Unofficial Comment Form
Project 2013-04 Voltage and Reactive Control (VAR) Revisions

Please DO NOT use this form for submitting comments. Please use the electronic form to submit comments on the draft VAR-001-4 and VAR-002-3 standards. The electronic comment form must be completed by 8:00 p.m. ET by Tuesday, September 3, 2013.

If you have questions please contact Soo Jin Kim via email or by telephone at 404-446-9742.

The project page may be accessed by clicking here.

Background Information
When the first versions of the VAR standards were approved in FERC Order No. 693,¹ the Commission also issued FERC issued several directives with regard to how to improve the standard. Each of the outstanding directives are explained in detail in the technical white paper (see project page).

The informal consensus building for VAR began in February 2013. Specifically, the ad hoc group engaged stakeholders on how best to address the FERC directives, remove paragraph 81 candidates, and implement results-based approaches. A discussion of the ad hoc group’s consensus building and collaborative activities are also included in the technical white paper.

Based on stakeholder outreach, the VAR-001 and VAR-002 standards have been modified. The proposed VAR-001 answers most of the FERC directives from Order No. 693, and VAR-002 has been modified to address certain compliance issues today. This posting is soliciting comment on a pro forma standard and a Standard Authorization Request (SAR).

You do not have to answer all questions. Enter comments in simple text format. Bullets, numbers, and special formatting will not be retained.

**Question**

1. Do you have any specific questions or comments relating to the scope of the proposed pro forma standard or SAR?

☑ Yes  
☐ No

Comments: The SAR should not be posted with the Standard. The intent of posting a SAR for comment is to seek industry’s input on the need and scope of a proposed standard’s development or revision. Posting the Standard for comments and ballot means that the SAR is “water under the bridge”, and that industry’s input on the SAR doesn’t mean anything.

2. Do you have any specific questions or comments relating to the requirements in the proposed pro forma standards?

☑ Yes  
☐ No

Comments: VAR-002 uses footnote (3) on page 6 to clarify the phrase “voltage or Reactive Power schedule.” VAR-001 does not use a footnote or otherwise define “voltage or Reactive Power schedule.” Instead of using a footnote to clarify/define the phrase, add the phrase “voltage or Reactive Power schedule” to the Definitions of Terms Used in the Standard, making sure it is applicable to both VAR-001 and VAR-002. Suggest adding the following wording to both VAR-001 and VAR-002:

**Definitions of Terms Used in the Standard:**

*Voltage or Reactive Power Schedule* – A target value communicated by the Transmission Operator to the Generator Operator establishing a tolerance band within which the target value is to be maintained during a specified period.

If this definition is added to VAR-001 and VAR-002, then VAR-002 footnote (3) should be deleted.

For VAR-001-4:

Recommend adding “upon request” to this sub-requirement to make it read: “Each Transmission Operator shall provide a copy of these documented policies or procedures to adjacent Transmission Operators, upon request.”
VAR-001 uses the term “real-time” (no capitalization) throughout, whereas VAR-002 uses the term “Real-time” (capitalized) in R1. The capitalized term is defined in the NERC Glossary of Terms Used. The Glossary definition is the meaning intended for both standards. Please use consistent terminology employing the capitalized Glossary term “Real-time” throughout both Standards.

Regarding VAR-001, typically, the voltage and Reactive Power (VAR) output of a generator may be adjusted by one or more of three means: a no-load tap changer (NLTC), a load-tap changer (LTC), or an automatic voltage regulator (AVR). The requirements in the VAR-001 Standards should more fully and clearly address these Real-time and periodic NLTC, LTC and AVR changes or adjustments.

The following wording changes are proposed for VAR-001 Requirements R1, R3, R4 and R6:

The language of R1 includes key words such as “implemented” and “control voltage,” representing Real-time actions taken by a TOP to keep voltages within limits that could be interpreted to include actions such as switching shunt capacitors/reactors, adjusting transformer taps, adjusting transfers, adjusting generation or other dynamic VAR sources (like SVC's). The intent of R1 may simply be to address the RC monitoring issue, as directed by FERC Order 742 (see Rationale for R1). However, the R1 language can also be interpreted to include the Real-time aspects of R4 creating a potential overlap. Depending on the interpretation and intent of the drafting team for R1, might R4 be a candidate for elimination? Regardless, clarity of wording and intent in R1 is needed.

If the intent in R1 is to respond to FERC's Order 742 directive to assure “monitoring,” then the Drafting Team should consider deleting the action verb “implemented.” The revised wording would read:

**R1.** Each Transmission Operator shall have documented policies or procedures that are to establish, monitor, and control voltage levels and Reactive Power flows (Mvar flows) within limits ...

If “implemented” is not deleted, then it should be replaced by words conveying the intended meaning, e.g., “that are monitored and enforced.” However, there enforcement is inherent in all standards that all “documented policies or procedures” will be enforced. Application is verified by audit. Adding the phrase “that are implemented” is not needed, and can possibly lead to confusion.

The TOP should only be required to develop exemption criteria in R3 if there is an established need for generator exemptions. Once the TOP has determined that there is a need for generator exemptions, only then should it be required to develop and implement exemption criteria. We recommend changing to word of R3 to not only conform to the appropriate Requirement format but include the preceding:

**R3.** Each Transmission Operator shall determine the criteria that shall exempt generators from R4.
Requirement R4 may already be covered by FAC-001 and Requirement R1 and may be deleted. But if not, it should be clarified recognizing the following:

NLTCs are typically mechanically-fixed at time of generator interconnection and are only adjusted, if necessary, during a generator outage. The NLTCs may not be adjusted in Real-time. The TOP typically establishes initial voltage and Reactive Power requirements in the Interconnection Agreement under FAC-001-0, which states:

**R2.** The Transmission Owner’s facility connection requirements shall address ...

**R2.1.9.** Voltage, Reactive Power, and power factor control.

The interconnection provisions of R4 are covered in FAC standards. Non-Real-time Periodic timeframe changes in the NLTC settings may be addressed under Requirement R6.

Requirement R6 does not appear to refer to Real-time operations and may be deleted from the Real-time standard. However, if it is not deleted, the wording should be revised to address NLTCs only. NLTCs are typically mechanically-fixed at time of generator interconnection and are only adjusted, if necessary, during a generator outage. The NLTCs may not be adjusted in Real-time. The initial NLTC settings are typically addressed during the generator interconnection process (see FAC-001). The need for a NLTC change is typically determined by the TOP through periodic (e.g., seasonal, 5-yr.) system studies. NLTCs adjustment are determined by and directed by the TOP.

Alternatively, a load tap changer (LTC) may be adjusted by the GOP under load in Real-time. The setting of any LTC and the automatic voltage regulator (AVR) are typically under the control of the GOP. If this Requirement is referring to a LTC operation in Real-time, it is inappropriately assigned to the TOP. The GOP should have the flexibility to follow its voltage and Reactive Power schedule using the LTC and/or AVR. Alternatively, if the requirement is addressing changes applicable only to the NLTC, then it should be reworded accordingly.

We assume the intent is to address NLTC tap changes only and recommend a wording/format change as follows:

**R6.** Each Transmission Operator shall determine the need for generator step-up transformer no-load tap changes.

6.1 After consulting the Generator Operator regarding necessary step-up transformer tap changes, the Transmission Operator shall provide documentation to the Generator Operator specifying the required tap changes, a timeframe for making the changes, and technical justification for these changes.
R1 can be interpreted to require a TOP to have documented policies or procedures in place that can be implemented to establish, monitor, and control voltage levels and Reactive Power flows (Mvar flows) within limits as defined in Parts 1.1 to 1.3. However, Part 1.1 requires that the policy/procedure shall include criteria used in system assessments. What is “system assessments” intended to mean? What is “criteria for the assessments” intended to mean, especially in relation to “established steady-state limits, voltage stability limits, etc.”? If the assessments were meant to yield the “limits”, then there it is confusing as to what limits are intended to be developed in relation to the “established” limits.

In Order 693, P. 1868, FERC directs the ERO to modify VAR-001-1 to include more detailed and definitive requirements on “established limits”. Does it mean more detailed and definitive requirements on stipulating voltage and reactive requirements with respect to established limits (SOLs, IROLs, voltage level, etc.), or does it mean more details on limits (boundaries) of the interconnection voltages as implied by Requirement R8 of the existing VAR-001 Standard? Requirement R1 does not provide clarity since Part 1.1 refers to “established steady-state limits, voltage stability limits”, which is different from the “established limits” presented in the R8 of the existing VAR-001 standard. Requirement R1 as presented does not provide any clarity as to what practice a TOP is required to meet.

Requirement R1 as presented is unclear on its objective and the exact actions required of the Responsible Entity as there are a number of “criteria” and “limits” in the main requirement and its part 1.1 that are confusing and subject to different interpretations. R1 as presented will leave a Responsible Entity not knowing what it needs to do to meet Requirement and its reliability objectives. Suggest that R1 and its parts be revised to clarify its intent, especially on the who, the specific actions and expected outcome according to the results-based principle and guideline.

With respect to part 1.1, Measure M1 asks for evidence that proves voltage is currently being monitored. “Such evidence may include, but is not limited to: 1) proof that points are telemetered, 2) alarms are functioning, and 3) during events of low or high voltage the policies and procedures are being followed to respond to control voltage levels.” These examples of evidence do not reflect the scope and depth of R1 and Parts 1.1 (the criteria and assessment parts).

R2 as presented appears to go beyond the FERC directive that RC be included to be assigned the “monitoring responsibility” as R2 now requires the RC to “....perform assessments on their respective areas in order to ensure sufficient reactive resources are available for scheduling to maintain voltage stability under normal and contingency conditions in order to provide the voltage levels as defined in Requirement R1.” The inclusion of RC in this requirement is also inconsistent with the view presented in the Informal Consideration with respect to parity between TOPs and RCs.

Parts 2.1 and 2.2 stipulate a number of tasks for the TOPs with respect to operating or directing the real-time operation of devices necessary to regulate transmission voltage and reactive flow, and to ensure that sufficient reactive resources have been scheduled to meet the acceptable day-ahead voltage limits.
identified in Requirement R1. These tasks do not involve the RC. It thus raises a question on the need for including RC in the main requirement when it is not required to take further actions to assure its assessment of “sufficient reactive resources are available for scheduling to maintain voltage stability under normal and contingency conditions” can be fulfilled in real-time operations. We believe the inclusion of RC in this requirement is inappropriate, or if there is a compelling reason to include the RC, then Parts 2.1 and 2.2 are insufficient to assure the RC’s assessment can be supported in real-time operations.

Requirement R2, Part 2.1 stipulates that the Transmission Operator has two things (operate or direct) that can be done to “…regulate transmission voltage and reactive flow necessary to regulate transmission voltage and reactive flow which may include…” Part 2.1 should only contain one thing.

The order of Requirements R3 and R4 should be reversed since the exemption criteria (R3) should appear after the overarching requirements for GOs to maintain a voltage or Reactive Power schedule and tolerance band.

Regarding Requirement R5, suggest replacing “know” with “monitor”. This provides an active approach, which is appropriately reflected by the wording in Measure M4.

In the Compliance Section, there is no requirement for the RC to retain evidence for Measure M2. Further, there is no requirement for the TOP to retain evidence for Measures M5 and M6.

Regarding the VSL for R1, there is no explicit requirement in R1 for the TOP to provide a copy of the assessment criteria to its RC or neighbor TOPs since the assessment criteria are supposed to be included in the policy or procedure document. The Low VSL thus serves no purpose. Further, from the standpoint of meeting the intent of Requirement R1, there is little to no difference between having documented policies or procedures which do not include any of the elements stipulated in Parts 1.1 to 1.3, and having no documented policies or procedures at all. Suggest to remove the Low VSL and the High VSL, and keep the Moderate VSL and revise the Severe VSL to include the condition presented in the High VSL as an “OR” condition under the Severe VSL.

Regarding the VSL for R2, throughout R2 there are no specific requirements for having policies and procedures implemented to have sufficient MVARs. R2 requires the TOP and RC to perform assessments on their respective areas in order to ensure sufficient reactive resources are available for scheduling to maintain voltage stability under normal and contingency conditions. Part 2.2 stipulates the requirements for scheduling reactive resources to meet the reactive requirements resulting from day-ahead assessments. Part 2.1 stipulates the requirement to operate or direct the real-time operation of devices necessary to regulate transmission voltage and reactive flow. While the Moderate VSL, which addresses non-compliance with Part 2.2 and appears to be reasonable, the Severe VSL does not correspond to how Part 2.1 is presented. The condition that “A lack of real-time operations is also severe.” seems irrelevant.
to Part 2.1 when it comes to operating or directing the real-time operation of devices necessary to regulate transmission voltage and reactive flow. There can be no lack of real-time operations, but a TOP may totally ignore the operations or directing the operations of devices necessary to regulate transmission voltage and reactive flow. There is no VSL for the RC failing to meet R2. Hence, the RC is assigned a responsibility but its compliance is not measured and there is no VSL to determine its non-compliance.

Regarding the VSL for R5, the conditions in the Moderate and High VSLs are irrelevant to the requirement. R5 requires a TOP to know (monitor) the status of all transmission Reactive Power resources, automatic voltage regulators, and power system stabilizers in its system. The Moderate VSL makes reference to a “stable area”, which is totally irrelevant and out of context of R5. In the High VSL, the TOP not knowing “the status of important equipment in weaker areas that were identified in assessments as part of R1.” are also irrelevant and out of context of R5. Finally, there is no Severe VSL. What constitutes a total failure to comply with Requirement R5?

Regarding the VSL for R6, the Low VSL should have an “is”, not an “are”. There is no Severe VSL and hence there is no condition to constitute a total failure to comply with Requirement R6.

VAR-002-3

Regarding Measure M2, M2 presents the scenarios where a Generator Operator may not be able to meet a voltage schedule or comply with the TOP’s directive, and how a GOP may manage the situations. The description part does not belong in a Measure, and should be moved to the Background Information Section that a Results-based standard template has made provision for.

Regarding Measure M3, the latter part of M3 is not presented in a manner to require the evidence to demonstrate compliance. Suggest revising M3 to read:

The Generator Operator shall have evidence it notified its associated Transmission Operator within 30 minutes of any of the changes identified in Requirement 3, or evidence that the status had been restored within the first 15 minutes of such change.

For all Measures, there are no examples of evidence provided. It would be appropriate if after each of the “evidence”, additional wording “such as log, recording, or other documents” so as to be consistent with the way Measures are presented in other standards.

Regarding Evidence Retention, it would be appropriate to reference the Measure Number for the GO’s and the GOP’s data retention requirements.
3. Do you have any issues with the proposed timeframes for the notification requirements in VAR-002 R2 and R3? If you propose different timeframes, please explain how a change in the timeframe will not create a reliability gap?

☐ Yes
☒ No

Comments:

4. During outreach, several issues pertaining to voltage coordination were discussed, as outlined in the ‘minority issues’ section of the technical white paper. However, those issues are not addressed because such issues are outside of the scope of this project. What suggestions do you have for improving voltage coordination between TOPs and GOPs? Is it appropriate to address this issue in a Standards project?

Comments: NERC’s Reliability Issue Steering Committee (RISC) is charged to address emerging reliability issues and recommend preferred approaches to manage such issues. Whether or not the TOP/GOP voltage coordination issue should rise up to a risk level that warrants special attention by the industry, and whether the appropriate way to address this issue in a standard project will be best evaluated and determined by the RISC. We suggest that the Drafting Team nominate this issue for RISC consideration.

The Requirements in both VAR-001-4 and VAR-002-3 should be reviewed to ensure they are in the correct NERC Standard Development format.