

Meeting Notes

Project 2016-EPR-02 Enhanced Periodic Review of VAR Standards

April 24-26, 2017

ERCOT
Austin, TX

Administrative

1. Introductions

The meeting was brought to order by the Chair, S. Solis at 1:00 p.m., Central on Monday, April 24, 2017. S. Solis provided the team with general comment and provided a safety briefing. Participants were introduced and those in attendance were:

Name	Company	Member/ Observer	In-person (Y/N)	Conference Call/Web (Y/N)
Stephen Solis	Electric Reliability Council of Texas, Inc. (ERCOT)	Chair	Y	-
Dennis Sauriol	American Electric Power (AEP)	Vice Chair	Y	-
Alex Chua	Pacific Gas & Electric (PG&E)	Member	-	-
Kevin Harrison	ITC Holdings	Member	Y	-
Bill Harm	PJM Interconnection, LLC	Member	Y	-
Tim Kucey	PSEG Fossil, LLC	Member	-	Y
Michael Scott	NextEra Energy, Inc.	Member	Y	-
Laura Anderson	North American Electric Reliability Corporation	NERC Staff	-	Y
Scott Barfield-McGinnis	North American Electric Reliability Corporation	NERC Staff	Y	-
Soo Jin Kim	North American Electric Reliability Corporation	NERC Staff	-	Y

Name	Company	Member/ Observer	In-person (Y/N)	Conference Call/Web (Y/N)
Lauren Perotti	North American Electric Reliability Corporation	NERC Staff	-	Y
Juan Villar	Federal Energy Regulatory Commission (FERC)	Observer	Y	-
Juan Luz	Federal Energy Regulatory Commission (FERC)	Observer	Y	-
Michael Cruz-Montes	CenterPoint Energy, LLC	Observer	Y	-
Robert Hirschak	CLECO	Observer	-	Y
Guy Zito	Northeastern Power Coordinating Council (NPCC)	Observer	Y	-

2. Determination of Quorum

The rule for NERC Standard Drafting Team (SDT or team) states that a quorum requires two-thirds of the voting members of the SDT. Quorum was achieved each call as six of the seven members were present.

3. NERC Antitrust Compliance Guidelines and Public Announcement

NERC Antitrust Compliance Guidelines and public announcement were read by S. Barfield-McGinnis. The group was reminded at the beginning of each call that participants are under the guidelines. There were no questions.

4. Roster Updates

The team reviewed the roster and confirmed that it was accurate and up to date.

Agenda

1. Respond to Comments

VAR-001-4.1

Q1: Requirement R4, regarding exemptions and exempted units, does not require periodic reviews or reviews triggered by changes; such as, technology, system conditions or other factors. Does this create an impact to reliability? If yes, please explain.

Yes – Response to question	No – Response to question	Response to question left blank
6	78	2

D. Sauriol reported that the main theme of comments that the “no” votes mainly stated that any exempt units that would cause a reliability issue would be discovered as the Transmission Operator performs the Operational Planning Analysis (OPA) and Real-time Assessment (RTA); therefore no periodic review would need to be conducted. The “yes” votes stressed the need for review do to system topology changes or technology changes that could impact a previously exempted unit.

While there were No votes, these commenters concluded that there could be issues, but these issues would be caught while performing an OPA or RTA. The EPRT recommended keeping the current recommendation and affirm that industry acknowledged that any exempt units that would cause a reliability issue would be discovered as the Transmission Operator performs the OPA and RTA; therefore, there is no need to require a periodic review of exemption criteria. A few comments supported a periodic review of an exempted generating unit.

There may be future opportunity to revise the standard or provide technical guidance (e.g., guideline) outside of a Reliability Standard. Industry submitted comments identifying that the newly approved IRO/TOP reliability standards should address these issues, although any edits or technical guidance may provide additional defense-in-depth.

Q2: If the voltage schedule issued by the Transmission Operator (TOP) to the GOP (Requirement R5¹) results in a generating unit routinely running at maximum limits, does a lack of dynamic reactive reserve have a reliability impact?

Yes – Response to question	No – Response to question	Response to question left blank
22	53	17

D. Sauriol reported that the major theme of comments noted that the lack of dynamic reserves can have an impact on reliability, but lack of reserves on a single unit would not pose an issue. The PRT recommended keeping the recommendation; however, based on industry submitted comments that the lack of reserves on a single unit would not pose a reliability issue regarding the need for a periodic review. Any issues involving multiple generating units would be identified as part of an OPA or RTA.

Q3. As of April 1, 2017, there will no longer be any explicit requirements for monitoring or ensuring adequate reactive reserves. Absent of any explicit requirements to monitor or ensure adequate reactive reserves within the IRO, TOP, or VAR standards, is there an impact to reliability? If yes, please explain.

¹ **R5.** Each Transmission Operator shall specify a voltage or Reactive Power schedule (which is either a range or a target value with an associated tolerance band) at either the high voltage side or low voltage side of the generator step-up transformer at the Transmission Operator’s discretion.

Yes – Response to question	No – Response to question	Response to question left blank
11	71	4

S. Solis reported that a few comments supported explicit monitoring of reactive reserves; however, the majority of industry comments indicated that the TOP/IRO standards address the issue of monitoring. The periodic review team affirmed that there may be future opportunity to revise the standard or provide technical guidance (e.g., guideline) outside of a Reliability Standard. Industry submitted comments identify that the newly approved IRO/TOP reliability standards should address these issues, although any edits or technical guidance may provide additional defense-in-depth.

Q4. As VAR-001-4.1 Requirement R5, Part 5.2 is silent with regards to a time duration that a generator can be outside of voltage schedule before notification is required. If the TOP is not required to specify the timing portion of the notification requirements while maintaining the necessary flexibility, is there an impact to reliability? If yes, please explain.

Yes – Response to question	No – Response to question	Response to question left blank
3	80	3

K. Harrison reported that the theme of “no” comments note there is a lack of a requirement to define a time duration does not affect reliability. However, it is good practice for the TOP to explicitly define this in their notification requirements provided to the GOP. The current standards provide the flexibility for the TOP to do this. The theme of “yes” comments note there is ambiguity could lead to an indefinite time delay, negating the requirement to provide some sort of notification. A time duration should be required, but it should not be prescriptively defined by NERC. The PRT consensus is that VAR-002 R5.2 provides sufficient flexibility for the TOP to provide a time duration. Having a time duration as part of the notification requirements could be included in a future revision to the Reliability Guideline-Reactive Power Planning.²

Q5. VAR-001-4.1 Requirement R5 does not include the RC as a recipient of voltage or Reactive Power schedules issued to generators. Is there an impact to reliability? If yes, please explain.

Yes – Response to question	No – Response to question	Response to question left blank
2	82	2

S. Solis reported that the theme of “yes” comments related to information in the voltage/reactive power schedules, at a minimum, could be used to improve the Reliability Coordinator’s (RC) awareness. Also, that VAR-001-4.1 is not the proper standard for such an obligation. Rather, commenters believe IRO-010-2 would be more appropriate.

² Reliability Guideline-Reactive Power Planning, December 2016, <http://www.nerc.com/pa/RAPA/rg/ReliabilityGuidelines/Reliability%20Guideline%20-%20Reactive%20Power%20Planning.pdf>

The theme of “no” comments note that notification could be attained by other means (e.g., IRO-010-2). Also, it is not necessary for RC’s wide-area view as this is generally a “local” issue. Other comments include that Requirement R1, Part 1.1 addresses this concern sufficiently. The consensus of the PRT is to modify the recommendation to note that IRO-010-2 provides for obtaining the status should the RC need it.

Q6. VAR-001-4.1 Requirement R5 dictates the status of an AVR. Does the lack of a similar requirement to identify the initial state of the PSS impact reliability? If yes, please explain.

Yes – Response to question	No – Response to question	Response to question left blank
15	69	2

S. Barfield-McGinnis reported that industry provided varying comment that included; not everyone has a power system stabilizer (PSS), the issue of initial state is addressed by VAR-002, and when a unit is identified by TPL-001-4 it is important to know the initial state. Other comments note that knowing the initial state is not meaningful and others that the state is already known or designated. Lastly, another commenter suggested that there should be a requirement for initial state of the PSS. The PRT reached consensus that there is no need to recommend addressing the initial state of the PSS and that the recommendation would be amended to note that the majority of stakeholders affirmed that a requirement of the initial state of the PSS is not necessary.

Q7. The continent-wide VAR standards do not address external control loops to the AVR that may impact the reactive response of a generator. Some external control loops do not have the purpose of automatic voltage control, therefore, is there a need to coordinate external loops to prevent an impact to reliability?³ If yes, please explain.

Yes – Response to question	No – Response to question	Response to question left blank
12	40	34

K. Harrison reported that the theme of “no” comments noted that it would not be appropriate for TOP to define or specify external control loops. A NERC standard is not appropriate for this type of coordination; however, if it were to be included, a VAR standard would not be the ideal place to address external control loops. The theme of “yes” comments included making sure the AVR is actually controlling voltage to a voltage target and that it is important and should be coordinated. However, a continent-wide requirement could be difficult to draft and could be overly prescriptive. The PRT concurred with industry comments not to recommend coordination of external control loops as a revision to VAR-001.

³ See also: Lesson Learned, Generator Distributed Control System Impact on Automatic Voltage Regulators, June 9, 2015, (http://www.nerc.com/pa/rrm/ea/Lessons_Learned_Document_Library/LL20150602_Generator_Distributed_Control_System_Impact_on_Automatic_Voltage_Regulators.pdf)

Q8. There are a number of errata (i.e., administrative) type observations listed in Attachment 4 of the VAR-001-4.1 template. If you disagree with any of the observations, please list the reference number when providing comment.

Number of stakeholders commenting	Number of stakeholders not commenting
14	72

Count	Comment
9	We agree with the errata list and thank the Periodic Review Team for identifying these administrative type observations.
2	2.4 Reactive Power Schedule should be defined and included the “which could include” statement one time and not repeated throughout the document. It impairs readability.
1	Texas RE recommends using the latest Results Based Standards template for VAR-001. Texas RE noticed R4 starts with “The Transmission Operator...” but the R4 Measure says “Each Transmission Operator...”
1	Reclamation agrees with the proposed errata.
1	The NSRF agrees with the review team.

S. Barfield-McGinnis report that overall industry agrees. One industry comment suggested making Requirement R4 consistent with Measure M4 and the other requirements and measures by starting off the requirement with “Each...” A second comment noted that item 2.4 Reactive Power Schedule should be defined and included the “which could include” statement one time and not repeated throughout the document. It impairs readability. The team retained their recommendations. Another comment suggested defining the phrase “Reactive Power schedule,” which is address by the PRT recommendations.

Q9. There are a number of other observations in Attachment 5 of the VAR-001-4.1 template that could enhance the standard, but would require a drafting team to develop for industry feedback. If you have any comments about these, please list the reference number when providing comment.

Number of stakeholders commenting	Number of stakeholders not commenting
12	62

In summary, six responders added comments about the EPR comments. Some agreed with comments others disagreed and preferred wording in standard. General consensus among responders was our comment that there is no redundancy between Requirement R5.1 of VAR-001-4.1 and Requirement R1 of VAR-002-4. Also three of the six commenters added verbiage that paralleled MRO’s comment. For example, the review team has highlighted a number of issues that would help with clarification of requirements; however the review team has also indicated that this is not a highly violated standard, is practically implemented and addresses a reliability need. While another commenter identified the need for additional requirements. The team believed this is a step in the wrong direction for a standard that is not often violated. Hydro-Québec

TransÉnergie reinforced the comment regarding the TO owning the GSU transformer. The consensus of the PRT is to retain the recommendation.

Q10. 1. The team did not identify a concern related to cost effectiveness as drafted. Do you agree? If not, please provide additional detail.

Yes – Response to question	No – Response to question	Response to question left blank
28	11	47

The PRT concluded that no action was needed based on comments received from industry. S. Barfield-McGinnis reported that Bonneville Power Administration commented that any new requirement should not require new equipment with respect to cost effectiveness.

Q11. Given the items identified by the periodic review team in the VAR-001-4.1 template, do you agree that the Reliability Standard is sufficient to protect reliability and meet the reliability objective of the standard and does not need immediate modification through standards development; however, there may be a future opportunity to improve any non-substantive or insignificant quality and content issues? If you have any other comments on this review that you haven't already mentioned above, please provide them here.

Yes – Response to question	No – Response to question	Response to question left blank
77	2	7

One commenter noted that they frequently encounter wind farms that do not recognize that the technology to maintain voltage is an AVR. Wind farm energy management systems (under a variety of names) clearly demonstrate the capability to control voltage and are used daily and because it is not specifically called an “AVR”, entities could miss these responsibilities. With the penetration of wind, it is imperative that this get corrected globally, rather than one-off awareness (via a compliance discovery method) or workshops that are not necessarily attended by all parties.

VAR-002-4

Q1. VAR-002-4, Requirement R2, requires the GOP to maintain generator voltage or Reactive Power schedule. Requirement R2, Part 2.3 requires a methodology for converting the voltage to the point being monitored by GOP, as applicable. Is Requirement R2, Part 2.3 necessary as a Requirement or is it sufficient to be a Measure (or technical guidance) of maintaining the voltage or Reactive Power schedule as required by Requirement R2? If yes, please explain.

Yes – Response to question	No – Response to question	Response to question left blank
17	72	14

T. Kucey noted that the predominant comment from industry was that VAR-002-4, Requirement R2 Part 2.3 is not required either at all or in its current form. With respect to “no,” “yes,” and “no

response” responses, industry commonly support: the use of technical guidance over current Requirement R2, Part 2.3 language or a rewrite of current language.

Q2. In VAR-002-4 Requirement R3 the GOP notifies the TOP when the AVR status has changed after 30 minutes. There is no requirement for a notification from either the TOP (or GOP) to be submitted to the RC. Is there an impact to reliability? If yes, please explain.

Yes – Response to question	No – Response to question	Response to question left blank
17	83	3

The majority response industry comments reported by T. Kucey was that there is no impact to reliability where VAR-002-4, Requirement R3 does not have a requirement for a notification from either the TOP (or GOP) to be submitted to the RC of an AVR status change. Responses commonly supported: (1) the use of other standards for transmittal of this info to RC; IRO-010-2 is named many times and TOP-001 is named one time, and (2) in most instances AVR status is more of a local concern versus RC wide area view concern; TOP can escalate issues to RC if local study result suggest possible issues. There was no consensus to change the recommendation; industry noted that the RC has various ways of obtaining notification if the RC needs the status.

Q3. There are a number of errata (i.e., administrative) type observations listed in Attachment 4 of the VAR-002-4 template. If you disagree with any of the observations, please list the reference number when providing comment.

Number of stakeholders commenting	Number of stakeholders not commenting
23	80

Count	Comment
9	We thank the Periodic Review Team for identifying these administrative type observations. However, we believe Paragraph 81 requirements do exist within this standard, particularly with Requirement 6 which requires GOs to provide certain modeling data upon request. Nonetheless, we believe pursuing a resolution to these administrative type concerns is a step in the wrong direction for a standard that is not often violated.
4	Part 2.2: Duke Energy agrees that telemetry is a sufficient method of notification to the TOP of an AVR status change. An issue could arise wherein the GOP relies on telemetry to serve as a notification to the TOP, only to find out that the telemetry was not working properly, or failed to alarm, during the status change.
1	For 2.2, if telemetry is stipulated to be acceptable for notification of AVR status change, it should be emphasized that email is not appropriate for notification. Most TOP operators work shifts and even if an email addresses is available for a group, the operator may not be monitoring emails in a timely manner to be sufficient for notification of operational issues.

Count	Comment
2	<p>From review template.</p> <p>2.1 – Agreed,</p> <p>2.2 Means of notification is agreed between GOP and TOP and is not need to be specified in the requirement. This should be addressed in detail in the TOP's TOP-003 Data Specification. If it is clarified that telemetry can be used, clarify that this is at the discretion of the TOP's TOP-003 Data Spec (may not be acceptable to all TOPs, while it is allowed by NERC).</p> <p>2.3 Agree</p> <p>2.4 Already clear, no additional clarity needed.</p> <p>2.5 Clear as is, not needed, but if changes are made they need to be made in R3 per the structure of the requirement.</p> <p>2.6 and 2.7, agree that this content needs to be clarified and that the Section 4, Applicability, is the appropriate place to do that</p>
4	<p>Item 2.2: This clarity is not needed since the TOP specifies the notification methods via BAL-001-4.1, R5.2 and possibly in TOP-003-3.</p> <p>Item 2.3: Not needed as R4 of VAR-002-4 already states "... a change in reactive capability"</p> <p>Item 2.5: The use of status in the main requirement of R4 refers to changes of the status of control detailed in R3, namely the change in status of the AVR, power system stabilizer, or alternative voltage controlling device. The "on" found at the beginning of the second line of R3 in VAR-002-4 is what needs to be changed to "of"</p> <p>Item 2.6: We disagree with removing this bulleted section of R4. It clearly exempts dispersed generating resources from R4 if this is retained. The purpose of this exemption was so that the status of individual inverters at such a site would not have to be individually reported.</p>
1	<p>Texas RE appreciate the SDT's efforts and careful review of the VAR-002-4 Standard. To that end, the SDT has identified a number of typos and non-substantive corrections that should be addressed. However, the in identification of these technical edits, the SDT indicated in item 2.2 that a future SDT may wish to clarify that "telemetry is a sufficient means of providing notification." Texas RE's perspective, this constitutes a substantive departure from standard applications of notification requirements. Put differently, Texas RE views the notification requirements in VAR-002-4, R3 as designed to specifically highlight changes in generator voltage regulation capability. Such changes could be lost in a broad stream of telemetered data, potentially reducing a TOP's situational awareness regarding the level of voltage control available at specific generation resources in real-time.</p> <p>While it may be possible to provide adequate notice through telemetry of AVR status changes, such an issue goes beyond a mere clarification and will require substantive development regarding possible impact. As such, the inclusion of this element is inappropriate as an errata item and should be fully vetted as a substantive change in any possible future projects involving a new version of VAR-002.</p>
1	<p>Reclamation agrees with the proposed errata.</p>

Count	Comment
1	2.2 - should be included in the Measure as a potential means for providing notification, not the requirement. Also, as mentioned TOP-003 allows the TOP to identify the method for providing data. The measure should also include "or other method prescribed by the TOP".

S. Barfield-McGinnis reports that overall industry comments agree with errata recommendations made by the PRT. There were two suggestions and three that disagreed with a couple of recommendations. The PRT moved a few of the recommended errata from Attachment 4 to Attachment 5 based on NERC legal feedback that they would substantive changes. These are identified by language that directs the reader to Attachment 5 for the recommendations that moved.

Q4. There are a number of other observations in Attachment 5 of the VAR-002-4 template that could enhance the standard, but would require a drafting team to develop for industry feedback. If you have any comments about these, please list the reference number when providing comment.

Number of stakeholders commenting	Number of stakeholders not commenting
25	78

There were substantive comments received on items 2.1 and 14.2. The item 2.1- Comments are unanimous that the language should remain as it stands. Item 14.2 comments differ significantly. Two stakeholders requested clarification or a new Requirement R4 addition for the PSS and one expresses that PSS operation should not be dictated by NERC. The PRT maintains as listed in item 2.1 for Requirement R2, Part 2.3, the requirement should have the clause “specified by the Transmission Operator” removed.

The PRT add the following bold text to item 14.2 to address industry comments: “Requirement R3 require the Generator Operator to notify the Transmission Operator of power system stabilizer (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.

Q5. The team did not identify a concern related to cost effectiveness as drafted. Do you agree? If not, please provide additional detail.

Yes – Response to question	No – Response to question	Response to question left blank
81	7	15

S. Barfield-McGinnis reported that stakeholders did not have any issues with cost effectiveness.

Q6. Given the items identified by the periodic review team in the VAR-002-4 template, do you agree that the Reliability Standard is sufficient to protect reliability and meet the reliability objective of the standard and does not need immediate modification through standards development; however, there may be a future opportunity to improve any non-substantive or insignificant quality and content issues? If you have any other comments on this review that you haven't already mentioned above, please provide them here.

Yes – Response to question	No – Response to question	Response to question left blank
83	16	4

The PRT maintained that the standard is not in need of immediate modification but there may be a future opportunity to improve quality and content issues in the standard.

2. Action Items

Have NERC staff review the changes to the template. S. Barfield-McGinnis will proof and clean where errata items moved in each template.

3. Future Meeting(s)

Conference call to address cleanup items scheduled for 3:00 p.m. Eastern on Thursday, May 11, 2017.

4. Adjourn

The meeting adjourned at 3:45 p.m. Eastern on Wednesday, April 26, 2017.