**Project 2007-09 Generator Verification**

Unofficial Comment Form

MOD-027-1

**Instructions**

Please **DO NOT** use this form for commenting.  Please use the [electronic comment form](https://www.nerc.net/nercsurvey/Survey.aspx?s=0a9a439eb5fe4b53a6416874be6ff18f) to submit comments on the proposed revisions to MOD-027-1.  Comments must be submitted by 8 p.m. ET on **October 29, 2012**.  If you have questions please contact Stephen Crutchfield at Stephen.crutchfield@nerc.net or by telephone at 609-651-9455.

### Background Information:

The GVSDT posted the draft standard, MOD-027-1, February 29 – April 16, 2012 for a formal comment period and initial ballot. Based on stakeholder feedback, the GVSDT made revisions to the standard to improve clarity.

Most stakeholders agreed with the inclusion of partial load rejection testing and the inclusion of the applicable footnote. As many stakeholders noted, the appropriate footnote in the posted version of the standard was footnote 4, rather than 5 – and is currently footnote 2 in the current draft of the standard. Based on the comments received, the GVSDT made the following clarifications and revisions:

1. Numerous revisions made to clarify the language in Attachment 1, including adding row numbers. Several Industry commenters indicated that it was not clear if the table was associated with Attachment 1 or not. In response, the SDT has re-formatted Attachment 1 to make it clear that the table is a part of Attachment 1.

2. Revised sections 4.2.1, 4.2.2, and 4.2.3 to clarify the language.

3. Corrected numbering error of footnotes 4 and 5.

4. Corrected language in the footnote associated with partial load rejection, changing “on-load data” to “on-line data”

5. Reformatted Subpart 2.1.1 that breaks the three alternatives for acquiring the unit MW response for model verification into 3 bullets instead of listing all three in a sentence.

Stakeholders were evenly divided in their opinions regarding the periodicity aspects of Attachment 1. The GVSDT received suggestions for improvements and made the following clarifications and revisions:

1. Numerous revisions were made to clarify the language in Attachment 1.

2. Row numbers were added to Attachment 1.

3. The following text was removed from Requirement R2: “within 365 calendar days from the date that the response was recorded.”

4. In Attachment 1, the column title was revised from “Comments” to “Required Action”.

5. Removed 25/50/75/100% phase in from the Implementation Plan allowing GOs to install MW Recorders. This phase in unnecessarily complicated the Implementation Plan considering that the vast majority of units already have recorders or processes in place where MW response can be recorded and provided (from plant DCS systems, recorders, SCADA data, etc). Note that low resolution data, approximately 1 sample per second, is adequate for turbine/governor and load control or active power/frequency control function model verification.

There was a lot of industry confusion regarding the GVSDT attempt to effectively propose an exemption for base load units as the term “base load units” per say did not appear in the draft of the standard. We inadvertently used the term “base load” in the question on the comment form, which appears to have caused some confusion. The term “base load” is never used in the standard. We apologize for the confusion this has caused. We have modified Attachment 1 to attempt to clarify that for units that do not respond to frequency excursions, Requirement R2 is met with a written statement to that effect transmitted to the Transmission Planner. Units which respond to over-frequency would need to have verification performed.

Stakeholders provide additional suggestions for revisions to the standard. The following revisions were made by the GVSDT:

1. A significant number of industry commenters opposed the use of the term “bulk power system” in the Applicability section. The SDT did not mean to convey a modification in the breadth of units which would be covered by the standard as “bulk power system” is a term used in the Compliance Registry. But based on the concerns expressed by industry, the SDT has replaced the term “bulk power system” with the NERC defined term “Bulk Electric System”.

2. For clarity and ease of reading, a paragraph within Requirement R3 was moved to the end of the requirement.

3. Change “facility” to “unit” in Measures 2 and 4 to match the terminology in the requirements. Also, other minor clarifications and edits made in the Measures.

4. Change “and” to “or” everywhere the phrase “and active power/frequency control functions” appears.

5. Revised Requirement R2 to remove “within 365 calendar days ......”

6. Revised Subpart 2.1.1 to specify “unit’s MW model response”.

7. Subpart 2.2 has been re-worded and merged into Subpart 2.1. The new verbiage makes it clear that the expert performing the model verification has flexibility regarding if the model should be represented by individual unit or plant aggregate models or any combination therein as dictated by the specific situation. This merger also results in appropriate mapping to the VSLs.

8. Revised Attachment 1 extensively for clarity, including removing specificity regarding when monitoring equipment must be installed. A row was added to the table to account for the possibility that no frequency excursions meeting the criteria occur when the unit is on-line – however, in order for that row to be applicable, monitoring equipment must be in place by the effective date of the standard.

9. Revised the Effective Dates, and subsequently the Implementation Plan, to mirror the Effective Dates in the current draft of MOD-026 (verification of Excitation Control Systems).

10. Removed an extra word “that” (just before the word accurately) in the Purpose statement.

11. The qualifier “directly connected” was applied at the top level of the Facilities section (A4.2) to emphasize direct connection to the BES.

12. The SDT removed the footnote regarding standby units as industry comments suggested that it did not provide additional clarity to the Applicability.

13.The SDT revised the draft standard to reference the net capacity factor calculation in Appendix F of the GADS Data Reporting Instructions. Also, the SDT moved the details of the capacity factor exemption concept form a footnote in the Applicability section to a row (Row 8) in the Periodicity Table. The team thought that would be appropriate as the Periodicity Table already included the “equivalent” unit concept (Row 5).

**Periodicity Table (Attachment 1) for MOD-027-1:**

Based on industry comments from the last posting, the GVSDT modified the Periodicity Table (Attachment 1) to make it to make it significantly simpler and concise. In an effort to re-enforce the resulting modifications detailed in the current draft of the Periodicity Table, the following examples are offered by the GVSDT to aid industry in understanding the proposed model verification periodicity:

Periodicity Example 1:

The following timeline depicts a scenario where the Generator Owner has elected to utilize the ambient event methodology, as opposed to a staged test, to capture the unit’s response to a frequency excursion and subsequently use that captured MW response to verify the model. In order to utilize the ambient event methodology, recorders need to be installed ready to capture the unit’s MW response to an ambient event (system frequency excursion) by the first day of the first calendar quarter following either applicable regulatory approval or, in jurisdictions where no regulatory approval is required, following Board of Trustees adoption. As opposed to the last draft of the standard, the Periodicity Table (Attachment 1) no longer specifies when the Generator Owner has to capture the unit’s Real Power response to a frequency excursion subject to the specification in Note 1 at the end of the Periodicity Table (including per unit hertz deviation and specifying that the unit has to be operating in a frequency responsive mode). The only requirement is that the verified model, documentation, and data must be transmitted to the Transmission Planner on or before the expected date.

In the example below, it is assumed that a unit is part of the 30% of the Generator Owners applicable unit’s gross MVA per Interconnection four years after regulatory or NERC B.O.T. adoption used to meet the Effective Date requirements for Requirement R2. The example assumes that the unit’s Real Power response to a frequency excursion subject to the specification in Note 1 at the end of the Periodicity Table was captured and subsequently the model was verified and transmitted (along with verification documentation and data) to the Transmission Planner exactly on the effective date (Year 4).

Once the model is initially verified, the expectation is that it will be verified again after a 10-year period. For this scenario, the requirements detailing activities by exception do not occur (Requirements R3 – R4), which is expected to be the situation for the majority of the time. The example goes on to assume that the unit’s Real Power response to a frequency excursion subject to the specification in Note 1 at the end of the Periodicity Table was captured between Year four and 14 and subsequently the model was verified and transmitted (along with verification documentation and data) to the Transmission Planner exactly 10 years after the submittal of the previous verification (i.e., 2nd verification and documentation submitted exactly at Year 14) – thus ending the 2nd model verification period and beginning the 3rd model verification period.



Periodicity Example 2:

The second example is much like Example 1 but with two differences. The first is that it is assumed that a unit is part of the 100% of the Generator Owners applicable unit’s gross MVA per Interconnection required to be verified ten years after regulatory or NERC B.O.T. adoption. The second difference is that for the second verification, twelve years passed (Year 22) before the first time since the first verification the unit was operating in a frequency responsive mode and was subjected to a BES frequency excursion since the previous verification at Year 10. Thus, the verified model and documentation and data were not transmitted to the Transmission Planner until Year 23. This delay is acceptable, because Row 3 of the Periodicity Table states that if a unit if not subjected to a frequency excursion per Note 1 in time to meet the expected periodicity, then Requirement R2 of the standard is met with a written statement to the Transmission Planner. However, the verification model and documentation and data is due to the Transmission Planner 365 days after a frequency excursion per Attachment 1 Note 1:



Periodicity Example 3:

The third example assumes that the Generator Owner chooses to perform a staged test. It is assumed that a unit is part of the 50% of the Generator Owners applicable unit’s gross MVA per Interconnection six years after regulatory or NERC B.O.T. adoption used to meet the Effective Date requirements for Requirement R2. The requirements detailing activities by exception do not occur (Requirements R3 – R4); which is expected to be the situation for the majority of the time. The first staged test has to be performed early enough for the subsequent model verification to be completed and transmitted to the Transmission Planner by Year six. For the second verification, another stage test is performed before the Year 10 anniversary date of the transmittal of the previous verification information – in for the subsequent model verification to be completed and transmitted to the Transmission Planner by Year 16.



Periodicity Example 4:

The fourth example details a scenario in which the GVSDT anticipates would rarely occur. The first six years is similar to Examples 1and 2 – it is assumed that a unit is part of the 50% of the Generator Owners applicable unit’s gross MVA per Interconnection six years after regulatory or NERC B.O.T. adoption. The example assumes that the unit’s Real Power response to a frequency excursion subject to the specification in Note 1 at the end of the Periodicity Table was captured and subsequently the model was verified and transmitted (along with verification documentation and data) to the Transmission Planner exactly on the effective date (Year 6).

However, the scenario assumes that four years after the transmittal of the model verification documentation and data for the first verification, the Generator Owner performs an activity which changes the equipment response (Year 10). As detailed in Requirement R4, the Generator Owner has 180 days to determine if updated model data can be provided, or if the model needs to be re-verified. The example timeline below assumes that later; i.e., the Generator Owner submits a plan in 180 days to re-verify the model. From that point, per the Periodicity Table, the Generator Owner begins to monitor for an appropriate ambient event while the unit is in a mode that it is expected to govern. Once the ambient event has occurred, then the Generator Owner has an additional year to transmit the model and documentation to the Transmission Planner. In this example, the ambient event with the unit in the proper operating mode occurred in two years after the Generator Owner decided to verify the model (i.e., Year 12.5), and the Generator Owner completed model verification and transmitted the results to the Transmission Planner at Year 13.5.



**You do not have to answer all questions. Enter All Comments in Simple Text Format.**

*Insert a “check” mark in the appropriate boxes by double-clicking the gray areas.*

1. **The GVSDT has revised Attachment 1 to attempt to clarify that, for units that do not respond to frequency excursions, Requirement 2 is met with a written statement to that effect transmitted to the Transmission Planner. Units which respond to over-frequency would need to have verification performed. Do you agree with this revision? If not, please explain in the comment area below.**

[ ]  Yes

[ ]  No

Comments:

1. **The GVSDT has revised Attachment 1 to make the periodicity requirements more clear. Do you agree with these revisions? If not, please explain in the comment area below.**

[ ]  Yes

[ ]  No

Comments:

1. **Do you have any other comment, not expressed in questions above, for the GVSDT?**

Comments: