

Periodic Review Recommendations: (DRAFT) VAR-002-4 – Generator Operation for Maintaining Network Voltage Schedules

February 20, 2017

Executive Summary

The periodic review team completed a comprehensive review of VAR-002-4 – Generator Operation for Maintaining Network Voltage Schedules. The team found the standard is sufficient to protect reliability and meet the reliability objective of the standard; however, there may be future opportunity to improve a non-substantive or insignificant quality and content issue. The following are the observations and recommendations of the periodic review team.

Introduction

The North American Electric Reliability Corporation (NERC) is required to conduct a periodic review of each NERC Reliability Standard at least once every ten (10) years, or once every five (5) years for Reliability Standards approved by the American National Standards Institute (ANSI) as an American National Standard.¹ The Reliability Standard identified above has been included in the current cycle of periodic reviews. The Review Team shall consist of two (2) subgroups; a Standing Review Team, which is appointed annually by the Standards Committee (SC) for periodic reviews, and a stakeholder Subject Matter Expert (SME) team. Consistent with Section 13 of the Standards Processes Manual (SPM)², the SC may use a public nomination process to appoint the stakeholder Subject Matter Expert (SME) team, or may use another method to appoint that results in a team that collectively has the necessary technical expertise and work process skills to meet the objectives of the project. The technical experts provide the subject matter expertise and guide the development of the technical aspects of the periodic review, assisted by technical writers, legal and compliance experts. The technical experts maintain authority over the technical details of the periodic review.

Together, the Standing Review Team and SME stakeholder team are the Review Team for a particular periodic review project and complete their portion of the template below.

The purpose of the template is to collect background information, pose questions to guide a comprehensive review of the standard(s) by the Review Team, and document the Review Team's considerations and recommendations. The Review Team will post the completed template containing

¹American National Standards Institute website: [https://www.ansi.org/
http://www.nerc.com/pa/Stand/Documents/Appendix_3A_StandardsProcessesManual.pdf](https://www.ansi.org/http://www.nerc.com/pa/Stand/Documents/Appendix_3A_StandardsProcessesManual.pdf).

² NERC Standard Processes Manual 45 (2013), posted at http://www.nerc.com/pa/Stand/Documents/Appendix_3A_StandardsProcessesManual.pdf.

its recommendations for information and stakeholder input, as required by Section 13 of the NERC SPM.

Review Team Composition

| | Standing Review Team | Plus Section 13 (SMEs): |
|--------------------------|--|--|
| Non-CIP Standards | <p>Chairs of the following NERC Standing Committees³:</p> <ul style="list-style-type: none"> • SC (Also the SC chair or his/her delegate from the SC will chair the Standing Review Team)⁴ • Planning Committee • Operating Committee <p>A regional representative will be included on the Standing Review Team.</p> <p>The Standing Review Team will meet with SMEs and help to ensure a consistent strategy and approach across all of the reviews.</p> | <p>The SC will appoint stakeholder SMEs for the particular standard(s) being reviewed. The SMEs will work together with the Standing Review Team to conduct its review of the standard(s) and complete the template below.</p> |
| CIP Standards | <p>Chairs of the following NERC Standing Committees⁵:</p> <ul style="list-style-type: none"> • SC (Also the SC chair or his/her delegate from the SC will chair the Standing Review Team) • CIPC | <p>The SC will appoint stakeholder SMEs for the particular standard(s) being reviewed. The SMEs will work together with the Standing Review Team to conduct its review of the standard(s) and complete the template below.</p> |

The Review Team will use the background information and the questions below, along with any associated worksheets or reference documents, to guide a comprehensive review that results in a recommendation from one of the following three (3) choices:

³Each committee chair may, at his or her discretion, delegate participation on the Standing Review Team to another member of his or her committee.

⁴ The Standards Committee chair may delegate one member of the SC to chair one Standing Review Team’s review of a standard s), and another SC member to chair a review of another standard(s).

⁵ Each committee chair may, at his or her discretion, delegate participation on the Standing Review Team to another member of his or her committee.

1. Recommend re-affirming the standard as steady-state (Green); or
2. Recommend that the standard is sufficient to protect reliability and meet the reliability objective of the standard; however there may be future opportunity to improve a non-substantive or insignificant quality and content issue – i.e., continue to monitor (Yellow); or
3. Recommend that the standard needs revision or retirement (Red).

If the team recommends a revision to, or a retirement of, the Reliability Standard, it must also submit a Standard Authorization Request (SAR) outlining the proposed scope and technical justification for the revision or retirement.

A completed Periodic Review Template and any associated documentation should be submitted by email to [Scott Barfield-McGinnis](mailto:Scott.Barfield-McGinnis@nerc.gov) via email or by telephone at 404-446-9689.

| |
|---|
| Applicable Reliability Standard: VAR-001-4.1 & VAR-002-4 |
| Team Members (include name and organization): |
| <ol style="list-style-type: none"> 1. Stephen Solis (Chair), Electric Reliability Council of Texas, Inc. 2. Dennis Sauriol (Vice Chair), American Electric Power 3. Alex Chua, Pacific Gas and Electric 4. Kevin Harrison, ITC Holdings 5. Bill Harm, PJM Interconnection, LLC 6. Tim Kucey, PSEG Fossil, LLC 7. Michael Scott, NextEra Energy, Inc. |
| Date Review Completed: |

Background Information (to be completed initially by NERC staff)

1. Are there any outstanding Federal Energy Regulatory Commission (FERC) directives associated with the Reliability Standard? *(If so, NERC staff will attach a list of the directives with citations to associated FERC orders for inclusion in a SAR.)*

- Yes
 No

2. Have stakeholders requested clarity on the Reliability Standard in the form of an (outstanding, in progress, or approved) Interpretation or Compliance Application Notice (CAN)? *(If there are, NERC staff will include a list of the Interpretation(s), CAN(s), or other stakeholder-identified issue(s) that apply to the Reliability Standard.)*

- Yes

No

Please explain:

3. Is the Reliability Standard one of the most violated Reliability Standards?

Yes

No

Please explain:

If so, does the cause of the frequent violation appear to be a lack of clarity in the language?

Yes

No

Please explain:

Questions for the Review Team

If NERC staff answered “Yes” to any of the questions above, the Reliability Standard probably requires revision. The questions below are intended to further guide your review. Some of the questions reference documents provided by NERC staff, as indicated in the Background questions above. Either as a guide to help answer the ensuing questions or as a final check, the Review Team is to use Attachment 3: Independent Expert Evaluation Process.

I. Quality

1. **Reliability Need, Paragraph 81:** Do any of the requirements in the Reliability Standard meet criteria for retirement or modification based on Paragraph 81 concepts? *Use Attachment 2: Paragraph 81 Criteria to make this determination.*

Yes

No

Please summarize your application of Paragraph 81 Criteria, if any:

2. **Clarity:** From the Background Information section of this template, has the Reliability Standard been the subject of an Interpretation, CAN or issue associated with it, or is frequently violated because of ambiguity?

- a. Does the Reliability Standard have obvious ambiguous language?
- b. Does the Reliability Standard have language that requires performance that is not measurable?
- c. Are the requirements consistent with the purpose of the Reliability Standard?
- d. Should the requirements stand alone as is, or should they be consolidated with other standards?
- e. Is the Reliability Standard complete and self-contained?
- f. Does the Reliability Standard use consistent terminology?

Yes

No

Please summarize your assessment:

Requirement 2, Part 2.3 is prescriptive and not performance based. It is not clear whether a methodology is required or equipment. The phrase "existing equipment" in Measure M2 causes this confusion. The phrase should be removed to eliminate an implied requirement or revise the requirement to be explicit.

Additionally, in the main part of Measure M2 the first sentence of the measure ("In order to identify when a generator is deviating from its schedule, the Generator Operator will monitor voltage based on existing equipment at its Facility.") implies a performance (i.e., monitoring) that is not required, but implicit. This sentence should be revised to remove the inference and moved to Part 2.3 of the measure to align with the requirement.

3. **Definitions:** Do any of the defined terms used within the Reliability Standard need to be refined?

Yes

No

Please explain:

4. **Compliance Elements:** Are the compliance elements associated with the requirements (Measures, Data Retention, Violation Risk Factors (VRF), Violation Severity Levels (VSL) and Time Horizons) consistent with the direction of the Reliability Assurance Initiative (RAI) and FERC and NERC guidelines?

Yes

No

If you answered "No," please identify which elements require revision, and why:

5. **Consistency with Other Reliability Standards:** Does the Reliability Standard need to be revised for formatting and language consistency among requirements within the Reliability Standard, or for coordination with other Reliability Standards?

Yes

No

If you answered “Yes,” please describe the changes needed to achieve formatting and language consistency:

6. **Changes in Technology, System Conditions, or other Factors:** Does the Reliability Standard need to be revised to account for changes in technology, system conditions or other factors?

Yes

No

If you answered “Yes,” please describe the changes and specifically what the potential impact is to reliability if the Reliability Standard is not revised:

7. **Practicable:**

- a. Can the Reliability Standard be practically implemented?

Yes

No

- b. Is there a concern that it is not cost effective as drafted?

Yes

No

Please summarize your assessment of the practicability of the standard:

8. **Consideration of Generator and Transmission Interconnection Facilities:** Is responsibility for generator Interconnection Facilities and Transmission Interconnection Facilities appropriately accounted for in the Reliability Standard?

Yes

No

Guiding Questions:

- a. If the Reliability Standard is applicable to Generator Owners (GOs) and/or Generator Operators (GOPs), is there any ambiguity about the inclusion of generator Interconnection Facilities? (If generation Interconnection Facilities could be perceived to be excluded, specific language referencing the Facilities should be introduced in the Reliability Standard.)

Response: There is no ambiguity about the inclusion of generator Interconnection Facilities.

- b. If the Reliability Standard is not applicable to GOs and/or GOPs, is there a reliability-related need for treating generator Interconnection Facilities as Transmission Lines for the purposes of this Reliability Standard? (If so, GOs that own and/or GOPs that operate relevant generator Interconnection Facilities should be explicit in the Applicability section of the Reliability Standard.)

Response: Not applicable.

- c. If the Reliability Standard is applicable to Transmission Operators (TOPs) and/or Distribution Providers (DPs), is there any ambiguity about the inclusion of Transmission Interconnection Facilities? (If Transmission Interconnection Facilities could be perceived to be excluded, specific language referencing the Facilities should be introduced in the Reliability Standard.)

Response: Not applicable.

9. **Results-Based Standard (RBS):** Is the Reliability Standard drafted as a RBS?

Yes

No

If not, please summarize your assessment:

Guiding Questions:

- a. Does the Reliability Standard address performance, risk (prevention) and capability?

Yes

No

- b. Does the Reliability Standard follow the RBS format (for example, requirement and part structure) in Attachment 1?

Yes

No

c. Does the Reliability Standard follow the Ten Benchmarks of an Excellent Reliability Standard⁶?

Yes

No

II. Content

10. **Technical accuracy:** Is the content of the requirements technically correct, including identifying who does what and when?

Yes

No

If not, please summarize your assessment:

11. **Functional Model:** Are the correct functional entities assigned to perform the requirements consistent with the Functional Model?

Yes

No

If not, please summarize your assessment:

12. **Applicability:** Is there a technical justification for revising the Applicability of the Reliability Standard, or specific requirements within the standard, to account for differences in reliability risk?

Yes

No

If so, please summarize your assessment:

⁶ Ten Benchmarks of an Excellent Reliability Standard, posted at Page 626 of:
http://www.nerc.com/pa/Stand/Resources/Documents/DT_Reference_Manual_Resource_Package_080114.pdf

13. **Reliability Gaps:** Are the appropriate actions for which there should be accountability included, or is there a gap?

Yes

No

If a gap is identified, please explain:

Requirement R3, does not identify the Reliability Coordinator (RC) to be included in notifications. A clarification on how the RC might receive automatic voltage regulator (AVR) notifications may be important as the AVR status could impact a System Operating Limit (SOL) or Interconnection Reliability Operating Limit (IROL) value. This may be addressed by a revision VAR-001-4, alternative guidance, or existing requirements (e.g., IRO-010-2 – *Reliability Coordinator Data Specification and Collection* as the method for acquiring necessary notifications).

14. **Technical Quality:** Does the Reliability Standard have a technical basis in engineering and operations?

Yes

No

If not, please summarize your assessment:

15. **Does the Reliability Standard reflect a higher solution than the lowest common denominator?**

Yes

No

If not, please summarize your assessment:

16. **Related Regional Reliability Standards:** Is there a related regional Reliability Standard, and is it appropriate to recommend the regional Reliability Standard be retired, appended into the continent-wide standard, or revised in favor of a continent-wide standard?

Yes

No

If yes, please identify the regional standard(s) and summarize your assessment:

Maintain awareness on the potential impact to VAR-002-4 since the WECC region is considering retirement or revisions to VAR-002-WECC-2.

RED, YELLOW, GREEN GRADING

Using the questions above, the Review Team shall come to a consensus on whether the Reliability Standard is Green – i.e., affirm as steady-state; Yellow – is sufficient to protect reliability and meet the reliability objective of the standard, however, there may be future opportunity to improve a non-substantive or insignificant quality and content issue – i.e., continue to monitor; or Red - either retire or needs revision, and, thus, a SAR should be developed to process the standard through the standards development process for retirement or revision. The reasons for the Review Team’s conclusions of Green, Yellow, or Red shall be documented. If a consensus is not reached within the Review Team, minority reviews shall be posted for stakeholder comment, along with the majority opinion on whether the Reliability Standard is Green, Yellow, or Red.

Recommendation

The answers to the questions above, along with its Red, Yellow, or Green grading and the recommendation of the Review Team, will be posted for a 45-day comment period, and the comments publicly posted. The Review Team will review the comments to evaluate whether to modify its initial recommendation, and will document the final recommendation which, will be presented to the SC.

Preliminary Recommendation (to be completed by the Review Team after its review and prior to posting the results of the review for industry comment):

- RE-AFFIRM (*This should be checked only if there are no outstanding directives, Interpretations or issues identified by stakeholders.*) GREEN
- REVISE (*The standard is sufficient to protect reliability and meet the reliability objective of the standard; however, there may be future opportunity to improve a non-substantive or insignificant quality and content issue.*) (Would include revision of associated RSAW.) YELLOW
- REVISE (*The recommended revisions are required to support reliability.*) (Would include revision of associated RSAW.) RED
- RETIRE (Would include retirement of associated RSAW.) RED

Technical Justification (*If the Review Team recommends that the Reliability Standard be revised, a draft SAR may be included and the technical justification included in the SAR*):

Preliminary Recommendation posted for industry comment (date):

Final Recommendation (to be completed by the Review Team after it has reviewed industry comments on the preliminary recommendation):

- RE-AFFIRM (*This should be checked only if there are no outstanding directives, Interpretations or issues identified by stakeholders.*) GREEN
- REVISE (*The standard is sufficient to protect reliability and meet the reliability objective of the standard; however, there may be future opportunity to improve a non-substantive or insignificant quality and content issue.*) (Would include revision of associated RSAW.) YELLOW
- REVISE (*The recommended revisions are required to support reliability.*) (Would include revision of associated RSAW.) RED
- RETIRE (Would include retirement of associated RSAW.) RED

Technical Justification (*If the Review Team recommends that the Reliability Standard be revised, a draft SAR must be included and the technical justification included in the SAR*):

Date submitted to Standards Committee:

Attachment 1: Results-Based Standards

Question 9 for the Review Team asks if the Reliability Standard is results-based. The information below will be used by the Review Team in making this determination.

Transitioning the current body of standards into a clear, concise, and effective body will require a comprehensive application of the RBS concept. RBS concepts employ a defense-in-depth strategy for Reliability Standards development where each requirement has a role in preventing system failures, and the roles are complementary and reinforcing. Reliability Standards should be viewed as a portfolio of requirements designed to achieve an overall defense-in-depth strategy and comply with the quality objectives identified in the resource document titled, "[Acceptance Criteria of a Reliability Standard](#)."

Accordingly, the Review Team shall consider whether the Reliability Standard contains results-based requirements with sufficient clarity to hold entities accountable without being overly prescriptive as to how a specific reliability outcome is to be achieved. The RBS concept, properly applied, addresses the clarity and effectiveness aspects of a standard.

A Reliability Standard that adheres to the RBS format should strive to achieve a portfolio of performance-, risk-, and competency-based mandatory reliability requirements that support an effective defense-in-depth strategy. Each requirement should identify a clear and measurable expected outcome, such as: a) a stated level of reliability performance, b) a reduction in a specified reliability risk, or c) a necessary competency.

- a. **Performance-Based**—defines a particular reliability objective or outcome to be achieved. In its simplest form, a results-based requirement has four components: who, under what conditions (if any), shall perform what action, to achieve what particular result or outcome?
- b. **Risk-Based**—preventive requirements to reduce the risks of failure to acceptable tolerance levels. A risk-based reliability requirement should be framed as: who, under what conditions (if any), shall perform what action, to achieve what particular result or outcome that reduces a stated risk to the reliability of the bulk power system?
- c. **Competency-Based**—defines a minimum set of capabilities an entity needs to have to demonstrate it is able to perform its designated reliability functions. A competency-based reliability requirement should be framed as: who, under what conditions (if any), shall have what capability, to achieve what particular result or outcome to perform an action to achieve a result or outcome or to reduce a risk to the reliability of the bulk power system?

Additionally, each RBS-adherent Reliability Standard should enable or support one or more of the eight reliability principles listed below. Each Reliability Standard should also be consistent with all of the reliability principles.

1. Interconnected bulk power systems shall be planned and operated in a coordinated manner to perform reliably under normal and abnormal conditions as defined in the NERC Standards.
2. The frequency and voltage of interconnected bulk power systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand.
3. Information necessary for the planning and operation of interconnected bulk power systems shall be made available to those entities responsible for planning and operating the systems reliably.
4. Plans for emergency operation and system restoration of interconnected bulk power systems shall be developed, coordinated, maintained, and implemented.
5. Facilities for communication, monitoring, and control shall be provided, used, and maintained for the reliability of interconnected bulk power systems.
6. Personnel responsible for planning and operating interconnected bulk power systems shall be trained, qualified, and have the responsibility and authority to implement actions.
7. The reliability of the interconnected bulk power systems shall be assessed, monitored, and maintained on a wide-area basis.
8. Bulk power systems shall be protected from malicious physical or cyber attacks.

If the Reliability Standard does not provide for a portfolio of performance-, risk-, and competency-based requirements or consistency with NERC's reliability principles, NERC staff and the Review Team should recommend that the Reliability Standard be revised or reformatted in accordance with the RBS format.

Attachment 2: Paragraph 81 Criteria

The first question for the Review Team asks if one or more of the requirements in the Reliability Standard meet(s) criteria for retirement or modification based on Paragraph 81 concepts.⁷ Use the Paragraph 81 criteria explained below to make this determination. Document the justification for the decisions throughout and provide them in the final assessment in the Periodic Review Template.

For a Reliability Standard requirement to be proposed for retirement or modification based on Paragraph 81 concepts, it must satisfy **both**: (i) Criterion A (the overarching criterion); and (ii) at least one of the Criteria B listed below (identifying criteria). In addition, for each Reliability Standard requirement proposed for retirement or modification, the data and reference points set forth below in Criteria C should be considered for making a more informed decision.

Criterion A (Overarching Criterion)

The Reliability Standard requirement requires responsible entities (“entities”) to conduct an activity or task that does little, if anything, to benefit or protect the reliable operation of the BES.

Section 215(a) (4) of the United States Federal Power Act defines “reliable operation” as: “... operating the elements of the bulk power system within equipment and electric system thermal, voltage, and stability limits so that instability, uncontrolled separation, or cascading failures of such system will not occur as a result of a sudden disturbance, including a cybersecurity incident, or unanticipated failure of system elements.”

Criteria B (Identifying Criteria)

B1. Administrative

The Reliability Standard requirement requires responsible entities to perform a function that is administrative in nature, does not support reliability and is needlessly burdensome.

This criterion is designed to identify requirements that can be retired or modified with little effect on reliability and whose retirement or modification will result in an increase in the efficiency of the ERO compliance program. Administrative functions may include a task that is related to developing procedures or plans, such as establishing communication contacts. Thus, for certain requirements, Criterion B1 is closely related to Criteria B2, B3 and B4. Strictly administrative functions do not inherently negatively impact reliability directly and, where possible, should be eliminated or modified for purposes of efficiency and to allow the ERO and entities to appropriately allocate resources.

⁷ In most cases, satisfaction of the Paragraph 81 criteria will result in the retirement of a requirement. In some cases, however, there may be a way to modify a requirement so that it no longer satisfies Paragraph 81 criteria. Recognizing that, this document refers to both options.

B2. Data Collection/Data Retention

These are requirements that obligate responsible entities to produce and retain data which document prior events or activities, and should be collected via some other method under NERC's rules and processes.

This criterion is designed to identify requirements that can be retired or modified with little effect on reliability. The collection and/or retention of data do not necessarily have a reliability benefit and yet are often required to demonstrate compliance. Where data collection and/or data retention is unnecessary for reliability purposes, such requirements should be retired or modified in order to increase the efficiency of the ERO compliance program.

B3. Documentation

The Reliability Standard requirement requires responsible entities to develop a document (*e.g.*, plan, policy or procedure) which is not necessary to protect reliability of the bulk power system.

This criterion is designed to identify requirements that require the development of a document that is unrelated to reliability or has no performance or results-based function. In other words, the document is required, but no execution of a reliability activity or task is associated with or required by the document.

B4. Reporting

The Reliability Standard requirement obligates responsible entities to report to a Regional Entity, NERC or another party or entity. These are requirements that obligate responsible entities to report to a Regional Entity on activities which have no discernible impact on promoting the reliable operation of the BES and if the entity failed to meet this requirement there would be little reliability impact.

B5. Periodic Updates

The Reliability Standard requirement requires responsible entities to periodically update (*e.g.*, annually) documentation, such as a plan, procedure or policy without an operational benefit to reliability.

This criterion is designed to identify requirements that impose an updating requirement that is out of sync with the actual operations of the BES, unnecessary, or duplicative.

B6. Commercial or Business Practice

The Reliability Standard requirement is a commercial or business practice, or implicates commercial rather than reliability issues.

This criterion is designed to identify those requirements that require: (i) implementing a best or outdated business practice or (ii) implicating the exchange of or debate on commercially sensitive information while doing little, if anything, to promote the reliable operation of the BES.

B7. Redundant

The Reliability Standard requirement is redundant with: (i) another FERC-approved Reliability Standard requirement(s); (ii) the ERO compliance and monitoring program; or (iii) a governmental regulation (e.g., Open Access Transmission Tariff, North American Energy Standards Board (“NAESB”), etc.).

This criterion is designed to identify requirements that are redundant with other requirements and are, therefore, unnecessary. Unlike the other criteria listed in Criterion B, in the case of redundancy, the task or activity itself may contribute to a reliable BES, but it is not necessary to have two duplicative requirements on the same or similar task or activity. Such requirements can be retired or modified with little or no effect on reliability and removal will result in an increase in efficiency of the ERO compliance program.

Criteria C (Additional data and reference points)

Use the following data and reference points to assist in the determination of (and justification for) whether to proceed with retirement or modification of a Reliability Standard requirement that satisfies both Criteria A and B:

C1. Was the Reliability Standard requirement part of a FFT filing?

The application of this criterion involves determining whether the requirement was included in a FFT filing.

C2. Is the Reliability Standard requirement being reviewed in an ongoing Standards Development Project?

The application of this criterion involves determining whether the requirement proposed for retirement or modification is part of an active Standards Development Project, with consideration for the status of the project. If the requirement has been approved by Registered Ballot Body and is scheduled to be presented to the NERC Board of Trustees, in most cases it will not need to be addressed in the periodic review. The exception would be a requirement, such as the Critical Information Protection (CIP) requirements for Version 3 and 4, that is not due to be retired for an extended period of time. Also, for informational purposes, whether the requirement is included in a future or pending Standards Development Project should be identified and discussed.

C3. What is the VRF of the Reliability Standard requirement?

The application of this criterion involves identifying the VRF of the requirement proposed for retirement or modification, with particular consideration of any requirement that has been assigned as having a Medium or High VRF. Also, the fact that a requirement has a Lower VRF is not dispositive that

it qualifies for retirement or modification. In this regard, Criterion C3 is considered in light of Criterion C5 (Reliability Principles) and C6 (Defense in Depth) to ensure that no reliability gap would be created by the retirement or modification of the Lower VRF requirement. For example, no requirement, including a Lower VRF requirement, should be retired or modified if doing so would harm the effectiveness of a larger scheme of requirements that are purposely designed to protect the reliable operation of the BES.

C4. In which tier of the most recent Actively Monitored List (AML) does the Reliability Standard requirement fall?

The application of this criterion involves identifying whether the requirement proposed for retirement or modification is on the most recent AML, with particular consideration for any requirement in the first tier of the AML.

C5. Is there a possible negative impact on NERC's published and posted reliability principles?

The application of this criterion involves consideration of the eight following reliability principles published on the NERC webpage.

Reliability Principles

NERC Reliability Standards are based on certain reliability principles that define the foundation of reliability for North American bulk power systems. Each reliability standard shall enable or support one or more of the reliability principles, thereby ensuring that each standard serves a purpose in support of reliability of the North American bulk power systems. Each reliability standard shall also be consistent with all of the reliability principles, thereby ensuring that no standard undermines reliability through an unintended consequence.

Principle 1. Interconnected bulk power systems shall be planned and operated in a coordinated manner to perform reliably under normal and abnormal conditions as defined in the NERC Standards.

Principle 2. The frequency and voltage of interconnected bulk power systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand.

Principle 3. Information necessary for the planning and operation of interconnected bulk power systems shall be made available to those entities responsible for planning and operating the systems reliably.

Principle 4. Plans for emergency operation and system restoration of interconnected bulk power systems shall be developed, coordinated, maintained, and implemented.

Principle 5. Facilities for communication, monitoring, and control shall be provided, used, and maintained for the reliability of interconnected bulk power systems.

Principle 6. Personnel responsible for planning and operating interconnected bulk power systems shall be trained, qualified, and have the responsibility and authority to implement actions.

Principle 7. The reliability of the interconnected bulk power systems shall be assessed, monitored, and maintained on a wide-area basis.

Principle 8. Bulk power systems shall be protected from malicious physical or cyber attacks.
(footnote omitted)

C6. Is there any negative impact on the defense in depth protection of the BES?

The application of this criterion considers whether the requirement proposed for retirement or modification is part of a defense in depth protection strategy. In other words, the assessment is to verify whether other requirements rely on the requirement proposed for retirement or modification to protect the BES.

C7. Does the retirement or modification promote results or performance based Reliability Standards?

The application of this criterion considers whether the requirement, if retired or modified, will promote the initiative to implement results- and/or performance-based Reliability Standards.

Attachment 3: Independent Expert Evaluation Process

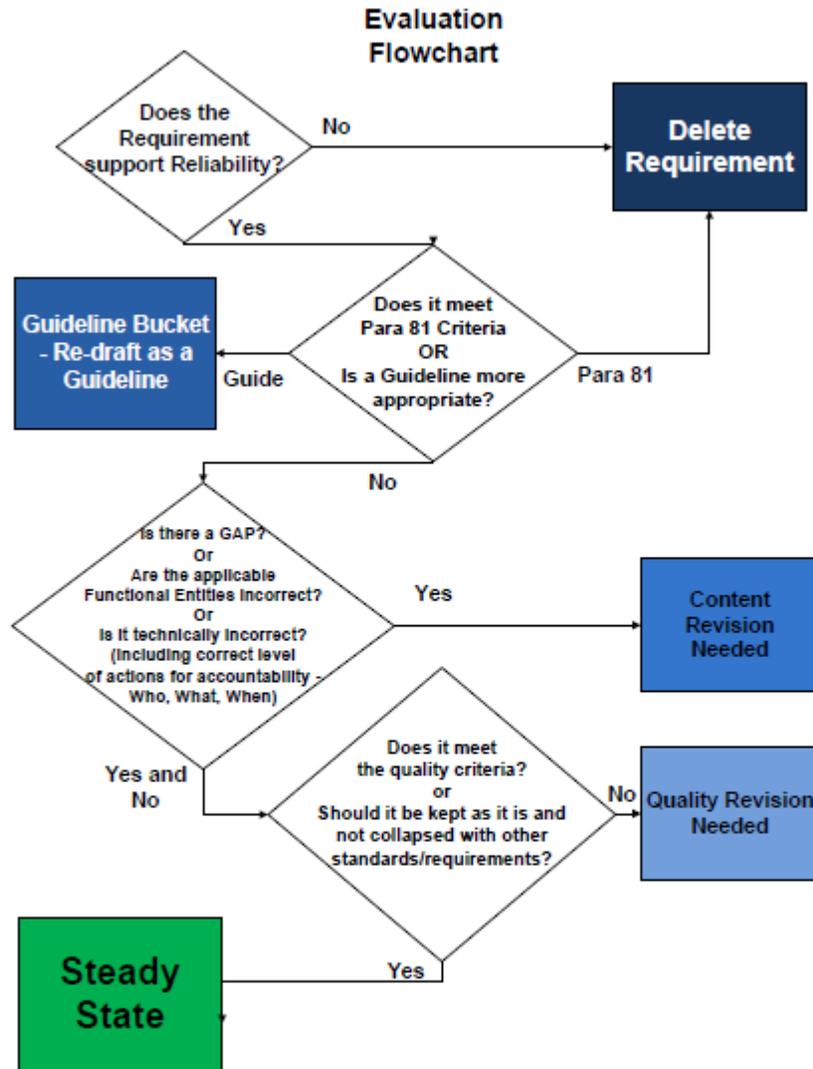


Figure 1: Evaluation Flow Chart

Attachment 4: Potential Errata Revisions/Corrections

The periodic review team has consolidated a number of errata and minor errors that could be cleaned by a drafting team should the standard be opened for revision. If providing comment during the posting period, please reference comments with the observation number.

1. Paragraph 81 (None)
2. Clarity
 - 2.1. Capitalize the term “reactive power” in Footnote 4. It uses the lowercase term "reactive power." The term Reactive Power⁸ is a NERC defined term and therefore should be capitalized.
 - 2.2. In Requirement R3, clarify that telemetry is a sufficient means of providing notification. Clarification in the Measure or Guidelines and Technical Basis could allow flexibility for the Generator Operator to choose how the notification occurs. If telemetry is met through TOP-003-3, for example, then verbal notification could be by exception.
 - 2.3. 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”).
 - 2.4. 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.
 - 2.5. In Requirement R4, visit whether criteria should be spelled out explicitly or "self-developed" for the term "status" in the main requirement.
 - 2.6. 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.
 - 2.7. Requirement R4 refers to the Bulk Electric System (BES)⁹ definition in a manner that brings in applicability (exception) component of certain Generator Operator. To the extent possible, this exception be considered for inclusion in the Applicability section of the standard.
3. Definitions (None)

⁸ Ibid.

⁹ Glossary of Terms Used in NERC Reliability Standards (http://www.nerc.com/pa/Stand/Glossary%20of%20Terms/Glossary_of_Terms.pdf)

4. Compliance Elements (None)
5. Consistency with Other Reliability Standards (None)
6. Changes in Technology, System Conditions, or other Factors (None)
7. Practicable (None)
8. Consideration of Generator and Transmission Interconnection Facilities (None)
9. Results-Based Standard (RBS) (None) (None)
10. Technical accuracy (None)
11. Functional Model (None)
12. Applicability (None)
13. Reliability Gaps (None)
14. Technical Quality (None)
15. Does the Reliability Standard reflect a higher solution than the lowest common denominator?
(None)
16. Related Regional Reliability Standards (None)

Attachment 5: Other Miscellaneous Corrections/Revisions

The periodic review team has consolidated a number of observations here that could be considered by a drafting team should the standard be opened for revision. If providing comment during the posting period, please reference comments with the observation number.

1. Paragraph 81 (None)
2. Clarity
 - 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 to avoid confusion.
 - 2.2. Requirement R6 uses the term "equipment rating." Equipment Rating¹⁰ 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).
3. Definitions (None)
4. Compliance Elements (None)
 - 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.
 - 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.

¹⁰ Ibid.

- 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...".
- 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.
5. Consistency with Other Reliability Standards (None)
6. Changes in Technology, System Conditions, or other Factors (None)
 - 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.
7. Practicable (None)
8. Consideration of Generator and Transmission Interconnection Facilities (None)
9. Results-Based Standard (RBS) (None) (None)
10. Technical accuracy (None)
 - 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."
 - 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.
11. Functional Model (None)
12. Applicability (None)
13. Reliability Gaps (None)
14. Technical Quality (None)
 - 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.

- 14.2. Requirement R3 require the Generator Operator to notify the Transmission Operator of power system stabilizer (PSS) unavailability. The operational requirements for PSS on/off clarity need to be assessed for inclusion within the VAR suite of standards. Consider whether new requirements or alternative guidance is needed to identify the expected initial state for a PSS.
15. Does the Reliability Standard reflect a higher solution than the lowest common denominator?
(None)
16. Related Regional Reliability Standards (None)
- 16.1. The standard does not address any specific power system stabilizer (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.