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| NOGRR Number | [246](https://www.ercot.com/mktrules/issues/NOGRR246) | NOGRR Title | Related to NPRR1161, Clarify AVR Notification Requirements for IRRs |
| Date Posted | | February 7, 2023 | |
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| Requested Resolution | | Normal | |
| Nodal Operating Guide Sections Requiring Revision | | 2.2.5, Automatic Voltage Regulators  2.7.3.4, QSE Responsibilities | |
| Related Documents Requiring Revision/Related Revision Requests | | Nodal Protocol Revision Request (NPRR) 1161, Clarify AVR Notification Requirements for IRRs | |
| Revision Description | | This Nodal Operating Guide Revision Request (NOGRR) clarifies that Intermittent Renewable Resources (IRRs), who remain synchronized to the ERCOT System but are not able to provide reactive power when not providing real power, do not have to notify ERCOT other than the Real-Time telemetered status. | |
| Reason for Revision | | Addresses current operational issues.  Meets Strategic goals (tied to the [ERCOT Strategic Plan](http://www.ercot.com/content/wcm/lists/144926/ERCOT_Strategic_Plan_2019-2023.pdf) or directed by the ERCOT Board).  Market efficiencies or enhancements  Administrative  Regulatory requirements  Other: (explain)  *(please select all that apply)* | |
| Business Case | | Some Market Participants reported to ERCOT that their procedures to comply with notification requirements related to Automatic Voltage Regulator (AVR) status changes would cause them to make daily or much more frequent voice calls to ERCOT that are not necessary upon approval of NPRR1138, Communication of Capability and Status of Online IRRs at 0 MW Output. This clarification will prevent unnecessary voice notifications to ERCOT Operators.  NPRR1138 requires the IRRs to telemeter a status of “Off” when the IRR is not producing real power output and is not capable of providing reactive power. It is normal for a unit that is Off-Line to have its AVR telemeter “Off” and no verbal notification made. The unique nature of IRRs remaining synchronized to the ERCOT System during night or no wind conditions technically meets the definition of “On-Line” and thus causes the need for clarification. Generation Resources that are capable of providing reactive power when not producing real power should still verbally notify ERCOT in addition to AVR telemetry as this is an abnormal operating status. | |

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| Market Segment | Not Applicable |

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| Proposed Guide Language Revision |

### 2.2.5 Automatic Voltage Regulators

(1) A Resource Entity shall immediately notify its QSE and its interconnecting TO of any change in Automatic Voltage Regulator (AVR) status (i.e., AVR unavailability due to maintenance or failure and when the AVR returns to normal operation). A QSE shall immediately notify ERCOT, via telemetry and verbal notification, of any change in AVR status and shall supply AVR status logs to ERCOT upon request per Protocol Section 6.5.5.1, Changes in Resource Status. For each Generation Resource that is On-Line but not producing real power and is not capable of providing reactive power, each QSE must still telemeter its AVR status to ERCOT, but is not required to provide verbal notifications of its AVR status changes to ERCOT during these operating conditions.

(2) Resource Entities shall conduct tests for the purpose of model verification on AVRs or verify AVR performance through comparison with operational data a minimum of every ten calendar years. All new Generation Resources shall conduct an AVR test as prescribed in paragraph (4) of Protocol Section 8.1.1.2.1.4, Voltage Support Service Qualification, within five years of the initial AVR test approved as part of the commissioning process. All subsequent tests shall be conducted on a ten year cycle. Additionally, if equipment characteristics are knowingly modified, an AVR test shall be conducted within 120 days of the modification. Industry accepted testing techniques shall be used for testing, measuring and calculating the modeling parameters. The test report must list the test(s) conducted or include the operational data used to verify the modeling parameters. Any models created from the test data must be a standard Power System Simulator for Engineering (PSS/E) dynamic model or ERCOT and Transmission Service Provider (TSP) approved user written model.

(a) Resource Entities will provide the test data or verified dynamic models to ERCOT by submittal to the Net Dependable Capability and Reactive Capability (NDCRC) application located on the MIS Secure Area or by updating its Resource Registration information respectively.

(b) All devices included in the AVR control system including but not limited to synchronous condensers, static Volt-Ampere reactive (VAr) compensators, static synchronous compensators (STATCOMs), and switchable shunt reactive devices required to meet Protocol Section 3.15, Voltage Support, shall be included in the AVR test and set to regulate the transmission level voltage at the Point of Interconnection Bus (POIB).

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| [NOGRR204: Replace paragraph (2) above with the following upon system implementation of NPRR989:]  (2) Resource Entities shall conduct tests for the purpose of model verification on AVRs or verify AVR performance through comparison with operational data a minimum of every ten calendar years. All new Generation Resources and Energy Storage Resources (ESRs) shall conduct an AVR test as prescribed in paragraph (4) of Protocol Section 8.1.1.2.1.4, Voltage Support Service Qualification, within five years of the initial AVR test approved as part of the commissioning process. All subsequent tests shall be conducted on a ten year cycle. Additionally, if equipment characteristics are knowingly modified, an AVR test shall be conducted within 120 days of the modification. Industry accepted testing techniques shall be used for testing, measuring and calculating the modeling parameters. The test report must list the test(s) conducted or include the operational data used to verify the modeling parameters. Any models created from the test data must be a standard Power System Simulator for Engineering (PSS/E) dynamic model or ERCOT and Transmission Service Provider (TSP) approved user written model.  (a) Resource Entities will provide the test data or verified dynamic models to ERCOT by submittal to the Net Dependable Capability and Reactive Capability (NDCRC) application located on the MIS Secure Area or by updating its Resource Registration information respectively.  (b) All devices included in the AVR control system including but not limited to synchronous condensers, static Volt-Ampere reactive (VAr) compensators, static synchronous compensators (STATCOMs), and switchable shunt reactive devices required to meet Protocol Section 3.15, Voltage Support, shall be included in the AVR test and set to regulate the transmission level voltage at the Point of Interconnection Bus (POIB). |

(3) Resource Entities shall verify excitation systems model data upon initial installation, within 120 days of performance modifications, and a minimum of ten calendar years thereafter.

(4) An exemption may be granted for the testing requirements listed in paragraphs (2) and (3) above if the Resource on which the AVR or excitation system is installed has an Annual Net Capacity Factor (ANCF) of 5% or less over the most recent three calendar years preceding the planned testing calendar year. ANCF is calculated as follows:

**Annual Total Net Generation in MWHr/(Annual Hours \* Average Seasonal Net Max Sustainable Rating) \* 100%**

Wherein:

Annual Hours = Number of hours in the calendar year being reported. Hours in mothball or retired status are not included in the hour total;

and

Average Seasonal Net Max Sustainable Rating = Average of the Seasonal Net Max Sustainable ratings submitted via the NDCRC application located on the MIS Secure Area.

(a) At the end of this ten year timeframe, the current average three year ANCF (for years eight, nine, and ten) will be examined by ERCOT to determine if the exemption can be declared for the next ten year period. If no longer eligible for exemption based on the ANCF, then model verification must be completed within 365 calendar days of the date the capacity factor exemption expired. Under certain operating conditions, ERCOT may require a ten year test even if the current average three year ANCF is below the 5% threshold.

(5) Black Start designated units are not eligible for the ANCF exemption detailed in paragraph (4) above. If a Resource that had been granted an exemption detailed in paragraph (4) above is accepted for Black Start Service (BSS), the Resource has 365 days from the start date of BSS to submit modeling information detailed in paragraph (2) above.

(6) Generation Resource AVR modeling information required in the ERCOT planning criteria shall be determined from actual Generation Resource testing described in these Operating Guides. Within 30 days of ERCOT’s request, the results of the latest test performed shall be supplied to ERCOT and the TSP.

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| [NOGRR204: Replace paragraph (6) above with the following upon system implementation of NPRR989:]  (6) Generation Resource or ESR AVR modeling information required in the ERCOT planning criteria shall be determined from actual Generation Resource or ESR testing described in these Operating Guides. Within 30 days of ERCOT’s request, the results of the latest test performed shall be supplied to ERCOT and the TSP. |

2.7.3.4 QSE Responsibilities

(1) Each QSE shall ensure that any Generation Resource that it represents and that is required to provide VSS responds to any VSS Dispatch Instruction including VSS Dispatch Instruction to exceed its CURL or URL or TO Voltage Set Point instruction within the time requirements specified in paragraph (3)(b) of Section 2.2.10, Generation Resource Response Time Requirements, even if the new Voltage Set Point is within the tolerance band identified in paragraph (4) of Section 2.7.3.5, Resource Entity Responsibilities and Generation Resource Requirements. If the Resource Entity notifies the QSE that a Generation Resource cannot comply with the VSS Dispatch Instruction or TO Voltage Set Point instruction, either the Resource Entity or its QSE shall, as soon as practicable, notify the Entity that issued the instruction. The Resource Entity or its QSE shall provide the reason for not being able to comply and an estimated time for resolution, when known.

(2) Each QSE representing a Generation Resource shall provide in Real-Time the desired Voltage Set Point and the associated POIB kV measurement to the Generation Resource.

(3) Each QSE will continuously monitor the status of its Generating Resources’ AVRs and PSSs.

(4) Each QSE must, as soon as practicable, notify ERCOT, via telemetry and verbal notifications, when a Generation Resource experiences a change that affects its reactive capability, including any change to the operation mode of the Generation Resource’s AVR. For each Generation Resource that is On-Line but not producing real power and is not capable of providing reactive power, each QSE must still telemeter its AVR status to ERCOT, but is not required to provide verbal notifications of its AVR status changes to ERCOT during these operating conditions.

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| [NOGRR204: Replace Section 2.7.3.4 above with the following upon system implementation of NPRR989:]  **2.7.3.4 QSE Responsibilities**  (1) Each QSE shall ensure that any Generation Resource or ESR that it represents and that is required to provide VSS responds to any VSS Dispatch Instruction including VSS Dispatch Instruction to exceed its CURL or URL or TO Voltage Set Point instruction within the time requirements specified in paragraph (3)(b) of Section 2.2.10, Generation Resource and Energy Storage Resource Response Time Requirements, even if the new Voltage Set Point is within the tolerance band identified in paragraph (4) of Section 2.7.3.5, Resource Entity Responsibilities and Generation Resource and Energy Storage Resource Requirements. If the Resource Entity notifies the QSE that a Generation Resource or an ESR cannot comply with the VSS Dispatch Instruction or TO Voltage Set Point instruction, either the Resource Entity or its QSE shall, as soon as practicable, notify the Entity that issued the instruction. The Resource Entity or its QSE shall provide the reason for not being able to comply and an estimated time for resolution, when known.  (2) Each QSE representing a Generation Resource or ESR shall provide in Real-Time the desired Voltage Set Point and the associated POIB kV measurement to the Generation Resource or ESR.  (3) Each QSE will continuously monitor the status of its Resources’ AVRs and PSSs.  (4) Each QSE must, as soon as practicable, notify ERCOT, via telemetry and verbal notifications, when a Generation Resource or ESR experiences a change that affects its reactive capability, including any change to the operation mode of the Generation Resource’s or ESR’s AVR. For each Generation Resource that is On-Line but not producing real power and is not capable of providing reactive power, each QSE must still telemeter its AVR status to ERCOT, but is not required to provide verbal notifications of its AVR status changes to ERCOT during these operating conditions. |