Unofficial Comment Form

Project 2021-02 Modifications to VAR-002-4.1

**Do not** use this form for submitting comments. Use the [Standards Balloting and Commenting System (SBS)](https://sbs.nerc.net/) to submit comments on draft two of Reliability Standard **VAR-002-5 - Generator Operation for Maintaining Network Voltage Schedules** by **8 p.m. Eastern, Friday, June 23, 2023.   
m. Eastern, Thursday, August 20, 2015**

Additional information is available on the [project page](https://www.nerc.com/pa/Stand/Pages/Project-2021-02-Modifications-to-VAR-002.aspx). If you have questions, contact Senior Standards Developer, [Laura Anderson](mailto:laura.anderson@nerc.net), or at 404-446-9671.

## Background Information

This project addresses issues identified in three Standard Authorization Requests (SARs).

NERC Project 2021-02 proposed revisions address the NERC Inverter-based Resource Performance Task Force (IRPTF) Standard Authorization Request (SAR) and the VAR-002 Enhanced Periodic Review (EPR), NERC [Project 2016-EPR-02](https://www.nerc.com/pa/Stand/Project%202016EPR02%20Enhanced%20Periodic%20Review%20of%20VAR/Project_2016_EPR_02_Template_VAR-002-4_06022017_Final.pdf), to address ambiguities of voltage and reactive resource Requirements concerning dispersed power producing resources. The IRPTF issued an [IRPTF White Paper, March 2020](https://www.nerc.com/pa/Stand/Project%20202102%20Modifications%20to%20VAR00241%20DL/Review_of_NERC_Reliability_Standards_White_Paper_04142021.pdf), evaluating today’s current standards and requirements of Inverter Based Resources (IBRs) to determine whether current Standards sufficiently address the needs for IBRs.

For dispersed power producing resources, it is not clear if a Generator Operator (GOP) is required to notify the Transmission Operator (TOP) for the status change of voltage control on an individual generating unit. NERC [Project 2014-01 Standards Applicability for Dispersed Generation Resources (nerc.com)](https://www.nerc.com/pa/Stand/Pages/Project-2014-01-Standards-Applicability-for-Dispersed-Generation-Resources.aspx) revised VAR-002, Requirement R4, to clarify that it is not applicable to individual generating units of dispersed power producing resources. The IRPTF did not identify any reason why Requirement R3 should be treated differently than Requirement R4 in this respect and recommends VAR-002-4.1 be modified to make this same clarification to Requirement R3.

From a historical perspective, Requirements R3 and R4 dispersed Generation considerations, [Project 2014-01 VAR-002-4 SDT Consideration of Comments](https://www.nerc.com/pa/Stand/Prjct201401StdrdsAppDispGenRes/Consideration_of_Comments_DGR_VAR-002_v3_10292014.pdf), provided the following:

Project 2014-01 posted “*The DGR SDT understands that the generation facilities subject to Inclusion I4 of the BES definition can be comprised of individual generating units that are typically controlled by centralized voltage/reactive controllers that can be considered alternative voltage control devices as listed in Requirement R4. Additionally, there are generation facilities that perform voltage/reactive control at the individual power producing resource. The DGR SDT has determined that a status change of these controllers should be reported regardless of which voltage/reactive control design is used at a facility, which explains why the exclusion was not extended to Requirement R3. The exclusion in Requirement R4 was intended to exclude reporting of an individual generator at a dispersed generating facility coming offline as a change in reactive capability.*

### The SDT understands that a GOP’s voltage controlling equipment and elements differ based on the type of generation facility, and that indeed system configurations vary. However, a “one size fits all” approach would not be appropriate due to the unique characteristics of dispersed generation. Each generation facility may have a different methodology to ensure the facility has an automatic and dynamic response to changes in voltage to ensure the voltage schedule is maintained. It is implied, for example, in NERC VAR-001-3 that each GOP and TOP should understand capabilities of the generation facility and the requirements of the transmission system to ensure a mutually agreeable solution and schedule is used.”

There were 19 recommendations from the VAR-002 EPR reviewed by the Standard Drafting Team (SDT) to be considered for inclusion into the VAR-002 working draft with the objective to address clarity and technical accuracy of the NERC requirements. NERC is required to conduct a periodic review of each NERC Reliability Standard at least once every ten (10) years. Recommendations from the EPR team are to be considered by a NERC SDT should the Standard be opened for revision. Results from review found in Attachment 5, other Miscellaneous Corrections/Revisions, recommendations for clarity, compliance elements, terminology, and technical accuracy recommendations were accepted by the Project 2021-02 SDT acknowledging that the 2016 EPR recommendations were not addressed in the currently enforceable Reliability Standard and could provide more clarity to the requirements for IBRs and other Generation voltage control resources.

### Summary of proposed revisions:

| **NERC Project 2016-EPR-02 Attachment V Recommendations** | | **2021-02 SDT response to comments to proposed VAR-002-5 draft updates** |
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| Identifier | Description |  |
| 2.1 | Requirement R2, Part 2.3 has the clause “specified by the Transmission Operator” which is unnecessary and may introduce confusion with respect to whether it is referring to the voltage schedule or the methodology. Remove this phrase or reword to avoid confusion. | Requirement R2, Part 2.3 – Removed “specified by the Transmission Operator” to remove confusion of whether voltage schedule or methodology is being referred to in the requirement. |
| 2.2 | Requirement R6 uses the term "equipment rating." Equipment Rating is a NERC defined term.  Requirement R6 should be updated to reflect the defined term "Equipment Rating" or “rating” should be removed to be consistent with other standard (e.g., TOP‐001‐3, Requirements R3 and  R5). | Requirement R6 – Capitalized “equipment rating” for NERC defined term. |
| 2.3 | Requirement R4 is silent on the magnitude or quantity of “change in reactive capability” (e.g., 1 MVAR or 100 MVAR). Requirement R4 should be reviewed for potential improvements in establishing the level of change that trigger “change in reactive capability” or where that level of change would be identified. | Requirement R4 – Added “notify, in a mutually-agreeable criteria, its associated Transmission Operator of a status or functionality change of applicable AVR, volt/VAR controller(s), power system stabilizer (PSS), or alternative voltage controlling device which degrades or restores from degradation its ability to automatically control voltage. Status or functionality change notifications shall be made within 30 minutes of the change. If the status has been restored within 30 minutes of such change, then the Generator Operator is not required to notify the Transmission Operator.” This was to provide a requirement for the Generator Operator to seek out the clarity needed for reactive capability change reporting criteria needed for the Transmission Operator to assess the system reactive resource capability, per VAR-001 Requirement R2. |
| 2.4 | In Requirement R3, clarify that the Generator Operator shall provide notification to the  Transmission Operator that is mutually agreeable to the Transmission Operator. This would clarify which medium is available or unavailable for Generator Operator to use for notification, which will avoid the Requirement from prescribing the method (e.g., phone call, telemetry, email, etc.). | Requirements R3 and R4 – Added “in a mutually-agreeable criteria” to provide clarity of what reporting medium and threshold the Generator Operator should provide to the Transmission Operator. |
| 2.5 | Requirement R4 concerning reactive capability is based on the “D” Curve, which is a snapshot. Therefore, the notification component is for degradation or restoration from the degradation, not additional capability due to other factors. Revise the current Requirement R4 language for clarity (i.e., “change in reactive capability”) | Requirements R3 and R4 – Added “degrades or restores from degradation” to clarify the status or functionality changes impacting ability to automatically control voltage and changes in reactive capability need reported to Transmission Operator. |
| 2.6 | Revise Requirement R4 to add clarity that a full “D” Curve (i.e., restatement of capabilities) is not required when Reactive Power output is affected. | SDT comments to EPR Attachment V recommendation 2.5 would provide recommended clarity. |
| 2.7 | In Requirement R4, visit whether criteria should be spelled out explicitly or "self‐developed" for the term "status" in the main requirement. | Requirement R4 – Removed the word “status” in Requirement R4 for additional clarity that R4 is requiring notification of change in capability and not status as in Requirement R3. |
| 2.8 | In Requirement R4, the term "status" in the bulleted exception concerning dispersed  generating resources (DGR) should be struck given the use of "status" is associated with  Requirement R3 and not R4. | Removed bulleted Requirement R4 requirement to allow for Transmission Operator to indicate the threshold for reporting in a mutually agreeable criteria to access Generator Reactive resource capability per VAR-001, Requirement R2 and added applicability to dispersed generating resource in Section 4 of the proposed standard. |
| 2.9 | Requirement R4 refers to the Bulk Electric System (BES) definition in a manner that brings in applicability (exception) component of certain Generator Operators. To the extent possible, this exception be considered for inclusion in the Applicability section of the standard. | Updated purpose and Applicability sections of standard for clarity of dispersed Generation applicability and BES definition considerations. |
| 4.1 | In Requirement R5 the time horizon of Real‐time Operations is inappropriate. Requirement R5 requires the Generator Owner (GO) to provide data to the Transmission Operator (TOP) and Transmission Planner (TP) within 30 calendar days of a request. Therefore, mitigating a violation of this requirement could never occur in Real‐time Operations, but rather be the Operations Planning time horizon. The violation of this requirement should garner sanctions associated with a longer time horizon. | Requirement R5 – Changed the time horizon from “Real-time Operations” to “Operations Planning” due to 30-day time provided in the requirement. |
| 4.2 | In Requirement R6, the time horizon of Real‐time Operations is inappropriate. Requirement R6 requires that generator step‐up (GSU) transformer tap changes be implemented by the Generator Owner, this will typically involve an outage of the GSU transformer and is the culmination of a longer-term process to determine if a GSU transformer tap change is appropriate. The violation of this requirement should garner sanctions associated with a longer time horizon. | Requirement R6 – Changed the time horizon from “Real-time Operations” to “Operations Planning.” |
| 4.3 | The Requirement R2 Violation Severity Level (VSL) High category does not note that the entity complied with maintaining the voltage or Reactive Power schedule, which must be achieved to have partial performance of the requirement. It is recommended to add an introductory phrase to the High VSL category stating: “The Generator Operator maintained the voltage or Reactive Power schedule but did not...” | Requirement R2 VSL – added introductory phrase to the High VSL stating, “The Generator Operator for each applicable Facility maintained the voltage or Reactive Power schedule but did not…” to show partial compliance and performance to Requirement R2 but not Requirement R2, Part R2.3. |
| 4.4 | The last sentence of Measure M1 should be clarified to make clear that the reference is referring to being exempted from automatic voltage control mode and not voltage schedule. | Measure M1 – Restructured last sentence for clarity of exemption. |
| 6.1 | Requirement R5, Part 5.1.x may not be technology neutral with respect to transformer modeling data because of the use of “fixed tap ranges.” Revise the requirement to ensure that it is technology neutral and inclusive of load tap changing (LTC) transformers. | Requirement R5, Part R5.1.2 – Removed “fixed” to provide technology neutral language and to be inclusive of Load Tap Changing Transformers. |
| 10.1 | In Requirement R1 dispersed generation resources (DGR) can be comprised of numerous generators. Each generator may have its own automatic voltage regulator (AVR) in addition to a site AVR that coordinates the voltage level of each of the distributed generators to regulate voltage at a common point such as the GSU transformer. Reword the requirement by replacing "generator" with "generator or DGR site AVR.” | Requirements R1 and R2 – Added “applicable Facility” and “volt/VAR controller” for inclusion and added clarity to VAR-002 standard equipment scope to align to BES Generation definition. The SDT reviewed other standards terminology to identify dispersed power generating resource and voltage control equipment for consistency. |
| 10.2 | In Requirement R2 typical dispersed generation resources (DGR) have a site automatic voltage regulator (AVR) that coordinates the voltage of all generators to a common regulation point. If this site AVR fails each generator will typically either continue to regulate at the last known set point or revert to unity power factor. If the site AVR fails, the Generator Owner should report a change per Requirement R3. Augment the requirement to accommodate these circumstances without a violation. | Requirement R2, Part R2.1 – Added “…or if no other method of control is available, notify the Transmission Operator as soon as becoming aware of the condition…” to accommodate dispersed power producing resource volt/VAR site controller failure and continued operation to last known set point or revert to unity power factor on individual dispersed power producing resources without a violation under Requirement R3. |
| 14.1 | Requirement R5, does not identify the Transmission Owner (TO) for cases where the TO owns the generator step‐up transformer. Revise Requirement R6 to require the TO to communicate settings to the Transmission Operator. | The 2021-02 SDT did not accept this EPR recommendation due to the VAR-002 Reliability Standard not being applicable to the TO and outside scope of providing clarity to GO in VAR-002 standard for this SAR. |
| 14.2 | Requirement R3 require the Generator Operator to notify the Transmission Operator of PSS unavailability. The operational requirements for initial state of PSS (on/off) clarity need to be assessed for inclusion within the VAR suite of standards (including expectations for startup, shutdown, or testing mode). Consider whether new requirements or alternative guidance is needed to identify the expected initial state for a PSS. | Requirement R3 – Added “…functionality change of applicable AVR, volt/VAR controller(s), PSS, or alternative voltage controlling device which degrades or restores from degradation its ability to automatically control voltage…” to accommodate the use of on/off operation of PSS during normal operations to only make notifications to Transmission Operator for abnormal PSS operation impacting voltage control to add clarity for when to report to Transmission Operator on PSS and other applicable voltage control equipment. |
| 16.1 | The standard does not address any specific PSS requirements. Consider including PSS requirements in the VAR standard(s) similar to PSS requirements in VAR‐  501‐WECC‐2 (or any subsequent new version), if there is a reliability need. | The SDT 2021-02 did not accept this EPR recommendation due to providing additional PSS requirements similar to the PSS requirements in VAR-501-WECC-2 was outside the scope of 2021-02 SAR to provide clarity with a focus on dispersed power producing resources and felt another project, if approved, specifically to the VAR suite of standards with PSS subject matter is recommended. |

* Measures M1-M6 – Minor updates in the Measures to align with requirements’ proposed changes.
* Added footnotes 5 and 6 for providing additional clarity to describe volt/VAR controller and mutually-agreeable criteria, respectively.
* Applicable Facility is applied throughout the standard to provide scope Generation Facility defined in Section 4 Applicability section.

Questions

1. Do you agree the proposed changes in Draft Version II have provided additional clarity to the proposed Reliability Standard VAR-002, following the recommendations for the Enhanced Periodic Review (Project 2016-EPR-02) and NERC Inverter-based Resource Performance Task Force (IRPTF)? If no, please explain and provide recommendations.

Yes

No

Comments:

1. Do you agree with the revised Purpose statement? If you do not agree, please provide an explanation.

Yes

No

Comments:

1. The Project 2021-02 SDT proposes a one-year Implementation Plan. Do you agree with the proposed implementation plan timeframe? If you think an alternate timeframe is needed, please propose an alternate implementation plan with detailed explanation.

Yes

No

Comments:

1. Provide any additional comments on proposed Reliability Standard VAR-002-5 and the technical rationale document for the SDT to consider, if desired.

Comments: