

## Consideration of Comments on Initial Ballot of Interpretation of VAR-002 for ICF Consulting

**Summary Consideration:** Several balloters indicated that the interpretation may be read as “requiring” that automatic voltage regulation is required, even if not installed at a facility. The interpretation states “The standard is predicated on the assumption that the generator has the physical equipment (automatic voltage regulator) that is capable of automatic operation .... The standard has no stated requirement that each generator shall be equipped with an AVR.”

Several balloters asked for clarification on how to acquire an “exemption” from the Transmission Operator. The Interpretation cannot include any additional requirements such as how exemptions are determined or implemented. However, Reliability Standard VAR-001-1a Requirement R3 requires the Transmission Operator to identify criteria for exempting generators from compliance with the requirement (identified in VAR-001-1a R4) to comply with the voltage schedule (provided by the Transmission Operator) in automatic voltage control mode and the requirement (identified in VAR-001-1a R6) to maintain or change voltage or reactive power schedules (provided by the Transmission Operator).

Some balloters indicated that this interpretation does not support the “original” intent of the predecessor Planning Standard and stated that the original intent of the predecessor standard was to require all generators to have AVR and operate in the automatic mode. The original Planning Standard used as a basis for Version 0 was III.C.S1 which stated “All synchronous generators connected to the interconnected transmission systems shall be operated with their excitation system in the automatic voltage control mode unless approved otherwise by the transmission system operator.” Neither the current standard nor the Interpretation state or reference this “intention”.

Some balloters indicated that interpretations should be posted for comment before being balloted. The drafting team is aware that the NERC Standards Committee is considering proposing a revision to the Reliability Standards Development Procedure to include a comment period for interpretations.

The drafting team did not make any modifications to the interpretation based on the comments received.

| Entity                      | Segment | Vote        | Comment   |
|-----------------------------|---------|-------------|---|
| FirstEnergy Energy Delivery | 1       |             | FirstEnergy AFFIRMS the interpretation response provided in VAR-002a in response to questions raised by ICF Consulting. FirstEnergy agrees that all requirements of VAR-002 are applicable to all Generator Owner and Generator Operators as described in the interpretation response, regardless of whether or not the unit is equipped with an automatic voltage regulator (AVR). The interpretation response states “The standard is predicated on the assumption that the generator has the physical equipment (automatic voltage regulator) that is capable of automatic operation. A generator that is not equipped with an automatic voltage regulator results in a functionally equivalent condition to a |
| First Energy Solutions      | 3, 5, 6 |             |   |
| Ohio Edison Company         |         | Affirmative |   |

| Entity  | Segment | Vote     | Comment  |
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|   | 4       |          | <p>generator equipped with an automatic voltage regulator that is out of service due to maintenance or failure."</p> <p>However, in FERC Order 693, one could conclude that the Commission assumes that the standard is predicated on the assumption that all bulk power system connected generator units are equipped with AVR. In paragraph 1881 the Commission states "Reliability Standard VAR-002-1 requires generator operators to operate in automatic voltage control mode, to maintain generator voltage or reactive power output as directed by the transmission operator, and to notify the transmission operator of a change in status or capability of any generator reactive power resource."</p> <p>The standard, as written, does not explicitly require AVR equipment on all synchronous generation units connected to the bulk power system. Currently, the need for AVR installations is described in a Transmission Owner's facility connection requirements (FAC-001) and/or Interconnection Agreements between and Transmission Owner and Generation Owner.</p> <p>FirstEnergy believes the interpretation is correct and accurate based on the present state of the VAR-002a standard. However, NERC should adjust the scope of the existing standard development project "Project 2008-01: Voltage and Reactive Control" to consider questions raised by this interpretation request. Through project 2008-01, the industry should reflect on the reliability need to mandate AVR installations on the appropriate subset of BES generation units within a TOP or BA footprint. The subset could be based on some % of total units or % of total MVA capability.</p> |
| <p><b>Response:</b> Thank you for your support and comments for the future development of the standard. Your comments will be forwarded to the drafting team working on the further development of this standard for its consideration. Note that when a standard has an approved interpretation, the Reliability Standards Development Procedure includes the following language, which supports your recommendation, "The interpretation will stand until such time as the standard is revised through the normal process, at which time the standard will be modified to incorporate the clarifications provided by the interpretation."</p> |         |          |  |
| Hydro One Networks, Inc.  | 1, 3    | Negative | <p>Hydro One Networks Inc. casts a Negative vote with the following comments:</p> <ol style="list-style-type: none"> <li>1. The interpretation as written could mean that AVR is required even if not installed at a facility. This is not the intent of the Standard.</li> <li>2. The interpretation mentions that the TOP may provide exemptions but does not give a process to apply and grant such exemptions.</li> </ol>  |

| Entity  | Segment | Vote     | Comment  |
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| <p><b>Response:</b> 1. The interpretation states "The standard is predicated on the assumption that the generator has the physical equipment (automatic voltage regulator) that is capable of automatic operation .... The standard has no stated requirement that each generator shall be equipped with an AVR.</p> <p>2. The Interpretation cannot include any additional requirements such as how exemptions are determined or implemented. However, Reliability Standard VAR-001-1a Requirement R3 requires the Transmission Operator to identify criteria for exempting generators from compliance with the requirement (identified in VAR-001-1a R4) to comply with the voltage schedule (provided by the Transmission Operator) in automatic voltage control mode and the requirement (identified in VAR-001-1a R6) to maintain or change voltage or reactive power schedules (provided by the Transmission Operator).</p> |         |          |  |
| Hydro-Quebec<br>TransEnergie  | 1       | Negative | The interpretation is not clear, and may modify the intention of the standard in the sense that the requirement R3 could be interpreted to mean that an Automatic Voltage Regulator "AVR" is required if not already installed, when that is not the intention.  |
| <p><b>Response:</b> The interpretation states "The standard is predicated on the assumption that the generator has the physical equipment (automatic voltage regulator) that is capable of automatic operation .... The standard has no stated requirement that each generator shall be equipped with an AVR.</p>   |         |          |  |
| National Grid   | 1       | Negative | <p>National Grid agrees with the comments made by NPCC and its other regional entities that requirement R3 could be interpreted to mean that an Automatic Voltage Regulator "AVR" is required if not already installed, when that is not the intention. The interpretation is not clear, and may modify the intention of the standard.</p> <p>The existing Standard requirement R3 clearly states:<br/>         R3. Each Generator Operator shall notify its associated Transmission Operator as soon as practical, but within 30 minutes of any of the following:<br/>             R3.1. A status or capability change on any generator Reactive Power resource, including the status of each automatic voltage regulator and power system stabilizer and the expected duration of the change in status or capability.<br/>             R3.2. A status or capability change on any other Reactive Power resources under the Generator Operator's control and the expected duration of the change in status or capability.</p> <p>In addition there are compliance concerns on what would constitute sufficient notification by a GO to a TO that there was no AVR and if simply a Not Applicable would be an acceptable compliance reporting statement.</p> |

| Entity  | Segment | Vote     | Comment  |
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|   |         |          | <p>Also, exemptions by the TO are mentioned in the interpretation. What are the processes for granting an exemption? What if one is not given to a unit that does not have AVR? National Grid believes more work is needed on the Interpretation and that NERC should consider adding comment periods to Formal Interpretations rather than just posting them for a preballot review and ballot. National Grid therefore must vote against this interpretation.</p>  |
| <p><b>Response:</b> 1. The interpretation states "The standard is predicated on the assumption that the generator has the physical equipment (automatic voltage regulator) that is capable of automatic operation .... The standard has no stated requirement that each generator shall be equipped with an AVR. As the commenter points out, R3.1 and R3.2 require a status change notification – if equipment is not installed, there can be no change in status.</p> <p>The drafting team cannot speak for the Compliance Enforcement Authority.</p> <p>The Interpretation cannot include any additional requirements such as how exemptions are determined or implemented. However, Reliability Standard VAR-001-1a Requirement R3 requires the Transmission Operator to identify criteria for exempting generators from compliance with the requirement (identified in VAR-001-1a R4) to comply with the voltage schedule (provided by the Transmission Operator) in automatic voltage control mode and the requirement (identified in VAR-001-1a R6) to maintain or change voltage or reactive power schedules (provided by the Transmission Operator).</p> <p>The NERC Standards Committee is considering proposing a revision to the Reliability Standards Development Procedure to include a comment period for interpretations.</p> |         |          |  |
| Northeast Utilities   | 1       | Negative | <p>Northeast Utilities believes that VAR-002 R3 and the Interpretation could still be interpreted to mean that an Automatic Voltage Regulator (AVR) is required if not already installed, when that is not the intention.</p> <p>The interpretation is not clear, and may modify the intention of the standard.</p> <p>In addition, there are outstanding compliance concerns on what would constitute sufficient notification by a GOP to a TOP that there was no AVR, and if simply a "Not Applicable" would be an acceptable compliance reporting statement.</p> <p>Also, R2 and the interpretation require an exemption be granted by the TOP to the GOP - what are the processes and time frames for granting such an exemption? What if one is not given to a unit that has no AVR? NU believes more work is needed on the Interpretation and that NERC should consider adding comment periods to Formal Interpretations, rather than just posting them for a preballot review and ballot.</p> |
| <p><b>Response:</b> 1. The interpretation response states "The standard is predicated on the assumption that the generator has the physical equipment (automatic voltage regulator) that is capable of automatic operation .... The standard has no stated requirement that each generator shall be equipped with an AVR. AS the commenter points out, R3.1 and R3.2 requires a status change notification – if equipment is not installed, there can</p>   |         |          |  |

| Entity   | Segment | Vote        | Comment  |
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| <p>be no change in status.</p> <p>The Interpretation cannot include any additional requirements such as how exemptions are determined or implemented. However, Reliability Standard VAR-001-1a Requirement R3 requires the Transmission Operator to identify criteria for exempting generators from compliance with the requirement (identified in VAR-001-1a R4) to comply with the voltage schedule (provided by the Transmission Operator) in automatic voltage control mode and the requirement (identified in VAR-001-1a R6) to maintain or change voltage or reactive power schedules (provided by the Transmission Operator).</p> <p>The NERC Standards Committee is considering proposing a revision to the Reliability Standards Development Procedure to include a comment period for interpretations.</p> |         |             |  |
| California ISO   | 2       | Affirmative | The interpretation provides a clear description of the responsibility of the generator operator without AVR on what they need to do to comply with the standard.   |
| <p><b>Response:</b> Thank you for your comment and support.</p>  |         |             |  |
| Independent Electricity System Operator  | 2       | Affirmative | The IESO is concerned that the interpretation as written may send a wrong signal that generators are not required to be equipped with automatic voltage regulators. We therefore propose the leading sentence in the second paragraph be revised to: "The main objective of this standard is to mitigate reliability risks by requiring Generator Operators to notify Transmission Operators when removing automatic voltage regulators from service", although there are no requirements in the existing standard that require a generator to have an automatic voltage regulator, nor are there any requirements for a Generator Owner to modify its generator to add an automatic voltage regulator." |
| <p><b>Response:</b> The interpretation response states "The standard is predicated on the assumption that the generator has the physical equipment (automatic voltage regulator) that is capable of automatic operation .... The standard has no stated requirement that each generator shall be equipped with an AVR. The Interpretation cannot include any additional requirements such as stating that the installation of AVR is required. Your comments will be forwarded to the drafting team working on the further development of this standard for its consideration.</p>   |         |             |  |
| ISO New England, Inc.  | 2       | Negative    | This Interpretation will result in weakened Reliability: the original predecessor (Planning Standards = Version 0) of this Standard was intended to require AVRs on all generators and that they be operated in Auto mode. Additionally, a finding of the Blackout was a lack of this coordinated setting on Generators in the ECAR Region. ISO New England further believes that NERC should consider adding comment periods to   |

| Entity   | Segment | Vote        | Comment  |
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|  |         |             | Formal Interpretations rather than just posting them for a preballot review and ballot.  |
| <p><b>Response:</b> The original Planning Standard used as a basis for Version 0 was III.C.S1 which stated "All synchronous generators connected to the interconnected transmission systems shall be operated with their excitation system in the automatic voltage control mode unless approved otherwise by the transmission system operator." Neither the current standard nor the Interpretation state or reference this "intention".</p> <p>The NERC Standard Committee is currently working on the procedures for handling Interpretations. Your comments will be forwarded to it for consideration.</p> |         |             |  |
| Midwest ISO, Inc.  | 2       | Affirmative | We agree that the standard should not oblige a generator to install equipment. However, it is important that this interpretation does not overrule interconnection requirements of the local transmission owner/operator. There may be some misunderstanding as well. While we heard people talk about generators that didn't have an AVR, they may be mistaken. Even then the alternators in cars have AVRs. What people might be thinking in some situations is that they have a generator that doesn't strictly maintain a constant voltage. Generator AVRs generally have a reactive droop feature that lets voltage drop as the MVA loading increases. The operator has to give the generator a new setpoint to return to a given voltage as the machine is loaded. It's quite possible that many people who think they don't have an AVR, actually do. |
| <p><b>Response:</b> Thank you for your comments and additional explanation.</p>  |         |             |  |
| Consolidated Edison Co. of New York  | 3       | Negative    | Requirement R3 could be interpreted to mean that an Automatic Voltage Regulator is required when not already installed, and that is not the intention. The interpretation is not clear and may modify the intention of the standard. Exemptions by the TO are mentioned in the interpretation. It is not clear what the processes are for granting an exemption.   |
| <p><b>Response:</b> The interpretation response states "The standard is predicated on the assumption that the generator has the physical equipment (automatic voltage regulator) that is capable of automatic operation .... The standard has no stated requirement that each generator shall be equipped with an AVR. AS the commenter points out, R3.1 and R3.2 requires a status change notification – if equipment is not installed, there can be no change in status.</p>   |         |             |  |

| Entity   | Segment | Vote     | Comment   |
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| <p>The Interpretation cannot include any additional requirements such as how exemptions are determined or implemented. However, Reliability Standard VAR-001-1a Requirement R3 requires the Transmission Operator to identify criteria for exempting generators from compliance with the requirement (identified in VAR-001-1a R4) to comply with the voltage schedule (provided by the Transmission Operator) in automatic voltage control mode and the requirement (identified in VAR-001-1a R6) to maintain or change voltage or reactive power schedules (provided by the Transmission Operator).</p>  |         |          |   |
| Allegheny Energy Supply Company, LLC   | 5       | Negative | <p>Generators that do not have an AVR, and are not exempted by the TOP would be required to install an AVR. Synchronous generators that do not have AVR's most likely are small or older units.<br/>           This interpretation would allow the TOP to move the burden of voltage control to an entity that may not be best suited to provide the service.</p>   |
| <p><b>Response:</b> The interpretation response states "The standard is predicated on the assumption that the generator has the physical equipment (automatic voltage regulator) that is capable of automatic operation .... The standard has no stated requirement that each generator shall be equipped with an AVR. The exemption is a formal acknowledgement of the Transmission Operator's decision on how to meet system needs utilizing resources, if installed and operational, considering their size, effect and condition. A statement by the Transmission Operator to require a piece of non-existent equipment to perform in a specified manner is meaningless.</p> |         |          |   |
| Reliant Energy Services  | 5       | Negative | <p>Reliant voted no for the following reason;<br/>           Units without an AVR would be older, smaller and inefficient units. These units would not have a material impact on the BES. Even though the standard does not require an AVR the owner would probably opt to install an AVR rather than risk a violation. This unit should automatically be exempt without the TOP's approval.</p> <p>The "not receive a voltage schedule" is a concern. The standard should require the TOP to supply the GOP with a voltage schedule. Instead it gives the TOP the option to provide a voltage schedule or a reactive power schedule. The AVR must be in the auto voltage mode so shouldn't the TOP be required to supply a voltage schedule?</p> <p>Does operating the AVR in the auto voltage mode while requiring the generator to control to a reactive power schedule subject the BES to the risk of a voltage collapse event?</p> |
| <p><b>Response:</b> The standard has no stated requirement that each generator shall be equipped with an AVR. The exemption is a formal acknowledgement of the Transmission Operator's decision on how to meet system needs utilizing resources, if installed and operational, considering their size, effect and condition. A statement by the Transmission Operator to require a piece of non-existent equipment to perform in a specified manner is meaningless.</p>  |         |          |   |

| Entity   | Segment  | Vote               | Comment   |
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| <p>The commenter's concern about "not receive a voltage schedule" is related to the requestor's statements and not part of the Interpretation. VAR-001 contains requirements related to this concern. The Transmission Operator is in the best position to decide what is the most appropriate manner in which to maintain reliable operation in each area of the BES utilizing all the resources available.</p>   |          |                    |   |
| <p>U.S. Army Corps of Engineers Northwestern Division</p>  | <p>5</p> | <p>Affirmative</p> | <p>I do think there needs to be a requirement for the TOP to issue a waiver on following voltage or reactive schedules for those generators that don't have an AVR. As it stands, there is no obligation for a waiver to be issued and this puts the GOP in the untenable position of using alternative means to follow voltage or reactive schedules.</p>  |
| <p><b>Response:</b> Thank you for your comment and support. The standard has no stated requirement that each generator shall be equipped with an AVR. The exemption is a formal acknowledgement of the Transmission Operator's decision on how to meet system needs utilizing resources, if installed and operational, considering their size, effect and condition. A statement by the Transmission Operator to require a piece of non-existent equipment to perform in a specified manner is meaningless.</p> <p>Whether automatic equipment control is available or not, the Transmission Operator is required by VAR-001 to issue a schedule or provide an exemption. R2.2 does provide recourse for the generator that cannot comply with the schedule.</p> |          |                    |   |
| <p>U.S. Bureau of Reclamation</p>  | <p>5</p> | <p>Negative</p>    | <p>Reclamation's concerns: The response to the request for interpretation for R1 offered that "There are no requirements in the standard that require a generator to have an automatic voltage regulator, nor are there any requirements for a Generator Owner to modify its generator to add an automatic voltage regulator. Unless exempted by the Transmission Operator, each Generator Operator shall maintain the generator voltage or Reactive Power output (within applicable Facility Ratings) as directed by the Transmission Operator. . . . VAR-002-1a is predicated on the assumption that the generator has the physical equipment (automatic voltage regulator) that is capable of automatic operation."</p> <p>In R2 the interpretation provides "Requirement R2 allows a Transmission Operator to exempt generators from maintaining a generator voltage or Reactive Power output schedule." The standard should automatically exempt the Generator Operator from having to request an exemption or the exemption from the Transmission Operator is automatic when the generator does not have the physical equipment (automatic voltage regulator) (AVR). This would avoid the problem realibility problem when the Transmission Operator chooses to not provide the exemption when there is no physical equipment. The Generator Operator would have to attempt to follow voltage schedules with some non-automatic means.</p> <p>The interpretation of R2 offered: Requirement R2.1 states that the Generator Operator</p> |



| Entity | Segment | Vote | Comment  |
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|        |         |      | <p>must control voltage and reactive output in accordance with the schedule provided by the Transmission Operator using alternative methods when the automatic voltage regulator is not available. The action required is to control voltage or Reactive Power and the desired result is for the voltage schedule to be met. This requirement applies to a generator irrespective of whether it is equipped with an out of service automatic voltage regulator or no automatic voltage regulator at all. Requirement R2.2 is independent of the presence of an automatic voltage regulator and does allow the Generator Operator without an automatic voltage regulator to provide an explanation for not being able to comply with the Transmission Operator directed voltage schedule. Similarly, Requirement R2 is also independent of the presence of an automatic voltage regulator but does allow the Transmission Operator to consider information provided by the Generator Operator in accordance with R1 and possibly R2.2 regarding the fact that the generator is not automatic voltage regulator equipped. This interpretation presumes that a Transmission Operator would exempt a generator if no AVR is present.</p> <p>Since the standard uses the word "may" it implies that a Generator Operator would be required to follow a voltage schedule even if there is no AVR installed, if the Transmission Operator chooses to not allow an exemption. Synchronous generators that do not have AVR's most likely are small or old units. The Transmission Operator would be aware of the generating unit and would have allowances for other means of controlling voltage. The interpretation would allow the Transmission Operator to move the burden of voltage control to an entity that may not be best suited to provide the service. In those cases, the Generator Operator would be required to attempt to follow a voltage schedule with plant operators. System voltages change continuously; even a set voltage schedule would require continuous excitation system adjustment. This would not add to the system reliability. The interpretation for conditions where there is no physical AVR should allow for an exemption.</p> |
|        |         |      | <p><b>Response:</b> The standard has no stated requirement that each generator shall be equipped with an AVR. The exemption is a formal acknowledgement of the Transmission Operator's decision on how to meet system needs utilizing resources, if installed and operational, considering their size, effect and condition. A statement by the Transmission Operator to require a piece of non-existent equipment to perform in a specified manner is meaningless.</p> <p>Whether automatic equipment control is available or not, the Transmission Operator is required by VAR-001 to issue a schedule or provide an exemption. R2.2 does provide recourse for the generator that cannot comply with the schedule.</p>   |

| Entity   | Segment | Vote     | Comment  |
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| Commonwealth of Massachusetts<br>Department of Public Utilities  | 9       | Negative | <p>Requirement R3 can be interpreted to mean that an Automatic Voltage Regulator "AVR" is required if not already installed, when that is not the intention. The interpretation is not clear, and may modify the intention of the standard.</p> <p>R3. Each Generator Operator shall notify its associated Transmission Operator as soon as practical, but within 30 minutes of any of the following:</p> <p>R3.1. A status or capability change on any generator Reactive Power resource, including the status of each automatic voltage regulator and power system stabilizer and the expected duration of the change in status or capability.</p> <p>R3.2. A status or capability change on any other Reactive Power resources under the Generator Operator's control and the expected duration of the change in status or capability.</p> <p>What would constitute sufficient notification by a GO to a TO that there was no AVR? The original predecessor (Planning Standards = version 0) were intended to require AVRs on all generators and that they be operated in Auto mode. A finding of the Blackout was a lack of this coordinated setting on Generators in the ECAR Region.</p> |
| <p><b>Response:</b> The interpretation response states "The standard is predicated on the assumption that the generator has the physical equipment (automatic voltage regulator) that is capable of automatic operation .... The standard has no stated requirement that each generator shall be equipped with an AVR.</p> <p>The Interpretation does not address the extent or the process used to provide notification. These would be addressed by additional requirements which are not allowed in an Interpretation.</p> <p>The original Planning Standard used as a basis for Version 0 was III.C.S1 which stated "All synchronous generators connected to the interconnected transmission systems shall be operated with their excitation system in the automatic voltage control mode unless approved otherwise by the transmission system operator." Neither the current standard nor the Interpretation state or reference this "intention".</p> |         |          |  |
| New York State Reliability Council   | 10      | Negative | <p>We have voted NO because the VAR-002-1 Requirement R3 interpretation can be misinterpreted to mean that an Automatic Voltage Regulator "AVR" is required -- if not already installed -- when that is not the intention.</p> <p><b>Response:</b> The interpretation response states "The standard is predicated on the assumption that the generator has the physical equipment (automatic voltage regulator) that is capable of automatic operation .... The standard has no stated requirement that each generator shall be equipped with an AVR. As the balloter points out, R3.1 and R3.2 require a status change notification – if equipment is not installed, there can be no change in status.</p>  |