UNITED STATES OF AMERICA

BEFORE THE

FEDERAL ENERGY REGULATORY COMMISSION

Reliability Standards for Frequency and Voltage Protection Settings and Ride-Through For Inverter-Based Resources	)))))	RM25-3-000

The Union of Concerned Scientists appreciates the opportunity to provide comments on the Federal Energy Regulatory Commission's ("Commission") Notice of Proposed Rulemaking ("NOPR") in the above-captioned proceeding. UCS supports the Commission's effort to address the issues identified by the North American Electricity Reliability Corporation ("NERC") in the November 24 petition ("NERC Petition"), as well as the proposed revisions to NERC standards including the approval of Proposed Reliability Standard PRC-029-1.

I. INTRODUCTION

UCS is a national nonprofit organization dedicated to advancing responsible public policies in areas where science and technologies play a critical role. Established in 1969, UCS has created a unique alliance between many of the nation's leading scientists and thousands of committed citizens. The UCS Climate & Energy Program focuses on developing a sustainable energy system—one that is affordable and nondepletable, and that does not degrade natural systems or public health. UCS is headquartered in Cambridge, Massachusetts, and also has offices in Berkeley, Chicago and Washington, D.C.

In 2023 the Commission issued Order 901,[1] which directed NERC to develop new or modified Reliability Standards addressing reliability gaps pertaining to inverter-based resources ("IBR") in four areas: (1) data sharing; (2) model validation; (3) planning and operational studies; and (4) performance requirements.[2] In that order, FERC cited NERC's observation that the rapid integration of IBRs is "the most significant driver of grid transformation" on the Bulk-Power System.[3]

UCS sees the multitude of drivers for this grid transformation do not in themselves recognize and include standardization or attention to reliability coordination. These functions are and have been the responsibility of the Commission and (in part) of NERC through delegation. The Commission's efforts in prior rulemakings[4] to provide the economic opportunity for investment in new generation and the coordination and standardization of interconnection are foundational to open access for competitive generation, choice for states and consumers, and confidence throughout the industry that new generation can replace old generation. This rulemaking is a logical extension of those efforts to ensure a reliable electricity supply from the grid transformation we are experiencing.

UCS encourages the Commission to complete this rulemaking in a manner that can expedite the construction of grid facilities, both generation and transmission. The need for reforms is urgent, reflecting interest from the generation industry in making investments, and

---

[1] Reliability Standards to Address Inverter-Based Resources, Order No. 901, 88 FR 74250 (Oct. 30, 2023), 185 FERC ¶ 61,042 (2023).
[2] Ibid., 1.
[3] Ibid., 2, citing NERC, Inverter-Based Resource Strategy: Ensuring Reliability of the Bulk Power System with Increased Levels of BPS-Connected IBRs, 1 (June 2022),
[4] See for example *Standardization of Generator Interconnection Agreements and Procedures*, Order No. 2003, FERC Stats. & Regs. ¶ 31,146, at P 542 (2003), *order on reh'g*, Order No. 2003-A, FERC Stats. & Regs. ¶ 31,160, *order on reh'g,* Order No. 2003-B, FERC Stats. & Regs. ¶ 31,171 (2004), *order on reh'g*, Order No. 2003-C, FERC Stats. & Regs. ¶ 31,190 (2005), *aff'd sub nom. Nat'l Ass'n of Regulatory Util. Comm'rs v. FERC,* 475 F.3d 1277 (D.C. Cir. 2007), *cert. denied*, 552 U.S. 1230 (2008).

reliability authorities' alerts over maintaining adequate supplies to replace aged and uneconomic generators.

II. Comments

1. UCS is generally in favor of ride-through requirements for all generation including IBRs

UCS champions the use of energy technologies that contribute to a cleaner environment and greater reliability. UCS has cited ride-through requirements and constructive reliability enhancing responses from generators and demand response in interconnection rulemaking comments.[5] UCS has also called on gas generators to refrain from disabling frequency response for monetary gains at the expense of overall grid reliability.[6]

2. UCS supports the use of IEEE 2800-2022 as the basis for ride-through requirements

NERC and the Commission have worked over the years to organize the obligations of the industry and differing generation technologies to contribute to reliability. The adoption and application of ride-through standards has not been uniform.[7] In the present proposed standards, NERC has proposed to align with, rather than diverge from prior standard-setting efforts. The response from NERC following the discovery of combined cycle generators' actions to suppress frequency response[8] did not create a standard or requirement that the Generator Owner modify the performance of their generators in frequency disturbances.

---

[5] Comments of the Union of Concerned Scientists, Docket No. RM13-2-000, Small Generator Interconnection Agreements and Procedures Document Accession #: 20130531-5220

[6] See Jacobs, M. (July 20, 2015). Jaw-Dropping News in the Solar vs. Fossil Fuels Debate. https://blog.ucsusa.org/mike-jacobs/solar-vs-fossil-fuels-810/

[7] "Generally, nuclear plants may have voltage limits that are more restrictive than standard PJM voltage limits." PJM. Nuclear Plant Interface Coordination PJM Manual 39, Section 2.4. https://www.pjm.com/-/media/DotCom/documents/manuals/m39.pdf See also NERC standard NUC-001-3— Nuclear Plant Interface Coordination https://www.nerc.com/pa/stand/reliability%20standards/nuc-001-3.pdf

[8] North American Electric Reliability Corporation. Industry Advisory: Generator Governor Frequency Response. (February 5, 2015). https://www.nerc.com/pa/rrm/bpsa/alerts%20dl/2015%20alerts/nerc%20alert%20a-2015-02-05-01%20generator%20governor%20frequency%20response.pdf This document also provides an exemption for nuclear generation.

The NOPR explains that in the proposed standard, NERC chose to adopt language and criteria from IEEE 2800-2022, "IEEE Standard for Interconnection and Interoperability of Inverter-Based Resources (IBRs) Interconnecting with Associated Transmission Electric Power Systems."[9] The choice to base requirements on IEEE 2800 was maintained even when more stringent requirements were considered.

UCS supports the choice to adopt requirements from IEEE 2800-2022. As that standard itself notes, IEEE 2800 was developed by the IEEE in part as "an outgrowth of the recommendations from the [NERC] Inverter-Based Resources Performance Reliability Guideline."[10] Further, discussions within the standard of entities involved in interconnection of IBRs deliberately "resemble functional responsibilities of the North American regulatory framework."[11]

In public utility commission proceedings[12] UCS has already observed that utilities, commissions, and regional transmission organizations are looking to IEEE 2800 as a resource for implementing IBR interconnection procedures. The Midcontinent ISO has also taken steps to implement a standard based on IEEE 2800.[13] The choice to base ride-through requirements on this standard reinforces efforts to harmonize practices across the industry.

---

[9] RM25-3-000. p 11.
[10] The Institute of Electrical and Electronics Engineers, Inc., "IEEE Std 2800-2022: For Interconnection and Interoperability of Inverter-Based Resources (IBRs) Interconnecting with Associated Transmission Electric Power Systems" (IEEE, February 9, 2022), https://ieeexplore.ieee.org/document/9762253/.
[11] Ibid.
[12] See, for example, Michigan PSC docket U-21482: https://mi-psc.my.site.com/s/case/5008y000008RnuhAAC/
[13] MISO Planning Advisory Committee IBR Performance Requirements (IEEE 2800) (PAC-2024-2) (20241016) https://cdn.misoenergy.org/20241016%20PAC%20Item%2006c%20IBR%20Performance%20Requirements%20IEEE%202800%20(PAC-2024-2)653146.pdf

3. UCS shares the Commission's interest in information regarding the scale and impact of the exemption provision

The NERC Petition and the NOPR include a later step in the approval of Proposed Reliability Standard PRC-029-1. The Commission proposes to defer final determination of NERC's compliance with Order 901 until NERC has collected and reported on IBR capabilities and performance. UCS agrees that the Commission should require and review the information and any Corrective Action Plans that NERC will be required to file as Milestone 4 Reliability Standards with the Commission by November 4, 2026. As noted earlier, the industry has not uniformly adopted and implemented ride-through standards and responses for all generation technologies.

The NOPR notes that Proposed Reliability Standard PRC-029-1 "includes a provision that allows existing IBRs that are already in operation when [the standard] goes into effect (legacy IBRs) to obtain an exemption to the voltage and frequency Ride-through requirements if hardware replacements would be necessary to comply."[14] The NOPR then explains that "[t]he Commission seeks to understand the volume of exemptions, the circumstances in which entities have invoked the exemption provision, and ultimately to understand what if any effect the exemption provision has on the efficacy of [the standard]."[15] UCS shares the Commission's concern about the scale and impact of the exemption provision. Comments below focus on two key aspects of how the industry may implement the hardware limitations exemption in the proposed standards.

[14] RM 25-3-000. p 3.
[15] Ibid.

3.1 Required documentation of "hardware limitations" should include more detail to accomplish the stated purpose for allowing exemptions

NERC has submitted the Reliability Standard PRC-029-1 with recognition that existing generators may have been deployed with hardware limitations before the practices and standards for IBRs included ride-through standards equivalent to the present proposal. NERC has provided in each of Requirements R1, R2 and R3 of Proposed Reliability Standard PRC-029-1 an exemption where "documented hardware limitation exists."[16] The generators identifying such limitations are then subject to the reporting obligations of Proposed Reliability Standard PRC-029-1 Requirement R4.

Proposed Reliability Standard PRC-029-1 Requirement R4 addresses the information collection that will apply to generators claiming an exemption due to "known hardware limitations that prevent the IBR from meeting Ride-through criteria as detailed in Requirements R1-R3."[17] To comply, Generator Owners claiming an exemption must supply five pieces of information; identity of the IBR, which requirements cannot be met, which hardware components are responsible for the limitation, technical documentation confirming the limitation, and details of any plans to address the limitation. Notably, Generator Owners are not required to provide any information about the impacts of addressing the limitation, either in terms of time, cost, or lost revenue.

This absence is notable given the explanation in the NERC Petition for why the exemption was deemed necessary (emphasis added):

> Specifically, it was determined that the anticipated difficulty of Generator Owners having to **wholesale retrofit and redesign** legacy facilities currently in operation would be unreasonable and unduly burdensome, and it could lead to undesirable impacts on reliability. Entities would be required to **take units offline to retrofit** or risk

[16] RM25-3-000.
[17] NERC Petition. Page 37.

> noncompliance and could choose to retire the units instead of retrofit based on economic considerations. A proposed IBR Ride-through standard having no exemptions could result in a resource capacity deficiency due to these retired units and thus lead to a substantial negative impact on the reliability of the BPS.[18]

Despite NERC's concern about the need for Generator Owners to "take units offline" to perform "wholesale retrofit," nothing in the data being gathered to qualify for the exemption would allow the relevant reliability authority of the necessary transparency to understand anticipated impacts to the grid and develop a more informed understanding of the impacts of the proposed standard. Therefore, UCS recommends that additional information be gathered to qualify for the exemption. Specifically, Proposed Reliability Standard PRC-029-1 Requirement R4 should require Generator Owners to submit a preliminary non-binding estimate of the cost and time required to replace or retrofit the affected hardware, and an estimate of how long the IBR would need to be offline to implement the change, if applicable. Cost estimates should include any costs due to loss of generation capability or failing to produce energy during the retrofit process. This information would then allow the Commission to better determine how proposed requirements impact supply resources and exemptions affecting system reliability.

3.2 The Final Rule must clarify that proprietary information will be provided to the Compliance Enforcement Authorities

The NERC Petition proposes to introduce an unreasonable hurdle to collecting performance information. The Commission should not accept NERC's proposal that (emphasis added):

> "Each generator owner of an IBR must provide the information (**unless it is considered proprietary by the original equipment manufacturer**) to each planning coordinator, transmission planner, transmission operator, and reliability coordinator in the footprint in which the legacy IBR is located."[19]

[18] Ibid. Page 38.
[19] RM25-3-000. p 14.

This language may be misinterpreted to say that the obligations of Proposed Reliability Standard PRC-029-1 Requirement R4 exemption reporting process can be withheld with a simple say-so of equipment manufacturers. However, the Commission cites the NERC Petition where NERC includes the following critical information in footnote 11: "To the extent the original equipment manufacturer considers any material to be proprietary, the Generator Owner is required to share this proprietary material only with the [Compliance Enforcement Authority] CEA."[20]

UCS recommends that the Final Rule be updated to include this critical context to clearly communicate that the Commission expects the CEA will collect such information and use it in preparation of the reports and filings of the Milestone 4 Reliability Standards to be required to be filed with the Commission by November 4, 2026. Clarification that CEAs will collect and use performance information is central to the success of this aspect of Order 901 compliance.

III. Conclusion

The Commission has the opportunity to improve the reliability of the interconnected fleet of generation, here including IBRs, by improving the process by which the reliability entities collect and include the capabilities of system assets such as inverters. The Commission should adopt the NERC Proposed Reliability Standard PRC-029-1 and enhance the expectation that the information proposed to be collected is actually collected and used in a reasonable assessment of costs, capabilities and impacts, especially in the case of any exemptions sought. The Commission's supervision of NERC and the protection against undue discrimination should proceed with these added provisions.

[20] NERC Petition. p 115.

Respectfully submitted on this 7th day of February 2025.

Michael Jacobs
Michael Jacobs
Union of Concerned Scientists
2 Brattle Square, Suite 600
Cambridge, MA 02138
(617) 301-8057
mjacobs@ucsusa.org