage range. In the event of multiple excursions, the minimum ride-through time in Tables A or B is a cumulative time over a ten--second time window. For voltage between 0.005625 p.u. and 0.25 p.u. in Table A above and 0.095625 p.u. and 0.25 p.u. in Table B above, the minimum ride-through time is defined by a straight-line mathematical function where the duration is 0.15 seconds at zero voltage and 1.75 seconds at 0.9 p.u. voltage.

~~Table C:~~ Applicable to all IBRs~~B~~

~~Instantaneous Peak Phase-to-Phase or Phase-to-Ground Voltage (p.u. of nominal instantaneous peak voltage)~~	~~Minimum Ride-Through Time (milliseconds)~~
~~V > 1.80~~	~~No ride-through requirementMay ride-through or trip~~
~~1.70 < V ≤ 1.80~~	~~0.2~~
~~1.60 < V ≤ 1.70~~	~~1.0~~
~~1.40 < V ≤ 1.60~~	~~3.0~~
~~1.20 < V ≤ 1.40~~	~~15.0~~

~~The instantaneous voltages in Table BC above are the residual voltages with surge arrestors, if applied. During the conditions identified in Table BC above, an IBR should continue injecting current, but need not respond to the sub-cycle transient overvoltage. If required by equipment limitations, the IBR may operate in current blocking mode when instantaneous voltage exceeds 1.20 p.u. at the POIB. If the IBR operates in current blocking mode, it shall restart current exchange in less than or equal to five cycles following instantaneous voltage falling below, and remaining below, 1.2 p.u. at the POIB. In the event of multiple excursions, the minimum ride through time in Table BC is a cumulative time over a one -minute time window. If the applicable root-mean-square voltage thresholds identified in Tables A or B above are not exceeded, ride-through is required for any level of instantaneous voltage.~~

(2) Nothing in paragraph (1) above shall be interpreted to require an IBR to trip for voltage conditions beyond those for which ride-through is required.

(3) If protection systems (including, but not limited to protection for over-/under-voltage, rate-of-change-of-frequency, anti-islanding, and phase angle jump) are installed and activated to trip the IBR,~~The Resource Entity for an IBR shall set~~ they~~all protection~~

systems ve(including, but not limited to protection for over-/under-voltage, rate-of-change of frequency, anti-islanding, and phase angle jump)relays shall be set to enable the IBR to ride through voltage conditions beyond those defined in paragraph (1) above to the maximum extentlevel the equipment allowspossible consistent with IBR capability. An IBR shall ride-through any grid disturbance during which ride-through is required and the positive-sequence angle change within a sub-cycle-to-cycle time frame does not exceed 25 electrical degrees. In addition, the IBR shall ride-through any change in the phase angle of individual phases caused by occurrence and clearance of unbalanced faults, provided that the positive-sequence angle change does not exceed the stated criterion. Positively damped active and reactive current oscillations in the post-disturbance period are acceptable in response to phase angle changes.

(4) An IBR shall inject electric current when required toduring all periods requiring ride-through voltage conditions pursuant to paragraphs (1) and (3) above. Except when caused by reductions associated with intermittent primary energy source availability (e.g., wind speed or solar irradiance), an IBR shall not reduce active current injection during voltage conditions requiring ride-through unless allowed in this paragraph or to provide appropriate frequency response. AWhen the POIB voltage is outside the continuous operating voltage range, an IBR shall continue to deliver pre-disturbance active power current unless reduction is needed to allow for voltage support or otherwise limited due to its current limit or Reactive Power priority mode. Unless otherwise specified by ERCOT or the interconnecting TSP,. Any necessary reductions in active current to prioritize reactive current shall be relative to the voltage change at the POIB. Typically, more aggressive reductions in active current to allow for additional reactive current (if needed to stay within its current limitations) will occur at lower voltages (e.g., 0.4 p.u. or lower) but settings should be made based on the local needs of the ERCOT sSystem where the IBR interconnects and ensures sufficient active current is available for protection system sensing. an IBR Reactive Power priority mode shall be set to minimize reductions in real poweractive power current while maintaining robust Reactive Power responsereactive current response. When operating in Reactive Power priority mode, aAny necessary reductions in active power current to prioritize Rreactive Power current shall be proportional to the voltage change at the POIB. An IBR shall return to its pre-disturbance level of real power injection as soon as possible but no more than one second after POIB voltage recoversing to normal operating range. ERCOT, atin its reasonablesole discretion, may allow slower real power injection recovery rates if necessary for reliability as determined by the impacted TSP or ERCOT., or if required based on physical limitations of the IBR. Subsynchronous Resonance (SSR) Mitigation shall not depend on slower real power injection recovery rates.

(5) An IBR shall not enable any protections, plant controls, turbine controls and,/or inverter controls (including, but not limited to protection for rate-of-change of frequency (ROCOF), anti-islanding, and phase angle jump) that shall not disconnect the plant, or any individual inverter/turbine, or prevent current exchange between the IBR fromand the ERCOT SystemTransmission Grid or reduce IBR output during voltage conditions where ride-through is required. IBR plant controls, turbine controls and/or inverter controls

shall not reduce the IBR output during voltage conditions requiring ride-through unless necessary for proper operation of the IBR, forto provideing appropriate frequency response., or to prevent equipment damage. If an IBR requires any setting that would prevent it from riding through a voltage event as required in paragraph (1) above, the IBR operation shallmay be restricted as set forth in paragraph (109) below.If phase angle jump protection is required to prevent equipment damage, it shall allow the IBR to ride through positive-sequence phase angle changes within a sub-cycle-to-cycle time frame of the applicable voltage of less than or equal to 45 electrical degrees. If the positive-sequence angle change does not exceed 45 electrical degrees, the IBR shall remain in operation for any change in the phase angle of individual phases caused by occurrence and clearance of unbalanced faults. If an IBR requires any setting that would prevent it from riding through the voltage conditions required in paragraph (1) above, ERCOT may restrict its operations.

(6) If instantaneous over-current or over-voltage protection systems are installed and activated to trip the IBR, All IBR instantaneous over-current or over-voltage protection systemsthey shall use filtered quantities or time delays to prevent misoperation while providing the desired equipment protection. Any Alternating Current instantaneous over-voltage protection that could disrupt IBR power output shall use a measurement window of at least one cycle (of fundamental frequency).

(7) The IBR shall ride through multiple excursions outside the continuous operation range in Tables A or B in paragraph (1) above as applicable, unless the conditions and situations specified below exist, in which case the IBR may trip to protect equipment from the cumulative effect of successive voltage deviations:

(a) More than four voltage deviations at the POIB outside the continuous operation zonerange within any ten second period.;

(b) More than six voltage deviations at the POIB outside the continuous operation zonerange within any 120 second period.;

(c) More than ten voltage deviations at the POIB outside the continuous operation zonerange within any 1,800 second period.;

(d) Voltage deviations outside of continuous operation zonerange in Table A in paragraph (1) above following the end of a previous deviation outside of continuous operation zonerange by less than twenty20 cycles of system fundamental frequency.;

(e) More than two individual voltage deviations at the POIB below 50% of the nominal voltage (including zero voltage) within any ten second period.;

(f) More than three individual voltage deviations at the POIB below 50% of the nominal voltage (including zero voltage) within any 120 second period.; or

~~(g) A WGRFor wind turbine IBRs, iIndividual wind turbines may trip for consecutive voltage deviations resulting in stimulation of mechanical resonances exceeding equipment limits.~~

~~Any IBR that monitors and actively protects against multiple excursions outside of the continuous operation range in Tables A and B in paragraph (1) above, shall ensure its parameters to ride-through multiple voltage excursions are set to the maximum level the equipment allows to meet and, if possible, exceed the performance requirements in paragraph (1) above. Individual voltage deviations begin when the voltage at the POIB drops below the lower limit of the continuous operation range or exceeds the upper limit of the continuous operation range. Individual voltage deviations end when the root-mean-square voltage magnitude at the POIB, for the previous one-cycle period of fundamental frequency, returns to the continuous operation region.~~

~~(8)~~ An IBR shall not use phase angle jump or rate-of-change-of-frequency measurement quantities as a basis for reducing power output or tripping offline during fault conditions and subsequent recovery to a steady-state operating point~~ride-through any grid disturbance during which ride-through is required and the positive-sequence angle change within a sub-cycle-to-cycle time frame does not exceed 25 electrical degrees. In addition, the IBR shall ride-through any change in the phase angle of individual phases caused by occurrence and clearance of unbalanced faults, provided the positive-sequence angle change does not exceed the stated criterion. Positively damped active and reactive current oscillations in the post-disturbance period are acceptable in response to phase angle changes.fault disturbance where the POIB voltage remains~~ within the ride-through profiles specified in paragraph (1) above.~~ Measurements of quantities such as phase angle jump and rate-of-change-of-frequency during fault conditions are not meaningful and shall not be used to trip or reduce the output of the IBR during fault conditions.~~

(8~~9~~) The Resource Entity or IE for each IBR shall maximize the performance of its protection systems, controls, and other plant equipment (within equipment limitations) to meet and, if possible, exceed the requirements of paragraphs (1) through (7~~8~~) above by December 31, 2025. A Resource Entity or IE may request an ~~In its sole and reasonable discretion, ERCOT may allow a temporary~~ extension for upgrades or retrofits to confirm capability specified in paragraph (7) above by following the extension process set forth in Section 2.1~~3~~2, Procedures for Frequency and Voltage Ride-Through Exemptions~~,~~ and Extensions ~~and Appeals~~ for Transmission-Connected Inverter-Based Resources (IBRs), Type 1 Wind-Powered Generation Resources (WGRs) and Type 2 WGRs~~provides documented evidence of technical infeasibility from its original equipment manufacturer (or subsequent inverter/turbine vendor support company if the original equipment manufacturer is no longer in business) along with the modifications and the schedule for implementing those modifications.if the Resource Entity or IE provides documented evidence of technical infeasibility from its original equipment manufacturer (or subsequent inverter/turbine vendor support company if the original equipment manufacturer is no longer in business) along with the modifications and the schedule for implementing those modifications. The Resource Entity or IE shall maximize the rate-of-~~

~~change-of-frequency, phase angle jump and multiple excursion ride-through capability within known equipment limitations as soon as practicable.~~ Any temporary extensions under this paragraph shall be minimized and not extend beyond December 31, 2028.

~~(8) An IBR with a Standard Generation Interconnection Agreement (SGIA) executed prior to January 1, 2023, must comply with the voltage ride-through requirements in effect immediately prior to the effective date of this paragraph until December 31, 20243, at which time the IBR must comply with all parts of this Section except the instantaneous phase voltage conditions in Table B in paragraph (1) above. IBRs with an SGIA executed on or after January 1, 2023 must comply with all parts of this Section.~~

~~The Resource Entity or Interconnecting Entity for an IBR that cannot comply with the requirements of this Section by December 31, 20243 shall, by MarchJune 1, 20243, provide to ERCOT a schedule for modifying the IBR to comply with this Section's requirements or a written explanation of the IBR's inability to comply with the requirements, with supporting documentation containing the following:~~

~~(a) The IBR's voltage ride-through capability as of January 1, 2023 in a format similar to the tables in paragraph (1) above;~~

~~(b) The IBR's maximum voltage ride-through capability and any associated settings to attempt to meet this Section's requirements; and~~

~~(c) Any limitations on the IBR's voltage ride-through capability making it technically infeasible to meet this Section's requirements.~~

~~Based on the information provided by the Resource Entity or Interconnecting Entity, if ERCOT determines in its sole and reasonable discretion that an IBR cannot comply with one or more of the voltage ride-through requirements of this Section, ,ERCOT shallmay grant a temporary exemption from such requirements until December 31, 20254, or an earlier date, if ERCOT determines that earlier compliance is possible, provided, that such an exemption will not affect any Resource Entity's duty to comply with voltage ride-through requirements in effect before the effective date of this paragraph. During any temporary exemption period, the Resource Entity for the IBR shall implement any technically feasible modifications to achieve the IBR's maximum voltage ride-through capability as soon as practicable but no later than December 31, 20254. All temporary exemptions from this requirement to allow for IBR modifications shall terminate no later than December 31, 20254.~~

(9~~10~~) A Resource Entity of a Type 3 WGR may seek an extension for completing modifications to~~from~~ meet~~ing~~ the voltage ride-through performance Table~~s~~ A ~~and C~~ in paragraph (1) above by following the extension process set forth in Section 2.123. ~~In its sole and reasonable discretion, ERCOT may allow temporary extensions to meet the voltage ride-through performance Tables A and C in paragraph (1) above for Type 3 WGRs if the Resource Entity or IE provides documented evidence of technical infeasibility from its original equipment manufacturer (or subsequent inverter/turbine vendor support company~~

~~if the original equipment manufacturer is no longer in business) along with the modifications and the schedule for implementing those modifications.~~ During any ~~such~~~~temporary~~ extension, the Resource Entity ~~or IE~~ shall ensure ~~maximize its~~the WGR's voltage ride-through capability is set to the maximum level the equipment allows as soon as practicable.

(10~~1~~) Any temporary extensions for IBRs with SGIAs on or after ~~June~~August 1, 2024 shall be minimized and not extend beyond December 31, 2028. Temporary extensions for performance that do not meet the voltage ride-through performance in Table A in paragraph (1) of Section 2.9.1.2, Legacy Voltage Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs), ~~and~~ Type 1 Wind-Powered Generation Resources (WGRs) and Type 2 ~~Wind-Powered Generation Resources (~~WGRs~~)~~, are not allowed.

(~~9~~8~~10~~11~~2~~1) If an IBR fails to ~~comply~~perform in accordance with the applicable voltage ride-through requirements ~~of paragraphs (1) through (7~~8) ~~above~~this Section, ~~ERCOT may restrict the IBR operation as set forth in paragraph (12) below. Additionally~~, ~~the IBR operation may be restricted as set forth in paragraph (9) below. Additionally,~~ the Resource Entity for the IBR ~~and the interconnecting TSP~~ shall take the actions described in Section 2.1~~4~~3, Actions Following a Transmission-Connected Inverter-Based Resource (IBR), Type 1 Wind-Powered Generation Resource (WGR) or Type 2 WGR ~~an~~ Apparent Failure to Ride-Through. ~~investigate the event and report to ERCOT the cause of the IBR failure. The Resource Entity's investigation must include a diligent review of commercially reasonable efforts to avoid future failures. All impacted TSPs shall provide available information to ERCOT to assist with event analysis. The Resource Entity for each IBR not meeting the voltage ride-through requirements shall install, if not already installed, phasor measurement units or~~and digital fault recorders at locations ~~identified by ERCOT as soon as practicable but no later than 18 months after notification.~~

~~(12) In its sole and reasonable discretion, ERCOT may restrict, or not permit to operate, any IBR that has one or more performance failures to the applicable voltage ride-through requirements. ERCOT shall assess the risk of the performance failure in determining if such restrictions are implemented. If the assessment determines that any one of the below criteria is met, it may impose such restrictions on the IBR, or portions thereof, that experienced the performance failure:~~

~~(a) The actual or potential severity of the event on the ERCOT System is greater than the most severe single contingency. To determine potential severity, ERCOT will utilize: (i) nameplate capacity for PVGRs and ESRs; and (ii) the greater of the pre-disturbance output of the WGR or 50% of its nameplate capacity;~~

~~(b) The cause of the performance failure cannot be mitigated (i.e., fully implemented corrective actions) within 90 calendar days;~~

~~(c) The location of the performance failure did affect or has the potential to materially affect known stability limitations on the ERCOT System;~~

(d) The IBR experienced one or more previous failures in the prior 36 calendar months; or

(e) The performance failure presents an imminent safety or equipment risk on the ERCOT System.

(13) Each Qualified Scheduling Entity (QSE) shall, for each IBR not permitted to operate, reflect in its Current Operating Plan (COP) and Real-Time telemetry a Resource Status of OFF, OUT, or EMR in accordance with Protocol Sections 3.9.1, Current Operating Plan (COP) Criteria and 6.5.5.1, Changes in Resource Status, as appropriate. If the Resource Entity can implement IBR modifications to resolve the technical limitations or performance failures, it shall submit to ERCOT a report and supporting documentation containing the following:

(a) The current technical limitations and voltage ride-through capability in a format similar to the tables in paragraph (1) above;

(b) The proposed modifications and voltage ride-through capability allowing the IBR to comply with the voltage ride-through requirements in a format similar to the tables in paragraph (1) above; and

(c) A schedule for implementing those modifications.

(14) In its sole and reasonable discretion, ERCOT may accept the proposed modification plan submitted in paragraph (13) above. Upon completion of the accepted modification plan, ERCOT will remove the restrictions unless the IBR experiences additional unresolved technical limitations or performance failures. ERCOT may allow the IBR to operate at reduced output prior to implementation of an accepted modification plan if the reduced output allows the IBR to comply with the applicable ride-through requirements. ERCOT may also temporarily lift operational restrictions for any IBR to prevent or mitigate an actual or anticipated emergency condition. During such instances, ERCOT shall inform each affected QSE that the restrictions have been temporarily lifted as well as the start time and proposed end time. Each QSE shall update the COP, Outage Scheduler, and Real-Time telemetry to appropriately reflect the availability and capability of the IBR during the timeframe for which the restriction was lifted.

(911) Section 2, System Operations and Control Requirements, shall not affect the Resource Entity's responsibility to protect Generation Resources, IBRs, or ESRs from damaging operating conditions. The Resource Entity for a Generation Resource, an IBR, or ESR subject to paragraphs (1) and (2) above that is unable to remain reliably connected to the ERCOT System as set forth in paragraphs (1) and (2), shall provide ERCOT the reason(s) for that inability, including study results or manufacturer advice. The limitation description shall include the Generation Resource's or ESR's voltage ride-through capability in the format specified by ERCOT. Any such Generation Resource, IBR, or ESR that cannot comply with the applicable voltage ride-through requirements must

evaluate commercially reasonable efforts needed to comply or to increase the voltage ride-through capabilities as described in Section 2.6.4, Commercially Reasonable Efforts.

(9101012) An IBR is not required to comply with the requirements in Section 2 if doing so would cause it to violate its SSR Mitigation plan developed to comply with Protocol Section 3.22.1.2, Generation Resource or Energy Storage Resource Interconnection Assessment.Any IBR that cannot comply with the voltage ride-through requirements of paragraphs (1) through (7) above, may be restricted or may not be permitted to operate on the ERCOT System unless ERCOT, in its sole and reasonable discretion, allows it to do so. Any IBR that cannot comply with the voltage ride-through requirements after December 31, 20254, shall not be permitted to operate on the ERCOT System unless ERCOT issues the IBR a Reliability Unit Commitment (RUC) or Verbal Dispatch Instruction (VDI). Each Qualified Scheduling Entity (QSE) shall, for each applicable IBR not permitted to operate, reflect in its Current Operating Plan (COP) and Real-Time telemetry a Resource Status of OFF, OUT, or EMR in accordance with Protocol Sections 3.9.1, Current Operating Plan (COP) Criteria and 6.5.5.1, Changes in Resource Status, as appropriate. If the Resource Entity can implement IBR modifications to resolve the technical limitations or performance failures preventing compliance with theseapplicable voltage ride-through requirements, the Resource Entity shall submit to ERCOT a report and supporting documentation containing the following:

(a) The current technical limitations and IBR voltage ride-through capability in a format similar to the tables in paragraph (1) above;

(b) The proposed modifications and voltage ride-through capability allowing the IBR to comply with the voltage ride-through requirements in a format similar to the tables in paragraph (1) above; and

(c) A schedule for implementing those modifications.

In its sole and reasonable discretion, ERCOT may accept the proposed modification plan. Upon completion of the accepted modification plan, ERCOT will remove the restrictions placed on the IBR unless the IBR experiences additional unresolved technical limitations or performance failures. ERCOT may allow the IBR to operate at reduced output prior to the implementation of an accepted modification plan if the reduced output allows the IBR to comply with the applicable ride-through requirements.

2.9.1.2 Legacy Voltage Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs), and Type 1 Wind-Powered Generation Resources (WGRs) and Type 2 Wind-Powered Generation Resources (WGRs)

(1) All IBRs, and Type 1 WGRs and Type 2 WGRs subject to this Section in accordance with paragraph (1) of Section 2.9.1, Voltage Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs), and Type 1 Wind-Powered Generation Resources (WGRs), and Type 2 WGRsWind-powered Generation Resources (WGRs), and Type 3 WGRs, shall ride through the root-mean-square voltage conditions

in Table A below as measured at the Resource's ~~IBR, Type 1 WGR or Type 2 WGR's~~ POIB:

Table A

Root-Mean-Square Voltage (p.u. of nominal)	Minimum Ride-Through Time (seconds)
V > 1.20	May ride-through or may trip
1.175 < V ≤ 1.2	0.2
1.15 < V ≤ 1.175	0.5
1.10 < V ≤ 1.15	1.0
0.90 ≤ V ≤ 1.10	continuous
0.0 < V < 0.90	(V+0.084375)/0.5625
V = 0.0	0.15

For voltage between zero and 0.9 p.u. the minimum ride-through time in Table A above is defined by a straight line mathematical function where the duration is 0.15 seconds at zero voltage and 1.75 seconds at 0.9 p.u. voltage.

(2) Nothing in paragraph (1) above shall be interpreted to require an IBR, ~~or~~ Type 1 WGR or Type 2 WGR to trip for voltage conditions beyond those for which ride-through is required.

(3) If protection systems (including, but not limited to protection for over-/under-voltage, rate-of-change ~~of~~ frequency, anti-islanding, and phase angle jump) are installed and activated to trip the IBR, ~~or~~ Type 1 WGR or Type 2 WGR, ~~all protection systems (including, but not limited to protection for over-/under-voltage, rate-of-change of frequency, anti-islanding, and phase angle jump)~~they shall enable the IBR, ~~or~~ Type 1 WGR or Type 2 WGR to ride through voltage conditions beyond those defined in paragraph (1) above to the maximum ~~extent~~level the equipment allows~~possible~~.

(4) An IBR, ~~or~~ Type 1 WGR or Type 2 WGR shall inject electric current ~~during all periods requiring~~when required to ride-through voltage conditions. Except when caused by reductions associated with intermittent primary energy source availability (e.g., wind speed or solar irradiance), an IBR, Type 1 WGR or Type 2 WGR shall not reduce active current injection during voltage conditions requiring ride-through unless allowed in this paragraph or to provide appropriate frequency response. When the POIB voltage is outside the continuous operating voltage range, an IBR shall continue to deliver pre-disturbance active current unless reduction is needed for voltage support or otherwise specified by ERCOT or the interconnecting TSP. Any necessary reductions in active current to prioritize reactive current shall be relative to the voltage change at the POIB. Typically, more aggressive reductions in active current to allow for additional reactive current (if needed to stay within its current limitations) will occur at lower voltages (e.g., 0.4 p.u. or lower) but settings shall be based on the local needs of the area of the ERCOT System to which the IBR interconnects and ensure sufficient active current is available

for protection system sensing. An IBR, ~~or~~ Type 1 WGR or Type 2 WGR shall return to its pre-disturbance level of real power injection as soon as possible but no more than one second after POIB voltage recovers to normal operating range. Slower real power injection recovery rates may be allowed if necessary for reliability as documented by the impacted TSP or ERCOT. ~~, or if required based on physical limitations of the IBR.~~ ~~Subsynchronous Resonance (SSR) Mitigation shall not depend on slower real power injection recovery rates.~~

(5) IBR, Type I WGR and Type 2 WGR ~~An IBR or Type 1 WGR or Type 2 WGR p~~Pplant controls, turbine controls, and/or inverter controls ~~of anshall not disconnect the IBR or Type 1 WGR or Type 2 WGR~~ shall not disconnect the plant or any individual inverter/turbine, or prevent current exchange between the Resource ~~from~~ and the ERCOT ~~System~~Transmission Grid during voltage conditions where ride-through is required. ~~IBR, Type 1 WGR and Type 2 WGR plant controls, turbine controls, and/or inverter controls shall not or reduce itsthe Resource's output during voltage conditions whererequiring ride-through is required unless necessary for providinge appropriate frequency response, or to prevent equipment damage. If an IBR or Type 1 WGR or Type 2 WGR requires any setting that would prevent it from riding through the voltage conditions required in paragraph (1) above, ERCOT may restrict its operations unless a documented technical exception provides the basis for such setting as set forth in paragraph (11) below.~~

(6) If instantaneous over-current or over-voltage protection systems are installed and activated to trip the IBR, ~~or~~ Type 1 WGR or Type 2 WGR, ~~instantaneous over-current or over-voltage protection systems~~they shall use filtered quantities or sufficient time delays to prevent misoperation while providing the desired equipment protection. Any Alternating Current instantaneous over-voltage protection that could disrupt power output shall use a measurement period of at least one cycle (of fundamental frequency).

~~(7) The IBR or Type 1 WGR or Type 2 WGR shall coordinate with its interconnection TSP to ensure it can ride through multiple excursions outside the continuous operation range in Table A in paragraph (1) above, unless the conditions and situations specified below exist, in which case, it may trip to protect equipment from the cumulative effect of successive voltage deviations:~~

~~(a) More deviations than would occur based on the documented level of automatic reclose actions utilized by its interconnecting TSP.~~

~~(b) Individual wind turbines may trip for consecutive voltage deviations resulting in stimulation of mechanical resonances exceeding equipment limits.~~

~~Any IBR or Type 1 WGR or Type 2 WGR that monitors and actively protects against multiple excursions shall ensure its parameters to ride-through multiple voltage excursions are set to the maximum level the equipment allows to meet or exceed the requirements in paragraph (7) of Section 2.9.1.1, Preferred Voltage Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs). Individual voltage deviations begin when the voltage at the POIB drops below the lower limit of the~~

~~continuous operation range or exceeds the upper limit of the continuous operation range. Individual voltage deviations end when the root-mean-square voltage magnitude at the POIB, for the previous one-cycle period of fundamental frequency, returns to the continuous operation range.~~

(~~8~~7) An ~~An~~ IBRs, ~~or~~ Type 1 WGRs or Type 2 WGRs shall not use ~~ride-through any fault disturbance where the POIB voltage remains within the ride-through profiles specified in paragraph (1) above. ride through any fault disturbance where the POIB voltage remains within the ride-through profiles specified in paragraph (1) above. not use Mm~~Measurements of quantities such as phase angle jump ~~and~~ or rate-of-change-of-frequency ~~during fault conditions are not meaningful and shall not be used to trip or reduce the output of the Resource~~IBR or Type 1 WGR or Type 2 WGR measurement quantities as a basis for reducing power output or tripping offline during fault conditions and subsequent recovery to a steady-state operating point within the ride-through profiles specified in paragraph (1) above~~during fault conditions are not meaningful and shall not be used to trip or reduce the output of the Resource during fault conditions.~~ ~~where the POIB voltage remains within the ride-through profiles specified in paragraph (1) above, unless the Resource has an approved exemption or extension under Section 2.13.~~

(8) The Resource Entity for each IBR, Type 1 WGR or Type 2 WGR shall maximize the performance of its protection systems, controls, and other plant equipment (within equipment limitations) to meet and, if possible, exceed the performance requirements in paragraphs (1) through (7) above as soon as practicable but no later than December 31, 2025 or by its Commercial Operations Date, whichever is later.

~~(9) The Resource Entity or IE for each IBR or Type 1 WGR or Type 2 WGR with an SGIA executed prior to June 1, 20234, shall ensure its voltage ride-through capability is set to the maximum level the equipment allows to meet or exceed the requirements of paragraphs (1) through (8) above as soon as practicable with all available and known commercially reasonable upgrades as set forth in Section 2.11, Commercially Reasonable Efforts. but no later than December 31, 2025.~~

(~~10~~9) If~~The Resource Entity or Interconnecting Entity (IE) for each~~ an IBR, ~~or~~ Type 1 WGR or Type 2 WGR with an SGIA executed prior to ~~June~~August 1, 202~~3~~4 ~~that~~ cannot comply with paragraphs (1) through (~~8~~7) above by December 31, 2025 after maximizing the performance of its protection systems, controls, and other plant equipment (within equipment limitations), the Resource Entity ~~or Interconnecting Entity (IE)~~ shall, by ~~February~~April 1, 2025, ~~(or later as part of the interconnection process for any project not approved to energize as of February 1, 2025),~~ submit an Initial Voltage Ride-Through Capability Report ("IVRTCR") pursuant to Section 2.11.2, Initial Voltage Ride-Through Capability Documentation and Reporting Requirements, and request an extension to comply pursuant to Section 2.12, Procedures for Frequency and Voltage Ride-Through Exemptions and Extensions for Transmission-Connected Inverter-Based Resources (IBRs), Type 1 Wind-Powered Generation Resources (WGRs) and Type 2 WGRs. If the Resource Entity submits an IVRTCR and cannot comply with paragraphs (1) through (7)

above with an extension, it must submit a notice of intent to request an exemption ~~under~~pursuant to Section 2.123.~~December 31, 2024, submit to ERCOT a report and supporting documentation containing the following:~~ The Resource Entity must comply with the voltage ride-through requirements in effect on May 1, 2024 until it maximizes its voltage ride-through capability.

~~(a) The current and potential future voltage ride-through capability (including any associated adjustments to improve voltage ride-through capability) in a format similar to Table A in paragraph (1) above;~~

~~(b) The proposed modifications to maximize voltage ride-through capability and allow compliance with the applicable voltage ride-through requirements in paragraphs (1) through (8) above;~~

~~(c) A schedule for implementing those modifications as soon as practicable but no later than December 31, 2027 with documentation supporting the need for the extension;~~

~~(d) Any documented technical limitations for the IBR or Type 1 WGR or Type 2 WGR voltage ride-through capability making it technically infeasible to meet any requirement in paragraphs (1) through (8) above with documentation from the IBR or Type 1 WGR or Type 2 WGR original equipment manufacturer (or subsequent inverter/turbine vendor support company if the original equipment manufacturer is no longer in business) attesting there are no technically feasible solutions that do not require replacement or major retrofits to achieve, if applicable. Major retrofits include any hardware and labor that costs more than 20% of the cost of installing a new, comparable replacement equipment on a per turbine or per inverter basis; and~~

~~(e) Evidence that all models provided to ERCOT represent any documented technical limitation.~~

~~(11) In its sole and reasonable discretion, ERCOT may allow a documented technical exception to an existing IBR or Type 1 WGR or Type 2 WGR with an SGIA executed prior to January 16, 2014, that provides documented evidence from the original equipment manufacturer (or subsequent inverter/turbine vendor support company if original equipment manufacturer is no longer in business) of a technical limitation identified in paragraph (10)(d) above. Evidence from paragraphs (10)(a) through (e) above must sufficiently demonstrate that the ride-through capability has been maximized and does not create any risk of instability, uncontrolled separation or cascading outages for the ERCOT System and the limitation is accurately represented in models provided to ERCOT. Any exceptions will expire when the IBR implements a modification as described in paragraph (1)(c) of Planning Guide Section 5.2.1, Applicability, for which a Generator Interconnection or Modification (GIM) was initiated or when ERCOT is notified that the technical limitation no longer exists. Software and parameterization~~

~~changes needed to achieve the required performance are required and not allowed for an exception. Exceptions are not allowed that would effectively be lower than the current voltage ride-through requirements in effect as of December 1, 2023. For any IBR or Type 1 WGR or Type 2 WGR that receives a documented technical exception, the documented maximum capabilities that do not meet the capabilities in paragraphs (1) through (8) above will become the new performance requirements until the exception is removed. Mitigation plans where a Resource Entity or IE for an IBR, Type 1 WGR, or Type 2 WGR installs supplemental dynamic reactive devices or batteries that can provide sufficient leading and lagging dynamic Reactive Power to meet all Reactive Power requirements and the applicable ride-through requirements are allowed.~~

(10~~2~~1) If an IBR, ~~or~~ Type 1 WGR or Type 2 WGR fails to perform in accordance with the applicable voltage ride-through requirements, ~~ERCOT may restrict its operation as set forth in paragraph (13) below. Additionally,~~ the Resource Entity shall take the actions described in Section 2.13~~4~~, Actions Following a Transmission-Connected Inverter-Based Resource (IBR), Type 1 Wind-Powered Generation Resource (WGR) or Type 2 WGR ~~an~~ Apparent Failure to Ride-Through.~~investigate the event and report to ERCOT the cause of the failure. All impacted TSPs shall provide available information to ERCOT to assist with event analysis.~~

~~(13) In its sole and reasonable discretion, ERCOT may restrict, or not permit to operate, any IBR or Type 1 WGR or Type 2 WGR that has one or more performance failures to the applicable voltage ride-through requirements. ERCOT shall assess the risk of the performance failure in determining if such restrictions are implemented. If the assessment determines that any one of the below criteria is met, it may impose such restrictions on the IBR or Type 1 WGR or Type 2 WGR, or portions thereof, that experienced the performance failure:~~

~~(a) The actual or potential severity of the event on the ERCOT System is greater than the most severe single contingency. To determine potential severity, ERCOT will utilize: (i) nameplate capacity for PVGR and ESR resources; and (ii) the greater of the pre-disturbance output of the WGR or 50% of its nameplate capacity;~~

~~(b) The cause of the performance failure cannot be mitigated (i.e., fully implemented corrective actions) within 90 calendar days;~~

~~(c) The location of the performance failure did affect or has the potential to materially affect known stability limitations on the ERCOT system;~~

~~(d) The IBR or Type 1 WGR or Type 2 WGR experienced more than one failure in the prior 36 calendar months; or~~

~~(e) If the performance failure presents an imminent safety or equipment risk on the ERCOT System.~~

(14) Each QSE shall, for each IBR or Type 1 WGR or Type 2 WGR not permitted to operate, reflect in its COP and Real-Time telemetry a Resource Status of OFF, OUT, or EMR in accordance with Protocol Sections 3.9.1, Current Operating Plan (COP) Criteria and 6.5.5.1, Changes in Resource Status, as appropriate. If the Resource Entity can implement modifications to resolve the technical limitations or performance failures, it shall submit to ERCOT a report and supporting documentation containing the following:

(a) The current technical limitations and voltage ride-through capability in a format similar to Table A in paragraph (1) above;

(b) The proposed modifications and voltage ride-through capability allowing the affected Resource to comply with the voltage ride-through requirements in a format similar to Table A in paragraph (1) above; and

(c) A schedule for implementing those modifications.

(14) In its sole and reasonable discretion, ERCOT may accept the proposed modification plan. Upon completion of the accepted modification plan, ERCOT will remove the restrictions unless the IBR or Type 1 WGR or Type 2 WGR experiences additional unresolved technical limitations or performance failures. ERCOT may allow the IBR or Type 1 WGR or Type 2 WGR to operate at reduced output prior to the implementation of an accepted modification plan if the reduced output allows the IBR or Type 1 WGR or Type 2 WGR to comply with the applicable ride-through requirements. ERCOT may also temporarily lift operational restrictions for any IBR or Type 1 WGR or Type 2 WGR to prevent or mitigate an actual or anticipated emergency condition. During such instances, ERCOT shall inform each affected QSE that the restrictions have been temporarily lifted as well as the start time and proposed end time. Each QSE shall update the COP, Outage Scheduler, and Real-Time telemetry to appropriately reflect the availability and capability of the IBR or Type 1 WGR or Type 2 WGR during the timeframe for which the restriction was lifted.

2.9.1.2 Legacy Voltage Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs)

(1) All IBRs subject to this Section in accordance with paragraph (1) of Section 2.9.1, Voltage Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs), shall ride through the root-mean-square voltage conditions in Table A below as measured at the IBR's Point of Interconnection Bus (POIB):

Table A

Root-Mean-Square Voltage (p.u. of nominal)	Minimum Ride-Through Time (seconds)
V > 1.20	May ride-through or may trip
1.175 < V ≤ 1.2	0.2
1.15 < V ≤ 1.175	0.5

1.10 < V ≤ 1.15	1.0
0.90 ≤ V ≤ 1.10	continuous
0.0 < V < 0.90	(V+0.084375)/0.5625
V = 0.0	0.15

For voltage between zero and 0.9 pu the minimum ride-through time in Table A above is defined by a straight line mathematical function where the duration is 0.15 seconds at zero voltage and 1.75 seconds at 0.9 pu voltage. In the event of multiple excursions, the minimum ride-through time in Table A is a cumulative time over ten seconds.

(2) Nothing in paragraph (1) above shall be interpreted to require an IBR to trip for voltage conditions beyond those for which ride-through is required.

(3) If installed and activated to trip the IBR, all protection systems (including, but not limited to protection for over-/under-voltage, rate-of-change of frequency, anti-islanding, and phase angle jump) shall enable the IBR to ride through voltage conditions beyond those defined in paragraph (1) above to the maximum extent possible. An IBR shall ride-through any grid disturbance during which ride-through is required and the positive-sequence angle change within a sub-cycle-to-cycle time frame does not exceed 25 electrical degrees. In addition, the IBR shall ride-through any change in the phase angle of individual phases caused by occurrence and clearance of unbalanced faults, provided the positive-sequence angle change does not exceed the stated criterion. Positively damped active and reactive current oscillations in the post-disturbance period are acceptable in response to phase angle changes.

(4) An IBR shall inject electric current during all periods requiring ride-through. When the POIB voltage is outside the continuous operating voltage range, an IBR shall continue to deliver pre-disturbance active current unless otherwise limited due to its current limit. Unless otherwise specified by ERCOT or the interconnecting TSP, an IBR shall minimize reductions in active current while maintaining robust reactive current response. Any necessary reductions in active current to prioritize reactive current shall be proportional to the voltage change at the POIB. An IBR shall return to its pre-disturbance level of real power injection as soon as possible but no more than one second after POIB voltage recovers to normal operating range.

(5) IBR plant controls or inverter controls shall not disconnect the IBR from the ERCOT System or reduce IBR output during voltage conditions where ride-through is required unless necessary for providing appropriate frequency response, or to prevent equipment damage. If an IBR requires any setting that would prevent it from riding through voltage conditions as required in paragraph (1) above, the IBR operation may be restricted as set forth in paragraph (10) below.

(6) If installed and activated to trip the IBR, instantaneous over-current or over-voltage protection systems shall use filtered quantities to prevent misoperation while providing the desired equipment protection. Any instantaneous over-voltage protection that could

disrupt IBR power output shall use a measurement period of at least one cycle (of fundamental frequency).

(7) The IBR shall ride through multiple excursions outside the continuous operation range in Table A in paragraph (1) above, unless the conditions and situations specified below exist, in which case the IBR may trip to protect equipment from the cumulative effect of successive voltage deviations:

(a) More than four voltage deviations at the POIB outside the continuous operation zone within any ten second period.

(b) More than six voltage deviations at the POIB outside the continuous operation zone within any 120 second period.

(c) More than ten voltage deviations at the POIB outside the continuous operation zone within any 1,800 second period.

(d) Voltage deviations outside of continuous operation zone following the end of a previous deviation outside of continuous operation zone by less than twenty cycles of system fundamental frequency.

(e) More than two individual voltage deviations at the POIB below 50% of the nominal voltage (including zero voltage) within any ten second period.

(f) More than three individual voltage deviations at the POIB below 50% of the nominal voltage (including zero voltage) within any 120 second period.

(g) Individual wind turbines may trip for consecutive voltage deviations resulting in stimulation of mechanical resonances exceeding equipment limits.

Individual voltage deviations begin when the voltage at the POIB drops below the lower limit of the continuous operation range or exceeds the upper limit of the continuous operation range. Individual voltage deviations end when the root-mean-square voltage magnitude at the POIB, for the previous one-cycle period of fundamental frequency, returns to the continuous operation region.

(8) The Resource Entity or Interconnecting Entity (IE) for each IBR shall maximize voltage ride-through capability with existing equipment as soon as practicable but no later than December 31, 2025, and shall, by March 1, 2024, submit to ERCOT a report and supporting documentation containing the following:

(a) The current and potential future IBR voltage ride-through capability (including any associated adjustments to improve voltage ride-through capability) in a format similar to Table A in paragraph (1) above;

(b) The proposed modifications to maximize the IBR voltage ride-through capability and allow the IBR to comply with the voltage ride-through requirements in paragraphs (1) through (7) above;

(c) A schedule for implementing those modifications as soon as practicable but no later than December 31, 2025;

(d) Any limitations on the IBR's voltage ride-through capability making it technically infeasible to meet the requirements in paragraphs (1) through (7) above; and

(e) A plan (e.g., replacing inverters, turbines, or power converters, etc.) to comply with the voltage ride-through requirements of Section 2.9.1.1, Preferred Voltage Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs), as soon as practicable but no later than December 31, 2027 for any IBR that will be unable to comply with all of the requirements of paragraphs (1) through (7) above by December 31, 2025.

Based on the information provided by the Resource Entity or IE, if ERCOT determines in its sole and reasonable discretion an IBR cannot comply with all applicable voltage ride-through requirements, the IBR operation may be restricted after December 31, 2025 as set forth in paragraph (10) below. Any IBR that will be upgraded pursuant to paragraph (8)(e) above, may operate without restrictions until December 31, 2027, if it does not have any subsequent ride-through failures according to the voltage ride-through requirements of paragraphs (1) through (7) above.

(9) If an IBR fails to perform in accordance with the voltage ride-through requirements of paragraphs (1) through (7) above, the IBR operation may be restricted as set forth in paragraph (10) below. Additionally, the Resource Entity for the IBR shall investigate the event and report to ERCOT the cause of the IBR failure. All impacted TSPs shall provide available information to ERCOT to assist with event analysis.

(10) Any IBR that cannot comply with the voltage ride-through requirements of paragraphs (1) through (7) above, may be restricted or may not be permitted to operate on the ERCOT System unless ERCOT, in its sole and reasonable discretion, allows it to do so. Each QSE shall, for each IBR not permitted to operate, reflect in its Current Operating Plan (COP) and Real-Time telemetry a Resource Status of OFF, OUT, or EMR in accordance with Protocol Sections 3.9.1, Current Operating Plan (COP) Criteria and 6.5.5.1, Changes in Resource Status, as appropriate. If the Resource Entity can implement IBR modifications to resolve the technical limitations or performance failures preventing compliance with applicable voltage ride-through requirements, the Resource Entity shall submit to ERCOT a report and supporting documentation containing the following:

(a) The current technical limitations and IBR voltage ride-through capability in a format similar to Table A in paragraph (1) above;

(b) The proposed modifications and voltage ride-through capability allowing the IBR to comply with the voltage ride-through requirements in a format similar to Table A in paragraph (1) above; and

(c) A schedule for implementing those modifications.

In its sole and reasonable discretion, ERCOT may accept the proposed modification plan. Upon completion of the accepted modification plan, ERCOT will remove the restrictions placed on the IBR unless the IBR experiences additional unresolved technical limitations or performance failures. ERCOT may allow the IBR to operate at reduced output prior to the implementation of an accepted modification plan if the reduced output allows the IBR to comply with the applicable ride-through requirements. ***2.9.1 Voltage Ride-Through Requirements for Intermittent Renewable Resources and Energy Storage Resources Connected to the ERCOT Transmission Grid***

(1) All Intermittent Renewable Resources (IRRs) and ESRs that interconnect to the ERCOT Transmission Grid shall also comply with the requirements of this Section, except as follows:

(a) An IRR that interconnects to the ERCOT Transmission Grid pursuant to a Standard Generation Interconnection Agreement (SGIA) (i) executed on or before January 16, 2014 and (ii) under which the IRR provided all required financial security to the TSP on or before January 16, 2014, is not required to meet any high VRT requirement greater than 1.1 per unit voltage unless the interconnected IRR includes one or more turbines that differ from the turbine model(s) described in the SGIA (including any attachment thereto), as that agreement existed on January 16, 2014. Notwithstanding the foregoing, if the Resource Entity that owns or operates an IRR that was interconnected pursuant to an SGIA executed before January 16, 2014, under which the IRR provided all required financial security to the TSP on or before January 16, 2014, demonstrates to ERCOT's satisfaction that the high VRT capability of the IRR is not lower than the capability of the turbine model(s) described in the SGIA (including any attachment thereto), as that agreement existed on January 16, 2014 that IRR is not required to meet the high VRT requirement in this Section.

(b) An IRR that interconnects to the ERCOT System pursuant to an SGIA executed prior to November 1, 2008 is not required to meet VRT requirements presented in this Section. However, any Wind-powered Generation Resource (WGR) that is installed on or after November 1, 2008 and that initially synchronizes with the ERCOT System, pursuant to an SGIA (i) executed on or before January 16, 2014, and (ii) under which the IRR provided all required financial security to the TSP on or before January 16, 2014 (except for an IRR installed pursuant to an SGIA executed before November 1, 2008) shall be VRT-capable in accordance with the low VRT requirements in this Section and high-voltage requirements in this Section up to 1.1 per unit voltage unless the interconnected IRR includes one or more turbines that differ from the turbine model(s) described in the SGIA (including any attachment thereto), as that agreement existed on

~~January 16, 2014 in which case the IRR shall also be required to comply with the high VRT requirements of this Section, subject to the exemption described in paragraph (a), above.~~

~~(c) An IRR that is not technically capable of complying with a 1.2 per unit voltage high VRT requirement and that is not subject to either of the exemptions described in paragraphs (a) or (b), above, is not required to meet any high VRT requirement greater than 1.1 per unit voltage until January 16, 2016.~~

~~(d) Notwithstanding any of the foregoing provisions, an IRR's VRT capability shall not be reduced over time.~~

~~(2) Each IRR or ESR shall provide technical documentation of VRT capability to ERCOT upon request.~~

~~(3) Each IRR or ESR is required to set its voltage relays to remain in service for at least 0.15 seconds during all transmission faults and to allow the system to recover as illustrated in Figure 1, Default Voltage Ride-Through Boundaries for IRRs and ESRs Connected to the ERCOT Transmission Grid, below. Recovery time to 90% of per unit voltage should be within 1.75 seconds. Faults on individual phases with delayed clearing (zone 2) may result in phase voltages outside this boundary but if the phase voltages remain inside this boundary, then Resource voltage relays are required to be set to remain connected and recover as illustrated in Figure 1.~~

~~(4) Each IRR or ESR 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) unless a shorter clearing time requirement for a three-phase fault specific to the POIB is determined by and documented by the TSP in conjunction with the SGIA. The clearing time requirement shall not exceed nine cycles.~~

~~(5) Each IRR or ESR shall set its voltage relays to remain interconnected to the ERCOT System during the following high-voltage conditions, as illustrated in Figure 1: any per-unit voltage equal to or greater than 1.175 but less than 1.2 for up to 0.2 seconds, any per-unit voltage equal to or greater than 1.15 but less than 1.175 per unit voltage for up to 0.5 seconds, and any per-unit voltage equal to or greater than 1.1 but less than 1.15 for up to 1.0 seconds. The indicated voltages are measured at the POIB.~~

~~(6) An IRR or ESR may be tripped Off-Line or curtailed after the fault clearing period if this action is part of an approved Remedial Action Scheme (RAS).~~

~~(7) VRT requirements may be met by the performance of the Resource; by installing additional reactive equipment behind the POI; or by a combination of Resource performance and additional equipment behind the POI. VRT requirements may be met by equipment outside the POI if documented in the SGIA.~~

(8) If an IRR or ESR fails to comply with the clearing time or recovery VRT requirement, then the Resource Entity and the interconnecting TSP shall be required to investigate and report to ERCOT on the cause of the Resource's trip, identifying a reasonable mitigation plan and timeline.

Figure 1: Default Voltage Ride-Through Boundaries for IRRs and ESRs Connected to the ERCOT Transmission Grid

2.11 Commercially Reasonable Efforts

(1) "Commercially reasonable efforts" means that the Resource Entity must evaluate its facilities and available modifications it can make to its equipment, if any, to maximize its frequency and/or voltage ride-through capability up to the frequency and voltage ride-through requirements set forth in Section 2.6.2.1, Frequency Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs) and Type 1 and Type 2 Wind-Powered Generation Resources (WGRs) and Section 2.9.1.2, Legacy Voltage Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs) and Type 1 and Type 2 Wind-Powered Generation Resources (WGRs).

(a) Technically feasible modifications involving only software, firmware, settings or parameterization changes are presumed to be commercially reasonable unless

~~ERCOT and the Resource Entity agree the pricing is unreasonable for the modification. The Resource Entity shall implement any technically feasible modifications as soon as practicable but no longer than 12 months from the date on which the modification becomes commercially available to be installed and is available to be deployed on the subject equipment, unless a longer timeline is required by an impacted Transmission Service Provider (TSP), or as mutually agreed upon by the Resource Entity and ERCOT. The Resource Entity may request extensions beyond 12 months for circumstances beyond the Resource Entity's reasonable control and shall provide ERCOT with an updated schedule for when the applicable changes are expected to be completed.~~

~~(b) The Resource Entity shall use best efforts to determine if any technically feasible equipment upgrades or improvements that require physical modification are commercially reasonable for the subject equipment. The Resource Entity shall implement any such changes as soon as practicable but no later than 24 months after the modification becomes commercially available to be installed and is available to be deployed on the subject equipment unless a longer timeline is mutually agreed upon by the Resource Entity and ERCOT. The Resource Entity may request extensions beyond 24 months for circumstances beyond the Resource Entity's reasonable control and shall provide ERCOT with an updated schedule for when the applicable changes are expected to be completed.~~

~~(2) In determining whether any equipment upgrades or improvements that require physical modification are commercially reasonable, the Resource Entity may consider factors such as: (i) availability and/or cost of hardware; (ii) whether the improvements are technically feasible; (iii) facility's depreciated value; (iv) cost of capital; (v) facility's expected profitability for the remainder of its expected operational life; (vi) whether the improvement would materially enhance its ride through capabilities; and (vii) any other relevant factor.~~

~~(3) If ERCOT has a reasonable expectation that other commercially reasonable modifications are available for a particular Resource other than those identified by the Resource Entity, it may provide such information to the Resource Entity unless the information is considered Protected Information, confidential, or ERCOT Critical Energy Infrastructure Information (ECEII). Evidence may include but is not limited to: (i) information obtained about other, similar Resources; (ii) data provided by equipment manufacturers; or (iii) any other information indicating a commercially reasonable compliance solution exists. Nothing herein requires ERCOT to perform a financial analysis regarding what is considered commercially reasonable.~~

2.11~~2~~ Ride-Through Reporting Requirements for Transmission-Connected Inverter-Based Resources (IBRs), Type 1 Wind-Powered Generation Resources (WGRs) and Type 2 WGRs

(1) If the Resource Entity for an Inverter-Based Resource (IBR), Type 1 Wind-Powered Generation Resource (WGR) or Type 2 WGR believes one or more of its Resources (i) has already maximized its ride-through capabilities to meet or exceed the applicable ride-through performance requirements, or (ii) will maximize its ride-through capabilities with available software, firmware, settings and parameterization changes to meet or exceed the applicable ride-through performance requirements before December 31, 2025, the Resource Entity must submit to ERCOT accurate models reflecting the field settings of the IBR, Type 1 WGR or Type 2 WGR consistent with applicable requirements for model updates in these Protocols and Other Binding Documents.

(2) Until an IBR, Type 1 WGR or Type 2 WGR completes the work to maximize ride-through capability as required in Sections 2.6.2.1, Frequency Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs), Type 1 Wind-Powered Generation Resources (WGRs) and Type 2 WGRs; 2.9.1, Voltage Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs), Type 1 Wind-Powered Generation Resources (WGRs), Type 2 WGRs and Type 3 WGRs; 2.9.1.1, Preferred Voltage Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs); and 2.9.1.2, Legacy Voltage Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs), Type 1 Wind-Powered Generation Resources (WGRs) and Type 2 WGRs, the Resource must comply with the ride-through requirements in effect on May 1, 2024.

(3) Upon completing the work to maximize ride-through capability as required in Sections 2.6.2.1; 2.9.1; 2.9.1.1; and 2.9.1.2, the Resource Entity shall inform ERCOT (in a manner prescribed by ERCOT) it has completed the work to maximize ride-through capability for each Resource.

2.112.1 Initial Frequency Ride-Through Capability Documentation and Reporting Requirements

(1) The Resource Entity of an ~~Inverter-Based Resource (~~IBR~~)~~, Type 1 ~~Wind-powered Generation Resource (~~WGR~~),~~ or Type 2 WGR with a Standard Generation Interconnection Agreement (SGIA) executed prior to ~~June~~August 1, 2024 that cannot comply with paragraphs (1) through (~~5~~6) of Section 2.6.2.1, Frequency Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs), ~~and~~ Type 1 Wind-Powered Generation Resources (WGRs) and Type 2 ~~Wind-Powered Generation Resources (~~WGRs~~),~~ by December 31, 2025~~,~~ shall, by ~~February~~April 1, 2025, ~~(or later for any project that has not been approved to energize as of February 1, 2025),~~ submit to ERCOT via the Resource Integration and Ongoing Operations (RIOO) system, or as otherwise directed by ERCOT, ~~submit a~~n ~~report with supporting information or documentation and request an exemption or extension~~ Initial Frequency Ride-Through Capability Report ("IFRTCR") containing the following~~, in each case as is available or can be reasonably obtained:~~

(a) The Resource Entity DUNS Number;

(b) IBR/WGR Site Name;

(c) IBR/WGR Unit Name(s);

(d) Nodal Operating Guide Section(s) with which the Resource cannot comply;

(e) Current frequency ride-through capability in a format similar to the table in paragraph (1) of Section 2.6.2.1;

(f~~b~~) Known frequency ride-through limitations of the IBR, Type 1 WGR or Type 2 WGR as compared to the requirements in paragraphs (1) through (5) of Section 2.6.2.1;

(g~~e~~) A detailed description of the technical limitation preventing the Resource from meeting the ride-through requirement(s), including a letter signed by an officer or executive of the original equipment manufacturer (or subsequent support company if the original equipment manufacturer is no longer in business) or an engineering consulting firm verifying the limitations: ~~For known and available technically feasible modifications evaluated by the Resource Entity to meet the applicable ride-through requirements, the cost of implementing the modification(s) to meet the applicable ride-through requirement(s) on a per inverter or turbine basis. but found commercially unreasonable, the basis for such conclusion. ERCOT will treat all financial and proprietary information provided under this Section or Section 2.123, Procedures for Frequency and Voltage Ride-Through Exemptions, Extensions and Appeals for Transmission-Connected Inverter-Based Resources (IBRs), Type 1 Wind-Powered Generation Resources (WGRs) and Type 2 WGRs, as Protected Information;~~

(i) If a Resource Entity cannot address the entire plant design with a letter required in paragraph (1)(g) above, the Resource Entity must supplement a letter from the original equipment manufacturer for its equipment (or subsequent support company if the original equipment manufacturer is no longer in business) or an engineering consulting firm by providing a notarized attestation sworn to by the Resource Entity's highest-ranking representative, official, or officer with binding authority over the entity attesting to: the efforts made to obtain the letter, why those efforts failed, and which parts of the plant design is attested to. The attestation shall also include a detailed description of the technical limitation(s) preventing the Resource from meeting the ride-through requirement, including any information on technical limitations on all or part of the Resource which the Resource Entity is able to obtain from original equipment manufacturers or an engineering consulting firm under paragraph (1)(g) above;

(h~~d~~) Available software, firmware, settings or parameterization m~~Commercially reasonable m~~Modifications ~~that~~ the Resource Entity will implement to maximize

the frequency ride-through capability of the IBR, Type 1 WGR or Type 2 WGR within known equipment limitations,~~to approach or meet the frequency ride-through requirements in paragraphs (1) through (5) of Section 2.6.2.1~~ to the greatest extent possible;

(i~~e~~) To the extent the Resource Entity chooses to implement changes to existing equipment other than software, firmware, settings or parameterization modifications that increase the frequency ride-through capability, identification of any such equipment modifications;

(j) Expected post-modification Resource capability in a format similar to the table in paragraph (1) of Section 2.6.2.1 and documentation of any expected remaining limitation(s) following implementation of such modifications;

(k~~f~~) A schedule for implementing the modification(s);

(l~~g~~) ~~For any documented technical limitation that can be accurately represented in a model: (i) a~~A model accurately representing expected performance reflecting all technical limitations, or a statement that there are no new models available other than what is currently submitted to ERCOT that already reflect all technical limitations in frequency ride-through capability~~, or (ii) where such model is not available or reasonably obtainable by the time the report is submitted, a schedule for providing such athe model as soon as practicable~~; and

(m~~h~~) A description of any limitation that cannot be accurately represented in a model.

(2) If a Resource Entity does not timely provide to ERCOT an IFRTCR by April 1, 2025, the Resource will not be eligible for an exemption or extension to comply with the ride-through requirements. If a Resource Entity timely provides an IFRTCR by April 1, 2025 and ERCOT requests additional information, it will not render the Resource ineligible for an exemption.

2.11~~2~~.2 Initial Voltage Ride-Through Capability Documentation and Reporting Requirements

(1) The Resource Entity of an IBR, ~~or~~ Type 1 WGR or Type 2 WGR with an SGIA executed prior to ~~June~~August 1, 2024, that cannot comply with paragraphs (1) through (7~~8~~9) of Section 2.9.1.2, Legacy Voltage Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs), ~~and~~ Type 1 Wind-Powered Generation Resources (WGRs) and Type 2 ~~Wind-Powered Generation Resources (~~WGRs~~),~~ by December 31, 2025~~,~~ shall, by ~~February~~April 1, 2025~~, (or later as part of the interconnection process for any project that has not been approved to energize as of February 1, 2025),~~ submit to ERCOT via the RIOO system, or as otherwise directed by ERCOT, ~~submit a report with supporting information or documentation and~~ an Initial Voltage Ride-Through Capability Report ("IVRTCR") ~~request an exemption or extension~~ containing the following~~:, in each case as is available or can be reasonably obtained:~~

(a) The Resource Entity DUNS Number;

(b) IBR/WGR Site Name;

(c) IBR/WGR Unit Name(s);

(d) Nodal Operating Guide Section(s) with which the Resource cannot comply;

(e) Current voltage ride-through capability in a format similar to the table in paragraph (1) of Section 2.9.1.2;

(fb) Known voltage ride-through limitations of the IBR, Type 1 WGR or Type 2 WGR as compared to the requirements in paragraphs (1) through (798) of Section 2.9.1.2;

(c) For known and available technically feasible modifications evaluated by the Resource Entity to meet the applicable ride-through requirements, the cost of implementing the modification(s) to meet the applicable ride-through requirement(s) on a per inverter or turbine basis.but found commercially unreasonable, the basis for such conclusion. ERCOT will treat all financial and proprietary information provided under this Section or Section 2.123, Procedures for Frequency and Voltage Ride-Through Exemptions, Extensions and Appeals for Transmission-Connected Inverter-Based Resources (IBRs), Type 1 Wind-Powered Generation Resources (WGRs) and Type 2 WGRs, as Protected Information;(g) A detailed description of the technical limitation preventing the Resource from meeting the ride-through requirement(s), including a letter signed by an officer or executive of the original equipment manufacturer (or subsequent support company if the original equipment manufacturer is no longer in business) or an engineering consulting firm verifying the limitations:

(i) If a Resource Entity cannot address the entire plant design with a letter required in paragraph (1)(g) above, the Resource Entity must supplement a letter from the original equipment manufacturer for its equipment (or subsequent support company if the original equipment manufacturer is no longer in business) and an engineering consulting firm by providing a notarized attestation sworn to by the Resource Entity's highest-ranking representative, official, or officer with binding authority over the entity attesting to: the efforts made to obtain the letter, why those efforts failed, and which parts of the plant design is attested to. The attestation shall also include a detailed description of the technical limitation(s) preventing the Resource from meeting the ride-through requirement, including any information on technical limitations on all or part of the Resource which the Resource Entity is able to obtain from original equipment manufacturers or an engineering consulting firm under paragraph (1)(g) above;

(h) Available software, firmware, settings, or parameterization

~~(d) Commercially reasonable m~~Mmodifications ~~that~~ the Resource Entity will implement to maximize the voltage ride-through capability of the IBR, Type 1 WGR or Type 2 WGR to approach or meet the voltage ride-through requirements in paragraphs (1) through (7~~98~~) of Section 2.9.1.2 within known equipment limitations, to the greatest extent possible;

(i) To the extent the Resource Entity chooses to implement changes to existing equipment other than software, firmware, settings or parameterization modifications that increase the voltage ride-through capability, identification of any such equipment modifications;

(j~~e~~) Expected post-modification Resource capability in a format similar to the table in paragraph (1) of Section 2.9.1.2 and documentation of any expected remaining limitation(s) following implementation of such modifications;

(k~~f~~) A schedule for implementing the modification(s);

(l~~g~~) ~~For any documented technical limitation that can be accurately represented in a model: (i) a~~A model accurately representing expected performance reflecting all technical limitations, or a statement that there are no new models available other than what is currently submitted to ERCOT that already reflect all technical limitations in voltage ride-through capability~~, or (ii) where such model is not available or reasonably obtainable by the time the report is submitted, a schedule for providing such a model as soon as practicable~~; and

(m~~h~~) A description of any limitation that cannot be accurately represented in a model.

(2) If a Resource Entity does not timely provide to ERCOT an IVRTCR by April 1, 2025, the Resource will not be eligible for an exemption or extension to comply with the ride-through requirements. If a Resource Entity timely provides an IVRTCR by April 1, 2025 and ERCOT requests additional information, it will not render the Resource ineligible for an exemption.

~~*2.12.3 Use of Initial Reports and Requirements for Recurring Ride-Through Reports*~~

~~(1) The initial reports in Section 2.12.1, Initial Frequency Ride-Through Capability Documentation and Reporting Requirements and 2.12.2, Initial Voltage Ride-Through Capability Documentation and Reporting Requirements, satisfy the requirements for exemption and extension requests in accordance with Section 2.13, Procedures for Frequency and Voltage Ride-Through Exemptions, Extensions and Appeals.~~

~~(2) No later than February 1 of each year beginning with February 1, 2026, each Resource Entity of an IBR or Type 1 WGR or Type 2 WGR with an exemption under Section 2.13, as Protected Information, must submit a detailed report as described in paragraph (1) of~~

~~Section 2.12.1 or paragraph (1) of Section 2.12.2, as applicable, or an attestation signed by an officer or executive with authority to bind the Resource Entity affirming that no material changes have occurred since the Resource Entity's last report.~~

2.123 Procedures for Frequency and Voltage Ride-Through Exemptions and~~,~~ Extensions ~~and Appeals~~ for Transmission-Connected Inverter-Based Resources (IBRs), Type 1 Wind-Powered Generation Resources (WGRs) and Type 2 WGRs

2.123.1 Exemptions and Extensions Process

(1) If an Inverter-Based Resource (IBR), ~~or~~ Type 1 Wind-Powered Generation Resource (WGR) or Type 2 WGR has a technical limitation preventing it from fully meeting the frequency ride-through requirements in paragraphs (1) through (5) of Section 2.6.2.1, Frequency Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs), ~~and~~ Type 1 Wind-Powered Generation Resources (WGRs) and Type 2 ~~Wind-Powered Generation Resources (~~WGRs~~)~~, or the voltage ride-through requirements in paragraphs (1) through (~~8~~7) of Section 2.9.1.2, Legacy Voltage Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs), ~~and~~ Type 1 Wind-Powered Generation Resources (WGRs) and Type 2 ~~Wind-Powered Generation Resources (~~WGRs~~)~~; or as otherwise specified in paragraph~~s~~ (5) through (7) of Section 2.9.1, Voltage Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs), ~~and~~ Type 1 Wind-Powered Generation Resources (WGRs), ~~and~~ Type 2 ~~Wind-powered Generation Resources (~~WGRs and Type 3 WGRs~~)~~, or certain voltage ride-through requirements in accordance with paragraph (~~9~~10) of Section 2.9.1.1, Preferred Voltage Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs), the Resource Entity or Interconnecting Entity (IE) ("Requesting Entity") ~~may~~ must submit to ~~request from~~ ERCOT, ~~under this Section,~~ by April 1, 2025: (i) a request for an ~~exemption from meeting, or~~ extension to meet~~,~~ such ~~applicable~~ requirements and/or (ii) a notice of intent to request an exemption based on standards established in a subsequent Nodal Operating Guide Revision Request (NOGRR).

(2) For any IBR, Type 1 WGR or Type 2 WGR with a Standard Generation Interconnection Agreement (SGIA) dated before August 1, 2024, a notice of intent to request an exemption ~~requests~~ must be submitted to ERCOT on or before April 1, 2025 as part of the Initial Frequency Ride-Through Capability Report ("IFRTCR") and Initial Voltage Ride-Through Capability Report ("IVRTCR") as applicable. No new notices of intent to request an exemption ~~requests~~ beyond April 1, 2025, detailing additional technical limitations of ride-through requirements are allowed. A Resource Entity may only request an exemption based upon the technical limitations identified in its April 1, 2025 IFRTCR and/or IVRTCR. An exemption request and the ability to provide supplemental~~request may be supplemented only with additional~~ information, including updated models reflecting improved ride-through capability, will be established under processes ~~established~~ in a subsequent NOGRR.

~~(3) When seeking an exemption, a Requesting Entity shall provide to ERCOT:~~

~~(a) A detailed description of the technical limitation preventing the Resource from meeting the ride-through requirement(s), including a letter signed by an officer or executive of the original equipment manufacturer (or subsequent support company if the original equipment manufacturer is no longer in business) or an engineering consulting firm verifying the need for an exemption;~~

~~(b) Documentation describing any technically feasible modifications the Requesting Entity has implemented or will implement to meet the requirements;~~

~~(c) Documentation describing any technically feasible modification(s) the Requesting Entity will not implement due to being cost prohibitive;~~

~~(d) Models that accurately represent expected performance reflecting the technical limitations before and after any modifications to improve performance, including a description of any limitation that cannot be accurately represented in a model;~~

~~(e) The cost of implementing each technically feasible Resource modification or upgrade to meet the applicable ride-through requirement(s) on a per inverter or turbine basis;~~

~~(f) The cost of full in-kind replacement for all inverters or turbines/converters in the plant; and~~

~~(g) Any other financial information the Resource Entity believes ERCOT should consider.~~

~~(2) Subject to the appeal process in this Section, ERCOT may deny a request for an exemption or extension if the Requesting Entity fails to demonstrate, to ERCOT's reasonable satisfaction:~~

~~(a) For an IBR, Type 1 WGR or Type 2 WGR with a Standard Generation Interconnection Agreement (SGIA) executed prior to June 1, 2024, a Type 3 WGR with an original SGIA executed prior to June 1, 2024 that meets the criteria in paragraph (5) of Section 2.9.1, or an IBR, Type 1 WGR or Type 2 WGR seeking an exemption as described in paragraph (7) of Section 2.9.1, the Requesting Entity has:~~

~~(i) Maximized the ride-through capability of the IBR, Type 1 WGR or Type 2 WGR with all available commercially reasonable modifications; and~~

~~(ii) Represented the limitations of the IBR, Type 1 WGR or Type 2 WGR, which form the basis for the exemption, to the best of the Requesting Entity's understanding and in accordance with Section 2.13.1.1 Submission of Exemption Requests and Section 2.13.1.2 Submission of Extension Requests.~~

~~(b) For an IBR with an SGIA executed on or after June 1, 2024, seeking extensions as contemplated in paragraph (6) of Section 2.9.1, or paragraphs (9) or (10) of Section 2.9.1.1, the Requesting Entity has:~~

(i) Made best efforts to meet the original required timelines;

(ii) Maximized the IBR's ride-through capability during the extension period; and

Accurately represented the IBR's current ride-through capabilities in models provided to ERCOT.

(4) When determining whether to grant an exemption, ERCOT will, in its sole and reasonable discretion, grant the exemption unless one or more of the conditions below exists:

(a) The risk to ERCOT System reliability posed by the individually requested exemption/extension or, in aggregate, all requested exemptions/extensions are unacceptable to ERCOT. Unacceptable reliability risks include but are not limited to:

(i) Instability, cascading outages or uncontrolled separation;

(ii) Loss of generation capacity from multiple Resources equal to or greater than 500 MW;

(iii) Loss of Load equal to or greater than 75 MW;

(iv) Safety of or damage to neighboring equipment;

(v) Unknown or unverified limitation(s); or

(vi) Phase angle jump or rate-of-change-of-frequency tripping during faults.

(b) The Requesting Entity has not implemented all available software, firmware, settings or parameterization modifications to meet or provide material improvement to meeting the applicable ride-through requirements.

(c) The Requesting Entity has not implemented a technically feasible modification to meet or provide significant improvement to meet the applicable ride-through requirements where the cost to the Requesting Entity of upgrading or modifying the Resource is less than 40 percent of the cost of full in-kind replacement for all inverters or turbines/converters in the plant. Potential modifications to meet or provide material improvement to meet the applicable ride-through requirements include, but are not limited to, the following:

(i) Protection system upgrades or replacements;

(ii) Communication upgrades;

(iii) Controller card upgrade kits;

(iv) Component upgrades (e.g., DC chopper, Phase-Locked Loop (PLL) controller, vibration monitoring, DC controller, Uninterrupted Power Supply (UPS), etc.); or

~~(v) Plant equipment upgrades (transformers, dynamic reactive devices, etc.).~~

~~[NOGRR245: Insert paragraph (c) below no sooner than March 1, 2025:]~~

~~(c) The Requesting Entity has not implemented a technically feasible modification to meet or provide significant improvement to meet the applicable ride-through requirements where the cost to the Requesting Entity of upgrading or modifying the Resource is less than 40 percent of the cost of full in-kind replacement for all inverters or turbines/converters in the plant. Potential modifications to meet or provide material improvement to meet the applicable ride-through requirements include, but are not limited to, the following:~~

~~(i) Protection system upgrades or replacements;~~

~~(ii) Communication upgrades;~~

~~(iii) Controller card upgrade kits;~~

~~(iv) Component upgrades (e.g., DC chopper, Phase-Locked Loop (PLL) controller, vibration monitoring, DC controller, Uninterrupted Power Supply (UPS), etc.); or~~

~~(v) Plant equipment upgrades (transformers, dynamic reactive devices, etc.).~~

~~(3) ERCOT shall, in good faith, accept equipment manufacturer-documented limitations associated with an exemption or extension request.~~

~~(4) Approved exemptions and extensions under this section shall apply only to the extent requested and approved.~~

(3~~5~~) ERCOT, in its sole and reasonable discretion, will grant an extension if all of the following conditions exist:

(a) Circumstances beyond the Requesting Entity's reasonable control prevented it from meeting the deadline;

(b) The extension request demonstrates the Requesting Entity's good faith efforts to minimize the extension's duration;

(c) The Requesting Entity has provided accurate models that include all limitations and describes all limitations the Requesting Entity cannot model and represents to ERCOT the model is accurate;

(d) The date for the requested extension for a Resource with an SGIA before August 1, 2024 does not exceed December 31, 2027; and

(e) The date for the requested extension for a Resource with an SGIA after August 1, 2024 does not exceed December 31, 2028.

(4~~5~~) For any IBR, Type 1 WGR or Type 2 WGR with an approved exemption or extension, the documented maximum capabilities will become the new performance requirements until the exemption or extension has ended.

(5~~7~~6) Exemptions and extensions ~~under this Section~~ take effect immediately upon approval by ERCOT and apply only to the extent approved by ERCOT.

(6~~8~~7) Exemptions ~~under Section 2.123, Procedures for Frequency and Voltage Ride-Through Exemptions, Extensions and Appeals for Transmission-Connected Inverter-Based Resources (IBRs), Type 1 Wind-Powered Generation Resources (WGRs) and Type 2 WGRs,~~ continue until:

(a~~i~~) ~~-~~ The IBR, Type 1 WGR or Type 2 WGR fully implements a modification as described in paragraph (1)(c) of Planning Guide Section 5.2.1, Applicability, that is synchronized after January 1, 2028~~, except for exemptions that continue as contemplated in paragraph (9) of Section 2.9.1~~; or ~~or~~

(b~~ii~~) The IBR, Type 1 WGR or Type 2 WGR fully implements a modification that eliminates the need for the exemption.~~If ERCOT determines one of the conditions described in paragraph (4)(a) above arises after ERCOT previously granted an exemption to a Resource, ERCOT may revoke that exemption; or~~

(7) ~~(iii) ERCOT and the Requesting Entity learn that the technical limitation no longer exists due to a commercially reasonable modification and the Requesting Entity has had sufficient time to implement the solution in accordance with Section 2.11, Commercially Reasonable Efforts.~~ If ERCOT or the Resource Entity becomes aware of a newly available software, firmware, settings or parameterization modification for a Resource with an exemption ~~that is determined to not be cost prohibitive to implement~~, the Resource Entity shall: (i) submit an implementation plan to ERCOT for approval within 90 days, and (ii) if ERCOT approves the plan, implement the plan within 180 days, unless ERCOT approves a longer timeline.

(8~~9~~8) Extensions ~~under Section 2.123~~ shall end in accordance with Section 2.12~~3~~.1.2, Submission of Extension Requests.

(9~~10~~9) ~~Except for the provisions of Section 2.123.1.1, Submission of Exemption Requests and Section 2.13.1.2, t~~The deadlines in Section 2.12.1.2~~3~~ may be modified by mutual written agreement of ERCOT and the Requesting Entity ~~(together, "Parties")~~.

(10~~10~~) ~~During the pendency of an~~ Until the consideration of an exemption, extension, or appeal process is finalized~~, under Section 2.13, or a related proceeding before the Public Utility Commission of Texas (PUCT) or other Governmental Authority,~~ the IBR, Type 1 WGR or Type 2 WGR with an SGIA prior to August 1, 2024 that has submitted an extension

request or notice of intent to request an exemption ~~or extension request~~ and any required documentation by April 1, 2025 ~~is the subject of the exemption or extension request is required to~~ must meet the greater of: (i) its documented maximum ride-through capability, or ~~ies provided to ERCOT~~(ii) its performance requirements in effect on May 1, 2024 until there is a non-appealable Public Utility Commission of Texas (PUCT) final order. ~~If ERCOT:~~

~~(a) Grants the exemption or extension, the documented maximum ride-through capability becomes the Resource's compliance obligation; or~~

~~(b) Denies the exemption or extension and the Requesting Entity appeals ERCOT's decision to the PUCT, the Resource's compliance obligation shall be the greater of: (i) its documented maximum capability, or (ii) its performance requirements in effect on the day prior to August 1, 2024 until there is a non-appealable PUCT final order.~~

(11~~21~~) ERCOT shall not use a Resource Entity's IFRTCR, ~~or~~ IVRTCR, or notice of intent to request an exemption as a basis for referral to the Reliability Monitor so long~~s~~ as the Resource meets the applicable ride-through requirements set forth in paragraph (10) above~~any Requesting Entity's request for an exemption or extension.In the event the Requesting Entity has exhausted the appeal process or failed to timely appeal relief under Section 2.13, ERCOT may refer to the Reliability Monitor for investigation, any performance failure of the IBR, Type 1 WGR or Type 2 WGR as contemplated Section in 2.134, Actions Following a Transmission-Connected Inverter-Based Resource (IBR), Type 1 Wind-Powered Generation Resource (WGR) or Type 2 WGRan Apparent Failure to Ride-tThrough relating to frequency or voltage ride-through requirements.; provided, however, that no such referral shall occur until the Requesting Entity has exhausted the appeal process in Section 2.13.~~

(12~~32~~) All information submitted under Sections 2.11, Ride-Through Reporting Requirements for Transmission-Connected Inverter-Based Resources (IBRs), Type 1 Wind-Powered Generation Resources (WGRs) and Type 2 WGRs and 2.12, ~~3~~Procedures for Frequency and Voltage Ride-Through Exemptions and Extensions for Transmission-Connected Inverter-Based Resources (IBRs), Type 1 Wind-Powered Generation Resources (WGRs) and Type 2 WGRs shall be considered Protected Information.

2.12~~3~~.1.1 Submission of Exemption Requests

(1) A Requesting Entity may seek an exemption for an IBR, Type 1 WGR or Type 2 WGR as follows:

(a) A Requesting Entity for an IBR, Type 1 WGR or Type 2 WGR with an SGIA executed prior to ~~June~~August 1, 2024 may seek exemptions from ride-through requirements in paragraphs (1) through (5) of Section 2.6.2.1, Frequency Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs), ~~and~~ Type 1 Wind-Powered Generation Resources (WGRs) and Type 2

Wind-Powered Generation Resources (WGRs) or Section 2.9.1.2, Legacy Voltage Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs), and Type 1 Wind-Powered Generation Resources (WGRs) and Type 2 Wind-Powered Generation Resources (WGRs).

(b) A Requesting Entity for a Type 3 WGR with an original SGIA executed prior to JuneAugust 1, 2024, that meets the criteria in paragraph (5) of Section 2.9.1, Voltage Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs), and Type 1 Wind-Powered Generation Resources (WGRs), and Type 2 Wind-powered Generation Resources (WGRs), and Type 3 WGRs may seek an exemption as described in that Section.

(c) A Requesting Entity for an IBR with an SGIA executed after June 1, 2024, and with a Commercial Operations Date prior to December 31, 2026, may seek an exemption as described in paragraph (7) of Section 2.9.1.

(2) The Resource Entity intending to requesting an exemption for an IBR, Type 1 WGR, Type 2 WGR must, by April 1, 2025, submit an IFRTCR or IVRTCR with a notice of intent to request an exemption describing the need for the exemption consistent with Sections 2.11.1, Initial Frequency Ride-Through Capability Documentation and Reporting Requirements or 2.11.2, Initial Voltage Ride-Through Capability Documentation and Reporting RequirementsA Requesting Entity, through its Authorized Representative, may initiate a request for an exemption under this Section by submitting written notice of the request to ERCOT through the Resource Integration and Ongoing Operations (RIOO) system (or as otherwise specified by ERCOT), with the following information as available or reasonably obtainable:

(a) Requesting Entity Name;

(b) Requesting Entity DUNS Number;

(c) IBR/WGR Site Name;

(d) IBR/WGR Unit Name(s);

(e) Nodal Operating Guide Section(s) under which the exemption is requested;

(f) A detailed description of the grounds for the exemption and the basis for each request;

(g) Documentation describing all known limitations associated with the exemption request; and

(h) A statement from the equipment manufacturer supporting the need for the exemption; and

(ih) Any remaining information required in the reports in Section 2.112, Ride-Through Reporting Requirements for Transmission-Connected Inverter-Based Resources (IBRs),

~~Type 1 Wind-Powered Generation Resources (WGRs) and Type 2 WGRs, applicable to the request or paragraph (2) of Section 2.12.1, Exemptions and Extensions Process.~~

~~(3) A Requesting Entity that submitted a report pursuant to Section 2.12, the report shall also serve as the request for an exemption or extension, as applicable, satisfying the requirements of the preceding paragraph. A Requesting Entity may use the same form of report for future requests.~~

~~(4) If a commercially reasonable modification, as defined in Section 2.11, Commercially Reasonable Efforts, becomes available for an IBR, Type 1 WGR or Type 2 WGR with an exemption under Section 2.13, Procedures for Frequency and Voltage Ride-Through Exemptions, Extensions and Appeals, the Resource Entity shall notify ERCOT and implement the modification in accordance with the timelines required by Section 2.11.~~

2.12~~3~~.1.2 Submission of Extension Requests

(1) Unless otherwise approved by ERCOT, extension requests must be submitted by April 1, 2025. A Requesting Entity may seek an extension for an IBR, Type 1 WGR or Type 2 WGR as follows:

(a) A Requesting Entity for an IBR, Type 1 WGR or Type 2 WGR with an SGIA executed prior to ~~June~~August 1, 2024, may seek extensions for ride-through requirements in paragraphs (1) through (5) of Section 2.6.2.1, Frequency Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs), ~~and~~ Type 1 Wind-Powered Generation Resources (WGRs) and Type 2 ~~Wind-Powered Generation Resources (~~WGRs~~)~~ or Section 2.9.1.2, Legacy Voltage Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs), ~~and~~ Type 1 Wind-Powered Generation Resources (WGRs) and Type 2 ~~Wind-Powered Generation Resources (~~WGRs~~)~~.

(b) A Requesting Entity for an IBR with an SGIA executed on or after ~~June~~August 1, 2024 may seek extensions as contemplated in paragraph (6) of Section 2.9.1, Voltage Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs), ~~and~~ Type 1 Wind-Powered Generation Resources (WGRs), ~~and~~ Type 2 ~~Wind-powered Generation Resources (~~WGRs~~)~~, and Type 3 WGRs or paragraphs (9) or (10) of Section 2.9.1.1, Preferred Voltage Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs).

(2) A Requesting Entity, through its Authorized Representative, may initiate a request for an extension under this Section by submitting written notice of the request to ERCOT through the RIOO system (or as otherwise specified by ERCOT), with the following information ~~as available or reasonably obtainable~~:

(a) Requesting Entity Name;

(b) Requesting Entity DUNS Number;

(c) IBR/WGR Site Name;

(d) IBR/WGR Unit Name(s);

(e) Nodal Operating Guide Section(s) under which the extension is requested;

(f) A detailed description of the grounds for the extension and the basis for each request;

(g) Documentation from the equipment manufacturer describing any known limitations associated with the extension request, a description of proposed modifications, and a schedule for implementing modifications; and

(h) Other information specified in this Section ~~applicable to specific requests~~.

~~(3) A Requesting Entity may submit a report pursuant to Section 2.12, Ride-Through Reporting Requirements with the information specified in paragraph (2) above, and such report shall also serve as the request for an extension. A Requesting Entity may use the same form of report for future extension requests.~~

(34) The Requesting Entity for an IBR with an SGIA executed on or after ~~June~~August 1, 2024, seeking an extension contemplated in paragraph (6) of Section 2.9.1, or paragraph~~s~~ ~~(9) or~~ (10) of Section 2.9.1.1, shall, at a minimum, submit the following information to ERCOT:

(a) Documentation describing the justification for granting the extension;

(b) A model accurately representing all technical limitations and expected performance;

(c) A description of any limitation that cannot be accurately represented in a model;

(d) Data and information identified in paragraphs (5) through (7) below, as applicable; and

(e) Any other data or information ERCOT reasonably deems necessary to evaluate granting the extension.

(4~~5~~) If a Requesting Entity submits a request for an extension to meet the performance requirements in sections 5, 7, and 9 of the Institute of Electrical and Electronics Engineers (IEEE) 2800-2022, Standard for Interconnection and Interoperability of Inverter-Based Resources (IBRs) Interconnecting with Associated Transmission Electric Power Systems ("IEEE 2800-2022 standard") as described in paragraph (6) of Section 2.9.1, it must provide to ERCOT:

(a) Evidence from its original equipment manufacturer (or subsequent inverter/turbine vendor support company if the original equipment manufacturer

is no longer in business) of technical infeasibility to comply with any of the performance requirements in sections 5, 7, and 9 of the IEEE 2800-2022 standard by its synchronization date;

(b) A description of proposed modifications; and

(c) The schedule for implementing those modifications. Any temporary extension shall be minimized and not extend beyond December 31, 2028 or 24 months after the Resource's Commercial Operations Date, whichever is earlier.

(56) ~~If a Requesting Entity submits a request for an extension to meet the performance requirements in paragraph (7) as contemplated in paragraph (9) of Section 2.9.1.1, it must provide to ERCOT:~~

~~(a) Evidence from its equipment manufacturer of technical infeasibility to comply with the performance requirements in paragraph (7) of Section 2.9.1.1 by its synchronization date;~~

~~(b) A description of proposed modifications; and~~

~~(c) The schedule for implementing those modifications. Any extensions under this paragraph shall be minimized and not extend beyond December 31, 2028.~~

~~(7)~~ If a Requesting Entity submits a request for an extension to meeting the performance requirements in Table~~s~~ A ~~or C~~ in paragraph (1) as contemplated in paragraph (10) of Section 2.9.1.1, it must provide to ERCOT:

(a) Documented evidence from its equipment manufacturer of technical infeasibility to comply with the performance requirements in paragraph (1) of Section 2.9.1.1 by the IBR's/WGR's synchronization date;

(b) A description of proposed modifications; and

(c) The schedule for implementing those modifications. Any extensions under this paragraph shall be minimized and not extend beyond December 31, 2028. ERCOT will not grant any temporary extensions for performance that do not meet the voltage ride-through performance requirements in Table A in paragraph (1) of Section 2.9.1.2.

(6~~8~~) Extensions will terminate according to their terms at the time granted or at another date approved by ERCOT in writing.

2.12~~3~~.1.3 Timeline for Submission and Determination of ~~Exemption and~~ Extension Requests

(1) As soon as practicable after~~Not later than ten Business Days of~~ receiving a request for an ~~exemption or~~ extension, ERCOT shall provide the Requesting Entity with written confirmation of receipt and notification that either:

(a) The submission was complete and ERCOT is reviewing the request; or

(b) The submission was incomplete. For incomplete submissions, ERCOT will:

(i) Identify the missing information; and

(ii) Provide instructions for the Requesting Entity to submit the missing information (e.g., to ERCOT Legal at MPRegistration@ercot.com or through the RIOO system).

(2) Unless otherwise agreed by ERCOT, not later than ten Business Days of receiving a notice of an incomplete submission, the Requesting Entity shall submit the missing information to ERCOT through the RIOO system or as otherwise directed by ERCOT or request ~~that it needs~~ additional time to provide the additional information~~, along~~ with an explanation for the delay.

(3) Within seven days after ERCOT acknowledges receiving a complete request for ~~exemption or~~ extension, ERCOT shall designate an ERCOT senior representative with decision-making authority to participate in discussions with the Requesting Entity regarding the ~~exemption or~~ extension request.

(4) During the time ERCOT considers an ~~exemption or~~ extension request, ERCOT and the Requesting Entity will cooperate in requesting and providing relevant information to develop a complete record to allow an effective and efficient review process.

(5~~3~~) ERCOT shall make reasonable efforts to complete ~~an exemption~~ or extension request process within 180 days after receiving a complete request for an ~~exemption or~~ extension. If ERCOT cannot complete its review of the request within that time period, ERCOT shall provide the Requesting Entity an estimate of the additional time needed to complete its review.~~Not later than 180 days of receiving a request for an exemption or extension or as otherwise agreed to in writing by the Parties,~~ ERCOT shall provide the Requesting Entity with written notification that ERCOT has completed its review and ERCOT's determination that the ~~exemption or~~ extension is:

(a) Approved;

(b) Approved in part, along with details of the approved part of the ~~exemption or~~ extension, and a detailed explanation for denying part of the ~~exemption or~~ extension request; or

(c) Rejected, along with details explaining the grounds upon which ERCOT rejected the ~~exemption or~~ extension request.

~~2.123.1.4 Procedure for Appealing an ERCOT Decision to Reject an Exemption or Extension Request~~

(61) Upon issuance of ERCOT's decision on an ~~the exemption or~~ extension request, the Requesting Entity adversely affected may appeal ERCOT's decision to the Public Utility Commission of Texas (PUCT) pursuant to P.U.C. PROC. R. 22.251, Review of Electric Reliability Council of Texas (ERCOT) Conduct. For such an appeal, the Requesting Entity is not required to comply with Protocol Section 20, Alternative Dispute Resolution Procedure and Procedure for Return of Settlement Funds. ~~Not later than ten Business Days of receiving written notification of ERCOT's decision to reject, in full or in part, an exemption or extension request, the Requesting Entity may challenge the rejection using the appeal process set forth herein.~~

~~(2) For purposes of appealing an ERCOT decision to reject an exemption or extension request, the Requesting Entity is not required to comply with Protocol Section 20, Alternative Dispute Resolution. Nothing in this procedure for appealing an ERCOT determination to reject an exemption or extension request should limit or restrict the right of the Requesting Entity to file a petition seeking direct relief from the PUCT or other Governmental Authority without first exhausting this procedure or any other ERCOT dispute procedures where actual or threatened action by ERCOT could cause irreparable harm to the Requesting Entity or its impacted IBR(s)/WGR(s), and where such harm cannot be addressed within the time permitted under the process set forth in Section 2.13, Procedures for Frequency and Voltage Ride-Through Exemptions, Extensions and Appeals.~~

(723) A Requesting Entity that does not submit a notice of appeal to ERCOT within the required time period ~~ten Business Days of~~ after receiving ERCOT's notice rejecting the ~~exemption or~~ extension request is deemed to have accepted ERCOT's decision.

~~***2.13.1.4.1 Appeal Process and Timeline***~~

~~(1) To initiate an appeal of ERCOT's rejection of an exemption or extension request, the Requesting Entity must submit the following information to the ERCOT Legal Department at MPRegistration@ercot.com:~~

~~(a) Requesting Entity Name;~~

~~(b) Requesting Entity DUNS Number;~~

~~(c) IBR/WGR Site Name;~~

~~(d) IBR/WGR Unit Name(s);~~

~~(e) A description of the relief sought;~~

~~(f) A detailed description of the grounds for the relief;~~

~~(g) Any information or documentation in support of the grounds for relief; and~~

~~(h) Designation of a primary dispute representative.~~

~~(2) The date on which ERCOT receives the Requesting Entity's notice of appeal shall be the appeal initiation date.~~

~~(3) Not later than three Business Days of the appeal initiation date, ERCOT shall provide the Requesting Entity with written confirmation of receipt and the designation of the ERCOT dispute representative. The ERCOT dispute representative should be an executive-level employee with decision-making authority.~~

~~(4) Within ten Business Days of the appeal initiation date, the Requesting Entity may request an appeal with ERCOT to provide the Requesting Entity an opportunity to provide any clarification or information supporting the appeal. The appeal must be scheduled to occur at a mutually convenient time within 30 days of the appeal initiation date. The appeal may be in-person or remote.~~

~~(5) Within ten Business Days of the appeal meeting, or if an appeal meeting is not requested by the Requesting Entity, then within 30 days of the appeal initiation date, ERCOT will provide the Requesting Entity with notice of its appeal decision, including an explanation of the rationale if ERCOT denies the Requesting Entity's appeal in whole or part.~~

~~(6) If ERCOT denies a Requesting Entity's appeal of ERCOT's decision to reject an exemption or extension request, in whole or in part, the Requesting Entity may seek relief from the PUCT pursuant to 16 Texas Administrative Code (TAC) §22.251. For such an appeal, the Resource Entity or IE is not required to comply with Protocol Section 20, Alternative Dispute Resolution Procedure and Procedure for Return of Settlement Funds.~~

2.134 Actions Following a Transmission-Connected Inverter-Based Resource (IBR), Type 1 Wind-Powered Generation Resource (WGR) or Type 2 WGR ~~an~~ Apparent Failure to Ride-~~t~~Through

(1) The ~~R~~required ride-through performance criteria ("Required Criteria") ~~is~~are defined in Section 2.6.2.1, Temporary Frequency Ride-through Requirements for Transmission-Connected Inverter-Based Resources (IBRs), ~~and~~ Type 1 Wind-Powered Generation Resources (WGRs) and Type 2 ~~Wind-Powered Generation Resources (~~WGRs~~)~~, and Section 2.9.1, Voltage Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs), ~~and~~ Type 1 Wind-Powered Generation Resources (WGRs), ~~and~~ Type 2 ~~Wind-Powered Generation Resources (~~WGRs and Type 3 WGRs~~)~~. For any Inverter-Based Resource (IBR), Type 1 Wind-powered Generation Resource (WGR) or Type 2 WGR with an approved exemption or extension for the ride-through requirements, the Resource's documented maximum ride-through capabilities are the ride-through performance requirements for compliance purposes for the duration of the exemption or extension unless otherwise ~~excused~~indicated by Governmental Authority rules or regulations. All IBRs, Type 1 WGRs and Type 2 WGRs shall strive to meet or exceed the Required Criteria to the fullest extent their equipment allows.

(2) For any IBR, Type 1 WGR or Type 2 WGR with an approved exemption or extension for the ride-through requirements, the Resource's documented maximum ride-through capabilities are the ride-through performance requirements for compliance purposes for the duration of the exemption or extension unless otherwise indicated by Governmental Authority rules or regulations. Any IBR with documented maximized ride-through capabilities that exceed the applicable Required Criteria and fails to ride-through a disturbance within the IBR's documented maximized capabilities is also subject to this Section.

(3~~2~~) If an IBR, Type 1 WGR or Type 2 WGR does not ride-through in accordance with the applicable ride-through performance requirements, including its maximized capabilities (an "Apparent Performance Failure"), the Resource Entity shall, as soon as practicable~~and to the extent such information is available or can be reasonably obtained~~:

(a) Investigate the ~~event~~Apparent Performance Failure;

(b) Report to ERCOT the cause of the Apparent Performance Failure~~ via the Resource Integration and Ongoing Operations (RIOO) system (or as otherwise directed by ERCOT)~~; and

(c) Perform model validation and report the results to ERCOT.

(4~~3~~) Following an Apparent Performance Failure, Transmission Service Providers (TSPs) directly impacted by the Apparent Performance Failure shall provide available information to ERCOT to assist with event analysis.

(5~~4~~) The Resource Entity for an IBR, Type 1 WGR, or Type 2 WGR ~~with a Standard Generation Interconnection Agreement (SGIA) executed prior to June 1, 2024, and which~~that experiences an Apparent Performance Failure shall:

(a) Develop a plan to ensure the IBR, Type 1 WGR, or Type 2 WGR meets the applicable ride-through performance requirements (whether documented maximized capability or Required Criteria, whichever applies);~~Submit to ERCOT a new exemption or extension request under Section 2.13, Procedures for Frequency and Voltage Ride-Through Exemptions, Extensions and Appeals, or update the information provided in any existing exemption or extension request to reflect new information arising from the Apparent Performance Failure, including, documented limitations that were previously unknown, and any known and available commercially reasonable modifications to mitigate the identified cause of such Apparent Performance Failure; and~~

(b) Submit the plan to ERCOT for approval within 90 days; and~~Make any such commercially reasonable modifications in accordance with the timelines in Section 2.11, Commercially Reasonable Efforts.~~

(c) If ERCOT approves the plan, implement the plan within 180 days, unless ERCOT approves a longer timeline.

~~(5) Unless approved by ERCOT, no existing IBR, Type 1 WGR, or Type 2 WGR with a documented exemption shall reduce the ride-through capability of the unit below its capability prior to the replacement or modification. Unless approved by ERCOT, no existing IBR, Type 1 WGR, or Type 2 WGR without a documented limited technical exemption to applicable requirements shall reduce the ride-through capability of the unit below the required ride-through capability.~~

~~(65) The Resource Entity for an IBR, Type 1 WGR, or Type 2 WGR with an SGIA executed after June 1, 2024, shall provide ERCOT with a mitigation plan to meet the applicable ride-through requirements as soon as practicable but no later than 180 days, unless a longer timeline is mutually agreed upon by the Resource Entity and ERCOT.~~

(6) To encourage all Resources to maximize all equipment frequency and voltage ride-through parameters to the maximum level the equipment allows and all new Resources to also design the plant to the utilize the inverter or converter capabilities to the fullest extent, any Apparent Performance Failure where system conditions at the Point of Interconnection Bus (POIB) exceeded the Required Criteria but remained below documented maximized frequency or voltage ride-through capabilities exceeding the applicable requirements in Sections 2.6.2, Frequency Ride-Through Requirements for Generation Resources and Energy Storage Resources, 2.9.1, 2.9.1.1, Preferred Voltage Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs) or 2.9.1.2, Legacy Voltage Ride-Through Requirements for Transmission-Connected Inverter-Based Resources (IBRs), Type 1 Wind-Powered Generation Resources (WGRs) and Type 2 WGRs, shall be reported to the Reliability Monitor only if the Resource Entity does not fully meet the requirements in paragraphs (3) and (5) above.

Revised ERCOT Impact Analysis Report

NOGRR Number	245	NOGRR Title	Inverter-Based Resource (IBR) Ride-Through Requirements
Impact Analysis Date		August 22, 2024	
Estimated Cost/Budgetary Impact		Between $150k and $250k See Comments. Annual Recurring Operations and Maintenance (O&M) Staffing Cost: Between $1.3M and $2.3M. Short term contract labor (O&M) Budget Cost: Between $0.5M and $0.8M. See ERCOT Staffing Impacts	
Estimated Time Requirements		The timeline for implementing this Nodal Operating Guide Revision Request (NOGRR) is dependent upon Public Utility Commission of Texas (PUCT) prioritization and approval. Estimated project duration: 6 to 9 months	
ERCOT Staffing Impacts (across all areas)		Implementation Labor: 100% ERCOT; 0% Vendor There will be ongoing operational impacts to the following ERCOT departments totaling between 7.7 to 9.8 Full-Time Employees (FTEs) to support this NOGRR: • Dynamic Studies (3.2 FTEs effort) • Resource Integration (1.0 FTE effort) • Event Analysis (1.3 FTEs effort) • Operations IBR Performance Evaluation (2.2 to 4.3 FTEs effort) ERCOT has assessed its ability to absorb the ongoing efforts of this NOGRR with current staff and concluded the need for FTEs in the following departments: • Dynamic Studies department (3 FTEs) • Resource Integration department (1 FTE) • Event Analysis department (1 to 2 FTEs) • Operations IBR Performance Evaluation department (2 to 4 FTEs) • Dynamic Studies - department requires three additional FTEs to support the following work: * 6,000 hours for data & performance reviews, tracking, coordination & communication between internal and external individuals.	

Revised ERCOT Impact Analysis Report

	• Resource Integration - department requires one additional FTE to support the INR process efforts: * 1,800 hours per year to check and collect data = 3 hours per INR for 600 INRs per year. • Event Analysis - department requires one to two additional FTEs to support an additional 5 events each year beyond current levels: * 2,500 hours to support additional events = 300 hours per minor event (5) ~ 1500 hours and 1000 hours to support NERC/FERC/TRE and ERCOT Reliability Monitor event investigations, manual contingency creation, and rule change needs. • Operations IBR Performance Evaluation - department requires two to four additional FTEs. *4,000 - 8,000 hours for review, tracking, coordination & communication with OEMs, Resource Entities and serve as SMEs for ERCOT Reliability Monitor for performance failures and mitigation, support for appeals, and coordinate with Dynamic Studies department as necessary.
ERCOT Computer System Impacts	The following ERCOT systems would be impacted: • Resource Integration and Ongoing Operations (RIOO) 99% • Service Management Systems 1%
ERCOT Business Function Impacts	ERCOT will update its business processes to implement this NOGRR.
Grid Operations & Practices Impacts	ERCOT will update grid operations and practices to implement this NOGRR.

Evaluation of Interim Solutions or Alternatives for a More Efficient Implementation
None offered.

Comments
Pending PUCT approval, ERCOT plans to manually implement NOGRR245; and collect data and information related to NOGRR245 via manual processes until Resource Integration and Ongoing Operations (RIOO) and Service Management Systems changes can be implemented.

Board Report

OBDRR Number	051	OBDRR Title	Related to NPRR1216, Implementation of Emergency Pricing Program
Date of Decision		August 20, 2024	
Action		Recommended Approval	
Estimated Impacts		Cost/Budgetary: None Project Duration: No project required	
Proposed Effective Date		Upon implementation of Nodal Protocol Revision Request (NPRR) 1216, Implementation of Emergency Pricing Program	
Priority and Rank Assigned		Not applicable	
Other Binding Document Requiring Revision		Methodology for Implementing ORDC to Calculate Real-Time Reserve Price Adder	
Related Documents Requiring Revision/Related Revision Requests		NPRR1216 Verifiable Cost Manual Revision Request (VCMRR) 039, Related to NPRR1216, Implementation of Emergency Pricing Program	
Revision Description		This Other Binding Document Revision Request (OBDRR) align this methodology with the system changes required for the Emergency Pricing Program (EPP).	
Reason for Revision		☐ Strategic Plan Objective 1 – Be an industry leader for grid reliability and resilience ☐ Strategic Plan Objective 2 - Enhance the ERCOT region's economic competitiveness with respect to trends in wholesale power rates and retail electricity prices to consumers ☐ Strategic Plan Objective 3 - Advance ERCOT, Inc. as an independent leading industry expert and an employer of choice by fostering innovation, investing in our people, and emphasizing the importance of our mission ☐ Administrative ☒ Regulatory requirements ☐ ERCOT Board/PUCT Directive	

Board Report

	(please select ONLY ONE – if more than one apply, please select the ONE that is most relevant)
Justification of Reason for Revision and Market Impacts	The system changes for the Emergency Pricing Program may require the Value of Lost Load (VOLL) to change mid-day. This change to the methodology will align any changes needed to the new value.
TAC Decision	On 2/14/24, TAC voted unanimously to table OBDRR051. All Market Segments participated in the vote. On 6/24/24, TAC voted unanimously to recommend approval of OBDRR051 as submitted. All Market Segments participated in the vote. On 7/31/24, TAC voted unanimously to recommend approval of the 6/24/24 TAC Report and the 1/23/24 Impact Analysis for OBDRR051. All Market Segments participated in the vote.
Summary of TAC Discussion	On 2/14/24, participants discussed the possibility of moving VOLL language out of this Other Binding Document and into the Protocols alongside other parameters and values proposed within NPRR1216. On 6/24/24, there was no additional discussion beyond TAC review of the items below. On 7/31/24, TAC reviewed the 1/23/24 Impact Analysis for OBDRR051.
TAC Review/Justification of Recommendation	[X] Revision Request ties to Reason for Revision as explained in Justification [X] Impact Analysis reviewed and impacts are justified as explained in Justification [X] Opinions were reviewed and discussed [X] Comments were reviewed and discussed [ ] Other: (explain)
ERCOT Board Decision	On 8/20/24, the ERCOT Board voted unanimously to recommend approval of OBDRR051 as recommended by TAC in the 7/31/24 TAC Report.

Opinions

Board Report

Credit Review	Not applicable
Independent Market Monitor Opinion	IMM has no opinion on OBDRR051.
ERCOT Opinion	ERCOT supports approval of OBDRR051.
ERCOT Market Impact Statement	ERCOT Staff has reviewed OBDRR051 and believes the market impact for OBDRR051, along with NPRR1216, implements the EPP as directed by the PUCT.

Sponsor	
Name	Dave Maggio
E-mail Address	david.maggio@ercot.com
Company	ERCOT
Phone Number	512-248-6998
Cell Number	
Market Segment	Not applicable

Market Rules Staff Contact	
Name	Cory Phillips
E-Mail Address	cory.phillips@ercot.com
Phone Number	512-248-6464

Comments Received	
Comment Author	**Comment Summary**
None	

Market Rules Notes

None

Proposed Other Binding Document Language Revision

1. PURPOSE

For each Security-Constrained Economic Dispatch (SCED) process, ERCOT calculates a Real-Time On-Line Reserve Price Adder (RTORPA) and a Real-Time Off-Line Reserve Price Adder

(RTOFFPA) based on the On-Line and Off-Line available reserves in the ERCOT System and the Operating Reserve Demand Curve (ORDC). The price after the addition of RTORPA to Locational Marginal Prices (LMPs) approximates the pricing outcome of Real-Time energy and Ancillary Service co-optimization since RTORPA captures the value of the opportunity cost of reserves based on the defined ORDC. Additionally, the Real-Time Off-Line Reserve Capacity (RTOFFCAP) shall be administratively set to zero when the SCED snapshot of the Physical Responsive Capability (PRC) is less than or equal to the PRC MW at which Energy Emergency Alert (EEA) Level 1 is initiated. An Ancillary Service imbalance Settlement is done based on Protocol Section 6.7.5, Real-Time Ancillary Service Imbalance Payment or Charge, to make Resources indifferent to the utilization of their capacity for energy or Ancillary Service reserves.

This document describes:

- The ERCOT Board-approved methodology that ERCOT uses for determining the Real-Time reserve price adders based on ORDC;
- The ERCOT Board-approved parameters for implementing ORDC; and
- The ERCOT Board-approved ORDC multi-step price floor.

2. METHODOLOGY FOR IMPLEMENTING ORDC

For each execution of SCED, the System Lambda of the power balance constraint will be determined and the ORDC will be based on analysis of the probability of reserves falling below the minimum contingency level (PBMCL) multiplied by the difference between Value of Lost Load (VOLL) and System Lambda. This approach is needed with the current rules in order to ensure that power balance is given the highest priority and can result in a reserve price that is near zero with an energy price near System-Wide Offer Cap (SWCAP) under scarcity conditions.

Determining the following values is a major part of implementing ORDC to calculate Real-Time Reserve Price Adder:

1. VOLL
2. PBMCL
3. RTORPA and RTOFFPA

2.1 Determine VOLL

The VOLL is a parameter for implementing the ORDC and is set ~~on a daily basis~~ to be equal to the SWCAP, as defined in Protocol Section 4.4.11, System-Wide Offer Caps.

2.2 Determine PBMCL

Another key part of the ORDC concept is the determination of the PBMCL. PBMCL is derived by making certain adjustments to the Loss of Load Probability curve (LOLP). LOLP is the probability, at a given level of reserves, of the occurrence of a loss of reserves greater than the reserve level and is therefore determined by calculating the mean and standard deviation of differences between the hour-ahead forecasted reserves and the reserves that were available in

Real-Time during the Operating Hour using historical data, as described in greater detail, below. The LOLP curve is defined as follows:

$$LOLP(\mu, \sigma, R) = 1 - CDF(\mu, \sigma, R)$$

Where CDF is the Cumulative Distribution Function of the normal distribution with mean μ and standard deviation σ.

Once the LOLP curve is derived, ERCOT creates a Shifted Loss of Load Probability (SLOLP) curve. The SLOLP is the LOLP with mean μ shifted by the factor S * σ, and for a given value reserve level R can be calculated as:

$$SLOLP(\mu_s, \sigma, R) = 1 - CDF(\mu_s, \sigma, R)$$

Where $\mu_s = \mu + S * \sigma$ and CDF is the Cumulative Distribution Function of a normal distribution with mean μ_s and standard deviation σ.

The last step in determining PBMCL is shifting the SLOLP curve further to the right by a defined minimum contingency level, *X*, and setting the value of SLOLP to one for reserve levels below the minimum contingency level. The PBMCL curve for a given reserve level (R) is determined as follows:

$$\pi(R) = \begin{cases} SLOLP(R - X), & R - X > 0 \\ 1 & , R - X \leq 0 \end{cases}$$

The detailed logic for determining LOLP is described as below:

1) For each Operating Hour in the study period, calculate the system-wide Hour-Ahead (HA) reserve using the snapshot of last Hourly Reliability Unit Commitment (HRUC) for the Operating Hour (at the end of Adjustment Period):

HA Reserve = RUC On-Line Gen COP HSL – (RUC Load Forecast + RUC DCTIE Load) + RUC On-Line Load COP Non-Spin Responsibility + RUC On-Line Load COP Reg-Up Responsibility + RUC On-Line Load COP RRS Responsibility + RUC On-Line Load COP ECRS Responsibility + RUC Off-Line Gen COP OFFNS HSL + RUC Off-Line Gen COP CST30HSL

[OBDRR040: Replace the formula "HA Reserve" above with the following upon system implementation of NPRR1131:]

HA Reserve = RUC On-Line Gen COP HSL – (RUC Load Forecast + RUC DCTIE Load) + RUC On-Line NCLR and CLR COP Non-Spin Responsibility + RUC On-Line CLR COP Reg-Up Responsibility + RUC On-Line NCLR and CLR COP RRS Responsibility + RUC On-line NCLR and CLR COP ECRS Responsibility + RUC Off-Line Gen COP OFFNS HSL + RUC Off-Line Gen COP CST30HSL

The calculation above excludes the following Generation Resources:

(a) Nuclear Resources; and

(b) Resources with ONTEST Current Operating Plan (COP) Status.

[OBDRR017: Insert the language below upon system implementation of NPRR987:]

For the purpose of calculating the HA Reserve, the component of an Energy Storage Resource (ESR) that is modeled as a Generation Resource is considered a Generation Resource and the component of an ESR that is modeled as a Controllable Load Resource is considered a Load Resource.

2) For each SCED interval in the study period, calculate the system-wide available SCED reserve using SCED telemetry and solution as:

SCED Reserve = SCED On-Line Gen HSL – SCED Gen Base Point + SCED On-Line Load Telemetry RRS Schedule + SCED On-Line Load Telemetry Reg-Up Responsibility + SCED On-Line Load Telemetry Non-Spin Schedule + SCED On-Line Load Telemetry ECRS Schedule + SCED Off-Line Gen OFFNS HSL + SCED Off-Line RTCST30HSL – SCED under-generation Power Balance MW

[OBDRR017, OBDRR028, and OBDRR040: Replace applicable portions of the formula "SCED Reserve" above with the following upon system implementation of NPRR987, NPRR1069, or NPRR1131, respectively:]

SCED Reserve = SCED On-Line Gen HSL (excluding ESR Gens) – SCED Gen Base Point (excluding ESR Gens) + SCED On-Line ESR Capacity + Min (SCED CLR Base Point – SCED On-Line CLR LPC, SCED On-Line CLR Reg-Up Responsibility + SCED On-Line CLR RRS Responsibility + SCED On-Line CLR Non-Spin Responsibility + SCED On-Line CLR ECRS Responsibility) + SCED On-Line NCLR Telemetry RRS Schedule + SCED On-Line NCLR Telemetry Non-Spin Schedule + SCED On-Line NCLR Telemetry ECRS Schedule + SCED Off-Line Gen OFFNS HSL (excluding ESR-Gens) + SCED Off-Line RTCST30HSL (excluding ESR-Gens) – SCED under-generation Power Balance MW

The calculation above excludes the following Generation Resources:

(a) Nuclear Resources;

(b) Resources with telemetered net real power (in MW) less than 95% of their telemetered Low Sustained Limit (LSL); and

(c) Resources with a telemetered status of:

(i) ONTEST or ONHOLD;

(ii) STARTUP (except Resources with Non-Spinning Reserve (Non-Spin) Ancillary Service Resource Responsibility greater than zero); or

(iii) SHUTDOWN.

[OBDRR017: Insert the language below upon system implementation of NPRR987:]

The *SCED On-Line ESR Capacity* is defined as:

$$Min(\text{ESR-Gen } HSL - \text{ESR-Gen } Base\ Point, \frac{SOC_s^{Telem} - SOC_s^{OperMin}}{\Delta t}) + \text{ESR-CLR } Base\ Point$$

$$Where\ \Delta t = \frac{1}{4}\ hour$$

3) For each Operating Hour in the study period, calculate the hourly average system-wide SCED reserve by averaging the interval SCED reserve in step 2).

4) For each Operating Hour in the study period, calculate the system-wide Reserve Error as:

Reserve Error = HA Reserve – SCED Reserve (Hourly Average) + Firm_Load_Shed (Hourly Average)

5) Calculate the mean (μ) and standard deviation (σ) using the calculated Reserve Error in step 4) for the study period. This μ and σ are then used to determine the PBMCL curve as described above.

2.2.1 Calculation of R_s and R_{sns}

R_s is the reserves from Resources participating in SCED plus the Regulation Up Service (Reg-Up) and Responsive Reserve (RRS) from Load Resources and the additional available capacity from Load Resources other than Controllable Load Resources (CLRs) with a validated Real-Time RRS or ERCOT Contingency Reserve Service (ECRS) Schedule. R_{sns} is equal to R_s plus the reserves from Resources that are not currently available to SCED but could be available in 30 minutes.

1) R_s is calculated based on SCED telemetry and solution as:

$$R_s = RTOLCAP = RTOLHSL - RTBP + RTCLRCAP + RTNCLRCAP - RTOLNSRS - RTPBPC$$

[OBDRR009 and OBDRR017: Replace applicable portions of the formula "R_s" above with the following upon system implementation of OBDRR009 or NPRR987 as applicable:]

$$R_s = RTOLCAP = RTOLHSL - RTBP + RTCLRCAP + RTNCLRCAP + RTESRCAP - RTOLNSRS - RTPBPC + RTCDCTF$$

Where

$$RTCLRCAP = RTCLRBP - RTCLRLPC - RTCLRNS + RTCLRREG$$

[OBDRR040: Replace the formula "RTCLRCAP" above with the following upon system implementation of NPRR1131:]

$$RTCLRCAP = RTCLRBP - RTCLRLPC$$

*RTNCLRCAP = Min(Max(RTNCLRNPC – RTNCLRLPC,0.0), (RTNCLRECRS + RTNCLRRRS) * 1.5)*

[OBDRR017: Insert the language below upon system implementation of NPRR987:]

For ESRs:

$$RTESRCAP = Min(\text{ESR-Gen } HSL - \text{ESR-Gen } Base\ Point, \frac{SOC_s^{Telem} - SOC_s^{OperMin}}{\Delta t}) + \text{ESR-CLR } Base\ Point$$

$$Where\ \Delta t = \frac{1}{4}\ hour$$

[OBDRR009: Insert the formula "RTCDCTF" below upon system implementation:]

RTCDCTF = RTCDCTICL + RTCDCTICE – RTCDCTI + RTCDCTE – RTCDCTEC

Where:

- *RTOLCAP* is the system total Real-Time On-Line reserve capacity of all On-Line Resources for the SCED interval.
- *RTOLHSL* is the system total Real-Time telemetered High Sustained Limits (HSLs) for all Generation Resources available to SCED for the SCED interval, discounted by the system-wide discount factor, except for the following:
  - Nuclear Resources;

[OBDRR017: Insert the language below upon system implementation of NPRR987:]

  - ESRs;

  - Resources with telemetered net real power (in MW) less than 95% of their telemetered LSL;
  - Resources with a Verbal Dispatch Instruction (VDI) to deploy Firm Fuel Supply Service (FFSS); and
  - Resources with a telemetered Resource Status of:
    - ONTEST or ONHOLD;
    - ONRUC (including On-Line Reliability Must-Run (RMR) Resources but excluding those Reliability Unit Commitment (RUC) Resources that have been awarded a Day-Ahead Market (DAM) Three-Part Supply Offer for the hour);
      - For a Combined Cycle Generation Resource with a Resource Status of ONRUC that was RUC-committed from one On-Line configuration to a different configuration with additional capacity, the exclusion is equal to the maximum of zero and the telemetered HSL value minus the COP HSL of the Qualified Scheduling Entity (QSE)-committed configuration for the RUC hour at the snapshot time of the RUC instruction.
    - STARTUP (except for Resources with Non-Spin Ancillary Service Resource Responsibility greater than zero); or

- SHUTDOWN.

- *RTBP* is the system total SCED Base Points for all Generation Resources (excluding nuclear Resources, Resources with a telemetered ONTEST, ONHOLD, STARTUP (except Resources with Non-Spin Ancillary Service Resource Responsibility greater than zero), or SHUTDOWN Resource Status and Resources with telemetered net real power (in MW) less than 95% of their telemetered LSL) for the SCED interval discounted by the system-wide discount factor.

[OBDRR017: Replace the variable "RTBP" above with the following upon system implementation of NPRR987:]

- *RTBP* is the system total SCED Base Points for all Generation Resources (excluding nuclear Resources, ESRs, Resources with a telemetered ONTEST, ONHOLD, STARTUP (except Resources with Non-Spin Ancillary Service Resource Responsibility greater than zero), or SHUTDOWN Resource Status and Resources with telemetered net real power (in MW) less than 95% of their telemetered LSL) for the SCED interval discounted by the system-wide discount factor.

- *RTCLRCAP* is the system total Real-Time capacity from CLRs for the SCED interval. It is the sum of SCED Base Points less the telemetered CLR LSL and Non-Spin Schedule for all CLRs.

[OBDRR017, OBDRR028, and OBDRR040: Replace applicable portions of the variable "RTCLRCAP" above with the following upon system implementation of NPRR987, NPRR1069, or NPRR1131, respectively:]

- *RTCLRCAP* is the system total Real-Time capacity from CLRs for the SCED interval. It is the sum of SCED Base Points less the telemetered CLR LSL.

- *RTNCLRCAP* is the system total Real-Time capacity for all Load Resources other than CLRs that have a validated Real-Time RRS or ECRS Ancillary Service Schedule for the SCED interval.
- *RTPBPC* is the system total SCED under-generation Power Balance MW violated for the SCED interval.
- *RTNCLRNPC* is the system total Real-Time net real power consumption from all Load Resources other than CLRs that have a validated Real-Time RRS Ancillary Service Schedule for the SCED interval discounted by the system-wide discount factor.
- *RTNCLRLPC* is the system total Real-Time Low Power Consumption (LPC) from all Load Resources other than CLRs that have a validated Real-Time RRS Ancillary Service Schedule for the SCED interval discounted by the system-wide discount factor.
- *RTNCLRRRS* is the system total Real-Time RRS Ancillary Service Responsibilities from all Load Resources other than CLRs for the SCED interval discounted by the system-wide discount factor.

- *RTNCLRECRS* is the system total Real-Time telemetered ECRS Ancillary Service Responsibilities from all Load Resources other than CLRs for the SCED interval discounted by the system-wide discount factor.
- *RTOLNSRS* is the system total Real-Time telemetered On-Line Non-Spin Ancillary Service Schedule for all On-Line Generation Resources for the SCED interval discounted by the system-wide discount factor.

[OBDRR028: Replace the variable "RTOLNSRS" above with the following upon system implementation of NPRR1069:]

- *RTOLNSRS* is the system total Real-Time telemetered On-Line Non-Spin Ancillary Service Schedule for all On-Line Generation Resources, excluding the ESR-Gen, for the SCED interval discounted by the system-wide discount factor.

- *RTCLRBP* is the system total SCED Base Points from CLRs for the SCED interval discounted by the system-wide discount factor.

[OBDRR017 and OBRR028: Replace applicable portions of the variable "RTCLRBP" above with the following upon system implementation of NPRR987 or NPRR1069, respectively:]

- *RTCLRBP* is the system total SCED Base Points from CLRs for the SCED interval, excluding ESR-CLRs, discounted by the system-wide discount factor.

- *RTCLRLPC* is the system total Real-Time telemetered LPC from CLRs for the SCED interval discounted by the system-wide discount factor.

[OBDRR017 and OBDRR028: Replace applicable portions of the variable "RTCLRLPC" above with the following upon system implementation of NPRR987 or NPRR1069, respectively:]

- *RTCLRLPC* is the system total Real-Time telemetered LPC from CLRs for the SCED interval, excluding ESR-CLRs, discounted by the system-wide discount factor.

- *RTCLRREG* is the system total validated capacity from CLRs with Primary Frequency Response (not SCED qualified) Reg-Up Ancillary Service Schedule discounted by the system-wide discount factor.

[OBDRR017 and OBDRR028: Replace applicable portions of the variable "RTCLRREG" above with the following upon system implementation of NPRR987 or NPRR1069, respectively:]

- *RTCLRREG* is the system total validated capacity from CLRs with Primary Frequency Response (not SCED qualified), excluding ESR-CLRs, Regulation-Up Ancillary Service Schedule discounted by the system-wide discount factor.

[OBDRR040: Delete the variable "RTCLRREG" above upon system implementation of NPRR1131.]

- *RTCLRNS* is the system total validated Real-Time telemetered Non-Spin Ancillary Service Schedules from CLRs for the SCED interval discounted by the system-wide discount factor.

[OBDRR028: Replace the variable "RTCLRNS" above with the following upon system implementation of NPRR1069:]

- *RTCLRNS* is the system total validated Real-Time telemetered Non-Spin Ancillary Service Schedules from CLRs, excluding the ESR-CLR, for the SCED interval discounted by the system-wide discount factor.

[OBDRR040: Delete the variable "RTCLRNS" above upon system implementation of NPRR1131.]

[OBDRR017 and OBDRR028: Insert applicable portions of the variables "RTESRCAP", "ESR-Gen", "ESR-CLR", and "SOC" below upon system implementation of NPRR987 or NPRR1069, respectively:]

- *RTESRCAP* is provided by ESRs and considers energy limitations of the Storage Resources and potentially higher RTOLCAP contribution when charging. To consider energy limitations, a specific time period is required. This time period is 15 minutes. This value will exclude ESR-Gen with a telemetered Resource Status of:
  - ONTEST or ONHOLD;
  - STARTUP (except for Resources with Non-Spin Ancillary Service Resource Responsibility greater than zero); or
  - SHUTDOWN.
- *ESR-Gen* is the Energy Storage Resource modeled as Generation Resource when generating or idle.
- *ESR-CLR* is the Energy Storage Resource modeled as CLR when charging.
- *SOC* is the state of charge.

[OBDRR009: Insert the variable "RTCDCTF" below upon system implementation:]

- *RTCDCTF* is the total Real-Time change in Direct Current Tie (DC Tie) flows limited to +/- 1,250 MW in a single interval when ERCOT directs the following actions:
  - RTCDCTI is the ERCOT-directed DC Tie imports during an EEA or transmission emergency;
  - RTCDCTICL is the curtailment of DC Tie imports below the higher of DC Tie advisory import limit as of 0600 in the Day-Ahead or subsequent advisory import limit to address local transmission system limitations;
  - RTCDCTICE is the curtailment of DC Tie imports below the higher of DC Tie advisory import limit as of 0600 in the Day-Ahead or subsequent advisory import limit due to an emergency action by a neighboring system operator during an emergency that is accommodated by ERCOT;
  - RTCDCTE is the ERCOT-directed DC Tie exports to address emergency conditions in the receiving electric grid; or
  - RTCDCTEC is the curtailment of DC Tie exports below the higher of DC Tie advisory export limit as of 0600 in the Day-Ahead or subsequent advisory export limit during EEA, a transmission emergency, or to address local transmission system limitations.

2) R_{sns} is calculated based on SCED telemetry and solution as:

$$R_{sns} = RTOLCAP + RTOFFCAP$$

$$RTOFFCAP = RTCST30HSL + RTOFFNSHSL + RTCLRNS + RTNCLRNSCAP + RTOLNSRS + RTRUCCST30HSL$$

[OBDRR040: Replace the formula "RTOFFCAP" above with the following upon system implementation of NPRR1131:]

$$RTOFFCAP = RTCST30HSL + RTOFFNSHSL + RTNCLRNSCAP + RTOLNSRS + RTRUCCST30HSL$$

$$RTNCLRNSCAP = Min(Max(RTNCLRNPC - RTNCLRLPC, 0.0), RTNCLRNS * 1.5)$$

Where:

- *RTOLCAP* is the system total Real-Time On-Line reserve capacity of all On-Line Resources for the SCED interval.
- *RTOFFCAP* is the system total Real-Time Off-Line reserve capacity for the SCED interval.
- *RTCST30HSL* is the system total Real-Time telemetered HSLs of Generation Resources, excluding Intermittent Renewable Resources (IRRs), that have telemetered an OFF Resource Status and can be started from a cold temperature state in 30 minutes and discounted by the system-wide discount factor.

[OBDRR028: Replace the variable "RTCST30HSL" above with the following upon system implementation of NPRR1069:]

- *RTCST30HSL* is the system total Real-Time telemetered HSLs of Generation Resources, excluding Intermittent Renewable Resources (IRRs) and ESR-Gen, that have telemetered an OFF Resource Status and can be started from a cold temperature state in 30 minutes and discounted by the system-wide discount factor.

- *RTNCLRNSCAP* is the system total Real-Time capacity for all Load Resources that are not CLRs and that have a validated Real-Time Non-Spin Ancillary Service Schedule for the SCED interval.
- *RTNCLRNPC* is the system total Real-Time net real power consumption from all Load Resources that are not CLRs and that have a validated Real-Time Non-Spin Ancillary Service Schedule for the SCED interval discounted by the system-wide discount factor.
- *RTNCLRLPC* is the system total Real-Time LPC from all Load Resources that are not CLRs and that have a validated Real-Time Non-Spin Ancillary for the SCED interval discounted by the system-wide discount factor.
- *RTNCLRNS* is the system total Real-Time Non-Spin Ancillary Service Responsibilities from all Load Resources that are not CLRs for the SCED interval discounted by the system-wide discount factor.
- *RTCLRNS* is the system total validated Real-Time telemetered Non-Spin Ancillary Service Schedules from CLRs for the SCED interval discounted by the system-wide discount factor.

[OBDRR028: Replace the variable "RTCLRNS" above with the following upon system implementation of NPRR1069:]

- *RTCLRNS* is the system total validated Real-Time telemetered Non-Spin Ancillary Service Schedules from CLRs, excluding ESR-CLRs, for the SCED interval discounted by the system-wide discount factor.

[OBDRR040: Delete the variable "RTCLRNS" above upon system implementation of NPRR1131.]

- *RTOLNSRS* is the system total validated Real-Time telemetered On-Line Non-Spin Ancillary Service Schedule for all On-Line Generation Resources for the SCED interval discounted by the system-wide discount factor.

[OBDRR028: Replace the variable "RTOLNSRS" above with the following upon system implementation of NPRR1069:]

- *RTOLNSRS* is the system total validated Real-Time telemetered On-Line Non-Spin Ancillary Service Schedule, excluding ESR-Gen, for all On-Line Generation Resources for the SCED interval discounted by the system-wide discount factor.

- *RTOFFNSHSL* is the system total telemetered HSLs of Generation Resources that have telemetered an OFFNS Resource Status and discounted by the system-wide discount factor.

[OBDRR028: Replace the variable "RTOFFNSHSL" above with the following upon system implementation of NPRR1069:]

- *RTOFFNSHSL* is the system total telemetered HSLs of Generation Resources, excluding ESR-Gen, that have telemetered an OFFNS Resource Status and discounted by the system-wide discount factor.

- *RTRUCCST30HSL* is the system total Real-Time On-Line telemetered HSLs of ONRUC Resources that are qualified for RTCST30HSL for the SCED interval.

[OBDRR028: Replace the variable "RTRUCCST30HSL" above with the following upon system implementation of NPRR1069:]

- *RTRUCCST30HSL* is the system total Real-Time On-Line telemetered HSLs of ONRUC Resources, excluding ESR-Gen, that are qualified for RTCST30HSL for the SCED interval.

The system-wide discount factor used to discount inputs used in the calculation of reserves R_s and R_{sns} is calculated as the average of the currently approved Reserve Discount Factors (RDFs) applied to the temperatures from the current Season from the prior year.

2.2.2 Calculation of $\pi_S(R_S)$ and $\pi_{NS}(R_{SNS})$

$\pi_S(R_S)$ and $\pi_{NS}(R_{SNS})$ are functions that describe the PBMCL at various reserve levels.

1) Calculation of Curve $\pi_S(R_S)$:

$\pi_S(R_S)$ is a function of the Real-Time reserves that should be available in the first 30 minutes of the hour and is intended to capture the PBMCL for that level of reserves. The general equation for $\pi_S(R_S)$ is:

$$\pi_S(R_S) = \begin{cases} SLOLP_S(R_S - X), & R_S - X > 0 \\ 1 & , R_S - X \leq 0 \end{cases}$$

Where:

- *X in this equation is the minimum contingency level*
- *$SLOLP_S$ is the Shifted LOLP function for the spinning reserve.*

SLOLP$_S$ is different from the 60 minutes *SLOLP*, which is calculated based on the hourly error analysis. The reserves are classified into two categories; those that are being provided by Resources in SCED and Load Resources providing Reg-Up and RRS and those that are being provided by Resources that are not currently available to SCED but could be made available in 30 minutes. Since the first reserve type is available immediately, those reserves are the only ones considered to be available to respond to any event that happens in the first 30 minutes of the hour. All reserve types are then considered to be available to respond to events that happen in the second 30 minutes of the hour. Because the error analysis is hourly, to capture the events within the first 30 minutes for $\pi_S(R_S)$, the distribution parameters need to be scaled to reflect the 30 minute timeframe, with $\delta = 0.5$ hour:

$$\mu_s' = \delta * \mu_s = 0.5\mu_s$$

$$\sigma' = \frac{\delta}{\sqrt{\delta^2 + (1-\delta)^2}} * \sigma = 0.707\sigma$$

So the *SLOLP*$_S$ can be calculated based on the 60 minute *SLOLP* as follows:

$$SLOLP_s(\mu_s', \sigma', R) = SLOLP(0.5\mu_s, 0.707\sigma, R) = 1 - CDF(0.5\mu_s, 0.707\sigma, R)$$

2) Calculation of Curve $\pi_{NS}(R_{SNS})$:

$\pi_{NS}(R_{SNS})$ is a function of all the Real-Time reserves that can be expected to be available within the hour and is intended to capture the PBMCL for that level of reserves. The general equation for $\pi_{NS}(R_{SNS})$ is:

$$\pi_{NS}(R_{SNS}) = \begin{cases} SLOLP(R_{SNS} - X), & R_{SNS} - X > 0 \\ 1 & , R_{SNS} - X \leq 0 \end{cases}$$

This is similar to $\pi_S(R_S)$ but the key differences here are the types of reserves considered and the μ and σ that are used in calculating SLOLP

- *The total On-Line and Off-Line applies for the full change in net Load over the hour and there is no scaling adjustments needed for* μ_s and σ *in the* $\pi_{NS}(R_{SNS})$ *calculations to account for timeframe differences*
- *X in this equation is the minimum contingency level*

2.3 Determination of Price Adders (RTORPA and RTOFFPA)

Once PBMCL is determined, the Real-Time On-Line Reserve Price Adder (RTORPA) and Real-Time Off-Line Reserve Price Adder (RTOFFPA) for each SCED interval can be calculated. RTORPA (a.k.a. P_S) and RTOFFPA (a.k.a. P_{NS}) are functions of the PBMCL at various levels of

Real-Time reserves, the net value of Load curtailment, and time duration during which the reserves are available. RTORPA and RTOFFPA are determined as follows:

$$RTORPA = P_S = \begin{cases} \max(\min(Y, v), v * 0.5 * \pi_s(R_S) + P_{NS}), R_S \leq 6500 \\ \max(\min(Z, v), v * 0.5 * \pi_s(R_S) + P_{NS}), 6500 < R_S \leq 7000 \\ v * 0.5 * \pi_s(R_S) + P_{NS}, R_S > 7000 \end{cases}$$

$$RTOFFPA = P_{NS} = v * (1 - 0.5) * \pi_{NS}(R_{SNS})$$

Where:
$v = max(0, VOLL - SystemLambda)$
$R_S = RTOLCAP$
$R_{SNS} = RTOLCAP + RTOFFCAP$

Where *v* represents the net value of Load curtailment and is calculated as the VOLL minus the SCED System Lambda. System Lambda is subtracted from VOLL to reflect the scarcity value of the marginal dispatch capacity and to ensure that the final cost of energy does not go above the VOLL. The Off-Line Available Reserves (RTOFFCAP) will be set to zero when the SCED snapshot of the PRC is equal to or below the PRC MW at which EEA Level 1 is initiated.

3. METHODOLOGY REVISION PROCESS

Revisions to this document, and the parameters to be used in the methodology, shall be made according to the approval process as prescribed in Protocol Section 6.5.7.3, Security Constrained Economic Dispatch, which requires TAC review and ERCOT Board approval.

4. ADDITIONAL PARAMETERS FOR IMPLEMENTING ORDC

The values of the additional parameters used in implementing ORDC are as follows:

4.1 Minimum Contingency Level

The minimum contingency level (X) is 3,000 MW.

4.2 SLOLP Distribution Shift Parameter

The SLOLP distribution shift parameter (S) is 0.5.

4.3 ORDC Multi-Step Price Floor Parameters

The ORDC multi-step price floor "Y" is the RTORPA at reserve levels at or below an RTOLCAP value of 6,500 MW, as included in the equation in Section 2.3 above. Y = $20/MWh.

The ORDC multi-step price floor "Z" is the RTORPA at reserve levels greater than 6,500 MW and less than or equal to 7,000 MW for RTOLCAP, as included in the equation in Section 2.3 above. Z = $10/MWh.

ERCOT Impact Analysis Report

OBDRR Number	051	OBDRR Title	Related to NPRR1216, Implementation of Emergency Pricing Program
Impact Analysis Date		January 23, 2024	
Estimated Cost/Budgetary Impact		None.	
Estimated Time Requirements		No project required. This Other Binding Document Revision Request (OBDRR) can take effect upon implementation of Nodal Protocol Revision Request (NPRR) 1216, Implementation of Emergency Pricing Program	
ERCOT Staffing Impacts (across all areas)		Ongoing Requirements: No impacts to ERCOT staffing.	
ERCOT Computer System Impacts		No impacts to ERCOT computer systems.	
ERCOT Business Function Impacts		No impacts to ERCOT business functions.	
Grid Operations & Practices Impacts		No impacts to ERCOT grid operations and practices.	

Evaluation of Interim Solutions or Alternatives for a More Efficient Implementation
None offered.

Comments
There are no additional impacts to this OBDRR beyond what was captured in the Impact Analysis for NPRR1216.

Board Report

PGRR Number	106	PGRR Title	Clarify Projects Included in Transmission Project Information and Tracking (TPIT) Report
Date of Action		August 20, 2024	
Action		Recommended Approval	
Timeline		Normal	
Estimated Impacts		Cost/Budgetary: None Project Duration: No project required	
Proposed Effective Date		First of the month following Public Utility Commission of Texas (PUCT) approval	
Priority and Rank Assigned		Not applicable	
Planning Guide Sections Requiring Revision		2.2, ACRONYMS AND ABBREVIATIONS 6.4.1, Transmission Project Information and Tracking Report	
Related Documents Requiring Revision/Related Revision Requests		None	
Revision Description		This Planning Guide Revision Request (PGRR) defines transmission projects included in the Transmission Project Information and Tracking (TPIT) report.	
Reason for Revision		☐ Strategic Plan Objective 1 – Be an industry leader for grid reliability and resilience ☐ Strategic Plan Objective 2 - Enhance the ERCOT region's economic competitiveness with respect to trends in wholesale power rates and retail electricity prices to consumers ☐ Strategic Plan Objective 3 - Advance ERCOT, Inc. as an independent leading industry expert and an employer of choice by fostering innovation, investing in our people, and emphasizing the importance of our mission ☒ General system and/or process improvement(s) ☐ Regulatory requirements ☐ ERCOT Board/PUCT Directive	

Board Report

	(please select ONLY ONE – if more than one apply, please select the ONE that is most relevant)
Justification of Reason for Revision and Market Impacts	This PGRR defines which transmission projects are included in the TPIT report by clarifying that the TPIT report consists of Tier 1, 2, 3, and 4 projects while exempting those projects that meet the criteria in paragraph (2) of Section 6.4.1. This will make it easier for Market Participants to understand what projects qualify for inclusion in the TPIT report. This PGRR will not change the report itself and there will be no impact to what is currently reported.
ROS Decision	On 5/4/23, ROS voted unanimously to table PGRR106 and refer the issue to the Steady State Working Group (SSWG). All Market Segments participated in the vote. On 5/2/24, ROS voted unanimously to recommended approval of PGRR106 as amended by the 12/12/23 ERCOT comments. All Market Segments participated in the vote. On 6/6/24, ROS voted unanimously to endorse and forward to TAC the 5/2/24 ROS Report and the 4/19/23 Impact Analysis for PGRR106. All Market Segments participated in the vote.
Summary of ROS Discussion	On 5/4/23, ERCOT Staff presented PGRR106. On 5/2/24, participants reviewed the 12/12/23 ERCOT comments. On 6/6/24, participants reviewed the 4/19/23 Impact Analysis for PGRR106.
TAC Decision	On 6/24/24, TAC voted unanimously to recommend approval of PGRR106 as recommended by ROS in the 6/6/24 ROS Report. All Market Segments participated in the vote.
Summary of TAC Discussion	On 6/24/24, there was no additional discussion beyond TAC review of the items below.
TAC Review/Justification of Recommendation	[X] Revision Request ties to Reason for Revision as explained in Justification [X] Impact Analysis reviewed and impacts are justified as explained in Justification [X] Opinions were reviewed and discussed [X] Comments were reviewed and discussed (if applicable) [ ] Other: (explain)

Board Report

ERCOT Board Decision	On 8/20/24, the ERCOT Board voted unanimously to recommend approval of PGRR106 as recommended by TAC in the 6/24/24 TAC Report.

Opinions	
Credit Work Group Review	Not applicable
Independent Market Monitor Opinion	IMM has no opinion on PGRR106.
ERCOT Opinion	ERCOT supports approval of PGRR106.
ERCOT Market Impact Statement	ERCOT Staff has reviewed PGRR106 and believes it provides a positive market impact by enhancing transparency which would improve Market Participants' understanding of projects that would qualify for inclusion in the TPIT Report.

Sponsor	
Name	Eric Meier
E-mail Address	Eric.Meier@ercot.com
Company	ERCOT
Phone Number	512-248-6770
Cell Number	
Market Segment	Not Applicable

Market Rules Staff Contact	
Name	Erin Wasik-Gutierrez
E-Mail Address	erin.wasik-gutierrez@ercot.com
Phone Number	413-886-2474

Comments Received	
Comment Author	**Comment Summary**
SSWG 083123	Revised language to provide examples to add transparency on the types of planned transmission projects that may be included in the TPIT report as opposed to deleting the material impact language as proposed by ERCOT

Board Report

ERCOT 121223	Disagreed with the 8/31/23 SSWG comments and proposed a bright-line approach that would include all tier-type transmission projects except those exempted under paragraph (2) of Section 6.4.1.

Market Rules Notes

None

Proposed Guide Language Revision

2.2 ACRONYMS AND ABBREVIATIONS

TPIT Transmission Project and Information Tracking

6.4.1 Transmission Project Information and Tracking Report

(1) The ERCOT Transmission Project and Information Tracking (TPIT) report contains the status of the transmission projects (60 kV and above) that are classified as a Tier 1, 2, 3, or 4 project~~are classified as a Tier 1, 2, 3, or 4 project and have a material impact to the flow of power in the ERCOT System~~~~are~~ ~~have a material impact on the flow of power on the ERCOT System~~ and are updated by the Steady State Working Group (SSWG). Projects that meet the criteria under paragraph (2) below may be excluded from the TPIT report.~~The following types of planned transmission projects are considered to have a material impact on the flow of power:~~

~~(a) New transmission line;~~

~~(b) Transmission line work to increase the line rating;~~

~~(c) Reactive device installation (capacitor bank, reactor bank, FACTS device, etc.);~~

~~(d) New or upgraded autotransformer; or~~

~~(e) New or reconfigured substation that possess more than two through-flow lines if the change affects the transmission line, autotransformer, rating, topology, or buses are joined or split that were previously not.~~

~~(2) Examples of projects that may be excluded from the TPIT report:~~

~~(a) Minor physical change to a transmission line that does not affect the flow of power;~~

~~(b) Impedance change that can be reasonably attributed to a rounding error or recalculation of parameters with no actual construction;~~

~~(c) Planning model record fields such as "Machine", "Branch", "Load PSS/E Identifier" or other modeling parameters that are not related to actual construction; or~~

~~(d) Replacement of failed equipment (even if it results in a rating and/or impedance change).~~

(~~2~~32) The transmission projects listed in the TPIT report are typically projects that are planned for completion by a Transmission Service Provider (TSP) within the near-term planning horizon. Projects that may not be listed in the TPIT report include:

(a) Any project that requires Regional Planning Group (RPG) review and has not completed the review process;

(b) Any project with a projected in-service date beyond the last year for which an ERCOT SSWG case is posted; ~~or~~

(c) Any project that consists of only a Remedial Action Scheme (RAS) or an Automatic Mitigation Plan (AMP) (which is not typically modeled)~~.~~;

(d) A minor physical change to a transmission line that does not affect the flow of power;

(e) An impedance change that can be reasonably attributed to a rounding error or recalculation of parameters with no actual construction;

(f) Any repair and replacement-in-kind project; or

(g) Any replacement of failed equipment with a rating and/or impedance change that will be included in the equipment owner's next annual assessment.

ERCOT Impact Analysis Report

PGRR Number	106	PGRR Title	Clarify Projects Included in Transmission Project Information and Tracking (TPIT) Report
Impact Analysis Date		April 19, 2023	
Estimated Cost/Budgetary Impact		None.	
Estimated Time Requirements		No project required. This Planning Guide Revision Request (PGRR) can take effect following Public Utility Commission of Texas (PUCT) approval.	
ERCOT Staffing Impacts (across all areas)		Ongoing Requirements: No impacts to ERCOT staffing.	
ERCOT Computer System Impacts		No impacts to ERCOT computer systems.	
ERCOT Business Function Impacts		No impacts to ERCOT business functions.	
Grid Operations & Practices Impacts		No impacts to ERCOT grid operations and practices.	

Evaluation of Interim Solutions or Alternatives for a More Efficient Implementation
None offered.

Comments
None.

Board Report

VCMRR Number	039	VCMRR Title	Related to NPRR1216, Implementation of Emergency Pricing Program
Date of Decision		August 20, 2024	
Action		Recommended Approval	
Timeline		Normal	
Estimated Impacts		Cost/Budgetary: None Project Duration: No project required	
Proposed Effective Date		Upon implementation of Nodal Protocol Revision Request (NPRR) 1216, Implementation of Emergency Pricing Program	
Priority and Rank Assigned		Not applicable	
Verifiable Cost Manual Sections Requiring Revision		3.4, Additional Rules for Submitting Fuel Costs	
Related Documents Requiring Revision/Related Revision Requests		NPRR1216 Other Binding Document Revision Request (OBDRR) 051, Related to NPRR1216, Implementation of Emergency Pricing Program	
Revision Description		This Verifiable Cost Manual Revision Request (VCMRR) provides that actual fuel purchases that were used to determine the Operating Losses Payment Amount, as described in Protocol Section 6.8.2, Recovery of Operating Losses During an LCAP or ECAP Effective Period, shall not also be included when calculating fuel adders.	
Reason for Revision		☐ Strategic Plan Objective 1 – Be an industry leader for grid reliability and resilience ☒ Strategic Plan Objective 2 - Enhance the ERCOT region's economic competitiveness with respect to trends in wholesale power rates and retail electricity prices to consumers ☐ Strategic Plan Objective 3 - Advance ERCOT, Inc. as an independent leading industry expert and an employer of choice by fostering innovation, investing in our people, and emphasizing the importance of our mission ☐ Administrative ☐ Regulatory requirements	

Board Report

	☐ ERCOT Board/PUCT Directive *(please select ONLY ONE – if more than one apply, please select the ONE that is most relevant)*
Justification of Reason for Revision and Market Impacts	Pursuant to Section 3.4, a Filing Entity may file a fuel adder for a specific Resource. Fuel adders are used by ERCOT in various calculations, including the determination of Startup and minimum-energy caps, Make-Whole Payments, and the Mitigated Offer Cap (MOC). The purpose of fuel adders is to compensate the Resource for the incremental cost of transporting, storing, and purchasing fuel that is not covered by the index fuel price used by ERCOT. Resources that incurred operating losses during a LCAP or ECAP Effective Period are able to recover their actual marginal costs, including fuel costs, by filing a dispute per Protocol Sections 6.8, Settlement for Operating Losses During an LCAP or ECAP Effective Period, and 9.14, Settlement and Billing Dispute Process. Given that Resources recover the cost of these fuel purchases via a dispute, it is inappropriate to also include these fuel purchases with fuel adders. Otherwise, the Resource could recover the cost of the same fuel purchase multiple times via future Make-Whole Payments or clearing prices.
WMS Decision	On 2/7/24, WMS voted unanimously to table VCMRR039 and refer the issue to the Wholesale Market Working Group (WMWG). All Market Segments participated in the vote. On 5/1/24, WMS voted unanimously to recommend approval of VCMRR039 as submitted. All Market Segments participated in the vote. On 6/5/24, WMS voted unanimously to endorse and forward to TAC the 5/1/24 WMS Report and 1/23/24 Impact Analysis for VCMRR039. All Market Segments participated in the vote.
Summary of WMS Discussion	On 2/7/24, the sponsor provided an overview of VCMRR039. Participants requested additional review by WMWG. On 5/1/24, participants noted WMWG review of VCMRR039. On 6/5/24, participants noted the 1/23/24 Impact Analysis.
TAC Decision	On 6/24/24, TAC voted unanimously to recommend approval of VCMRR039 as recommended by WMS in the 6/5/24 WMS Report. All Market Segments participated in the vote.
Summary of TAC Discussion	On 6/24/24, there was no additional discussion beyond TAC review of the items below.