2019 GENERATOR FREQUENCY RESPONSE SURVEY FAQ

Question 1	Which event of those listed should I choose?
Answer	Select an event where the unit being evaluated was online with enough headroom (High Limit minus MW output at time of the event) to allow the generator governor to respond. For example, if a unit is at full load for one event, select an alternate event where the unit did have headroom to respond.

Question 2	Should I submit a response to each Frequency Event listed?
Answer	It is only required to choose a single event for each generator. However, if you wish, you can submit responses for multiple events.

Question 3	If a unit is offline, should I do an evaluation?
Answer	Yes. For offline units, please fill out the survey spreadsheet ("PFR_Survey_Ver1_…") on each unit and select "OffLine" from the drop down list for the "Unit Operating Mode @ Time of Event:" cell[D19]. Click any other cell and then Save the spreadsheet. This way we will have a record of your participation in the survey. There is no need to take any other actions (populate Historian Data or Calculate Results for an Offline Unit.

Question 4	Since there are no results or information from an offline unit, why take the time to enter data and submit.
Answer	Submitting data on your units is voluntary at this point. By submitting information for each unit (or farm for solar and wind) helps the Balancing Authority and NERC to determine the participation level in the survey.

Question 5	What is the NERC desired dead band and governor settings?
Answer	Per the Reliability Guideline: Primary Frequency Control - Version 2 (Approved by the Operating Committee on June 4, 2019) (URL: https://www.nerc.com/comm/OC_Reliability_Guidelines_DL/PFC_Reliability_Guideline_rev20190501_v2_final.pdf), for both the Eastern and Western Interconnections, governor dead-band settings should be .036 Hz (36mHz) with a droop setting of 5%.

Question 6	Should I use Gross or Net values for the generation?
Answer	Net is preferred as this is the true change the Grid sees during the event. However, the change (or delta) in Gross MW values will most likely be the same delta or very similar to the change in Net MW for the short duration of an event like is being analyzed.

Question 7	Should the MW values entered on the historian be the same (Net or Gross) as the Pmax and Pmin?
Answer	Yes, in order to calculate the available headroom, you need to be consistent for all MW values used. Either use all Gross of all Net for any MW values input in the spreadsheet.

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Question 8	What is the smallest generator that should submit a survey?
Answer	Survey participation is expected for resources meeting the NERC definition of a Bulk Electric System generator. This definition can be found in the NERC Glossary: *"Generating resource(s) including the generator terminals through the high-side of the step-up transformer(s) connected at a voltage of 100 kV or above with:* *a) Gross individual nameplate rating greater than 20 MVA. Or,* *b) Gross plant/facility aggregate nameplate rating greater than 75 MVA."* *and* *"Dispersed power producing resources that aggregate to a total capacity greater than 75 MVA (gross nameplate rating), and that are connected through a system designed primarily for delivering such capacity to a common point of connection at a voltage of 100 kV or above. Thus, the facilities designated as BES are:* *a) The individual resources, and* *b) The system designed primarily for delivering capacity from the point where those resources aggregate to greater than 75 MVA to a common point of connection at a voltage of 100 kV or above."*

Question 9	Why do I get a "No Evaluation" in the "Results" tab but everything else looks correct with the input?
Answer	If the actual generation is within 2% (or 5MW) of Pmax at the time of the event, the spreadsheet will not calculate a scored response. At this condition, very little headroom is available, and the unit is not scored. A "No Evaluation" is displayed. Check to see if this is the case for you unit.

Question 10	How should I submit if I have a wind farm? Should it be per turbine or facility?
Answer	A facility level response is desired. For most wind farms, Pmax at the time of the event will be the MW Output entered in the spreadsheet "Historian Data" tab.

Question 11	My wind farm has multiple controllers. Should I report each controller or each wind farm?
Answer	Each wind farm is desired.

Question 12	For a wind farm, my Pmin is zero, is that ok to enter?
Answer	Yes, Pmin equal to zero is a valid entry. I the wind farm has no frequency response, then Pmax at the time of the event should be the MW Output entered in the spreadsheet "Historian Data" tab. Since no upward headroom exist then the Spreadsheet will give a "No Evaluation".

Question 13	The steam turbine of my combined cycle operates in following mode or valves wide open (VWO). How does that impact the droop setting?
Answer	Most combined cycles operate in this fashion and the NERC guideline recommends setting each CT at 4% droop to approximate the combined block having an effective droop of ~5%.

Question 14	On the "Chart" tab in the spreadsheet, what is the "Offset" cell at the bottom of the chart used for?
Answer	This is used to align the T-zero time (displayed on the bottom axis of the chart) to the actual drop in frequency at the start of the event. Because not all data historians maybe precisely time synced, this adjustment is a way to make sure each unit is scored correctly.

Question 15	On the "Main Data Entry Tab" is Pmax and Pmin the unit ratings or values at the time of the event being analyzed?
Answer	Both these values should be entered for the time of the event. For example, if a 600 MW unit was limited to 500 MW at the time of the event, then 500 should be entered as the High Limit and not 600.

Question 16	I don't see a frequency deviation in my data for the event time specified. What are somethings to check?
Answer	1. Make sure you are making the correct time conversion from UTC to the timestamp of your data. For example: 09:00 UTC = 05:00 EDT = 04:00 CDT = 03:00MDT = 02:00 EPT 2. The event time given will be in UTC. Make sure that the timestamp entered in the "Historian" tab matches the "Time Zone of Historian Data:" dropdown time list on the "Main Data Entry" tab (Cell D24). For example: If the time of the MW & frequency data entered is EDT the "Time Zone of Historian Data:" should be set to EDT. The spreadsheet will then search the data for the correct time for the event. 3. If for some reason, your frequency data does not show a frequency drop, if you have generator speed, you could convert speed data to 60Hz to see if this better shows the frequency drop. 4. If the previous steps do not show the frequency (or speed) deviation, contact your host BA for additional assistance. In turn, BAs can request further assistance from the respective RS members for their region for assistance.

Question 17	Nuclear units operate at Pmax most of the time. Do I need to complete a survey for Nuclear units?
Answer	Yes, a record of your survey participation is desired. Submitting information helps the Balancing Authority and NERC to determine survey participation levels and also provides unit information that is useful for planning. At the time of the event, the Pmax valued entered on the "Main Data Entry" tab should be the same as the MW data placed in the "Historian Data" tab. A "No Evaluation" will be the result as there is no headroom to increase generation during the event.

Question 18	What sampling frequency should be entered in the spreadsheet?
Answer	The spreadsheet will accept 1 second to 10 second time increments. To get the most accurate results a 1 or 2 second time increment is preferred.

Question 19	Is it ok to convert machine speed to frequency and use that value instead of a direct frequency measurement to correspond to the MW value, is that ok.
Answer	Yes, that is perfectly fine. The formula to convert speed to Hz is: Frequency (Hz) = (RPM * Number of generator poles)/120 Example: 3,600 generator RPM for a 2-pole generator = 60.00 Hz Example: 3,594 generator RPM for a 2-pole generator = 59.90 Hz Also, this formula can also be used to determine that the +/- .036 Hz (36mHz) deadband is +/-2.16 RPM for a 2-pole generator.

Question 20	Viewing the "Chart" tab, the graph shows the generator initially responds correctly (increases generation) but then begins to decrease generation. Is this normal?
Answer	The initial response (first few seconds) after the dead band in exceed is mostly the governor response. If frequency is below the dead band (.036 Hz), the output should generally remain greater than the output at the point when frequency dropped below the dead band. Also, Outer Loop control, if set incorrectly, can override the governor response and cause this effect.

Question 21	How should I make an entry for my battery storage sites? Some are frequency responsive and some are not.
Answer	In general, the same data is requested for any generation source at point of interconnection that meets the NERC definition of a BES generator.

Question 22	Where should I submit the summary data to?
Answer	You should submit your summary results to your BA. The BA will collect submittals from GO's and forward to NERC.

Question 23	If I have questions about the spreadsheet, who should I contact?
Answer	**Eastern Interconnection:** Troy Blalock, jblalock@scana.com, 803-217-2040 David Deerman, jddeerma@southernco.com, 205-532-1280 **Western Interconnection:** Greg Park, greg@nwpp.org, 503-445-1089 Sam Rugel, srugel@tep.com, 520-745-3265 **NERC:** Elsa Prince, elsa.prince@nerc.net, 404-446-9681

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Question 24	What is the deadline for submitting results to my BA?
Answer	Results (Summary worksheet only) are requested by November 22, 2019

Question 25	What is the deadline for the BA to submit results to NERC?
Answer	Results are requested by December 22, 2019

Question 26	I missed the Webinar. Where can I get a copy of the presentation?
Answer	A copy of the Webinar will be posted on the NERC site. This FAQ will be updated with the URL for the recording when it is posted.

Question 27	What is the "PFR_Survey_Summary _Tool" spreadsheet used for?
Answer	This spreadsheet is used to collect data from individual "PFR_Survey_Ver1_…" spreadsheets and only submits one row of information on each unit to streamline the submittal process.

Question 28	What is the process for using the PFR_Survey_Summary _Tool?
Answer	There are a few items to remember to make this work: 1. Create a single folder and include: a. each "PFR_Survey_Ver1…" spreadsheet (one spreadsheet for each unit analyzed) 2. Be sure to have the first 10 characters of each "PFR_Survey" spreadsheet be "PFR_Survey". After that you are free to include any characters. It is suggested that the unit/facility name be included and the date of the event in the file name for future reference. Example: PFR_Survey_Ver1_08-01-10_CleanCoal _Unit 1.xlsm 3. The "PFR _Survey_Summary_Tool" spreadsheet should be in a different folder than the individual PFR_Survey's