

PJM Capacity Verification Testing Frequently Asked Questions

Summary of changes for 2021

Starting with the 2021 summer testing period, PJM eGADS has been enhanced to collect a bit more refined test information:

- 1) Generating units that are not affected by ambient conditions can now delineate that no weather station is needed to accompany their test information.
- 2) All generating units test durations will automatically be checked to see if the test start and end times render exactly a one or two hour test duration; if they do not, the test will not be accepted.
- 3) All generating units tests that utilize weather data, must use the same weather data source for both the observed and rated conditions. Also, if barometric pressure is used from other than a plant weather station, the barometric pressure (both observed and rated) must be corrected from the weather station elevation to the plant elevation; these two items are discussed in the latest Manual 21, update 15 changes that were effective May 26, 2021.
- 4) If weather station data is used in lieu of plant weather station data, the weather station needs to be a good surrogate for the plant weather station and does not necessarily need to be the weather station that is closest in proximity to the plant; this, too, was a Manual 21, update 15 change that was effective May 26, 2021.

There are other changes in this document below, so it is important that you refresh yourself with the all of the items in this document.

Collection of more pertinent information (circa 2020)

Starting with the 2020 summer testing period, PJM eGADS has been enhanced to collect more pertinent test information. Collection of the following generator site data (for both observed and rated conditions) will be required, based on unit type and equipment:

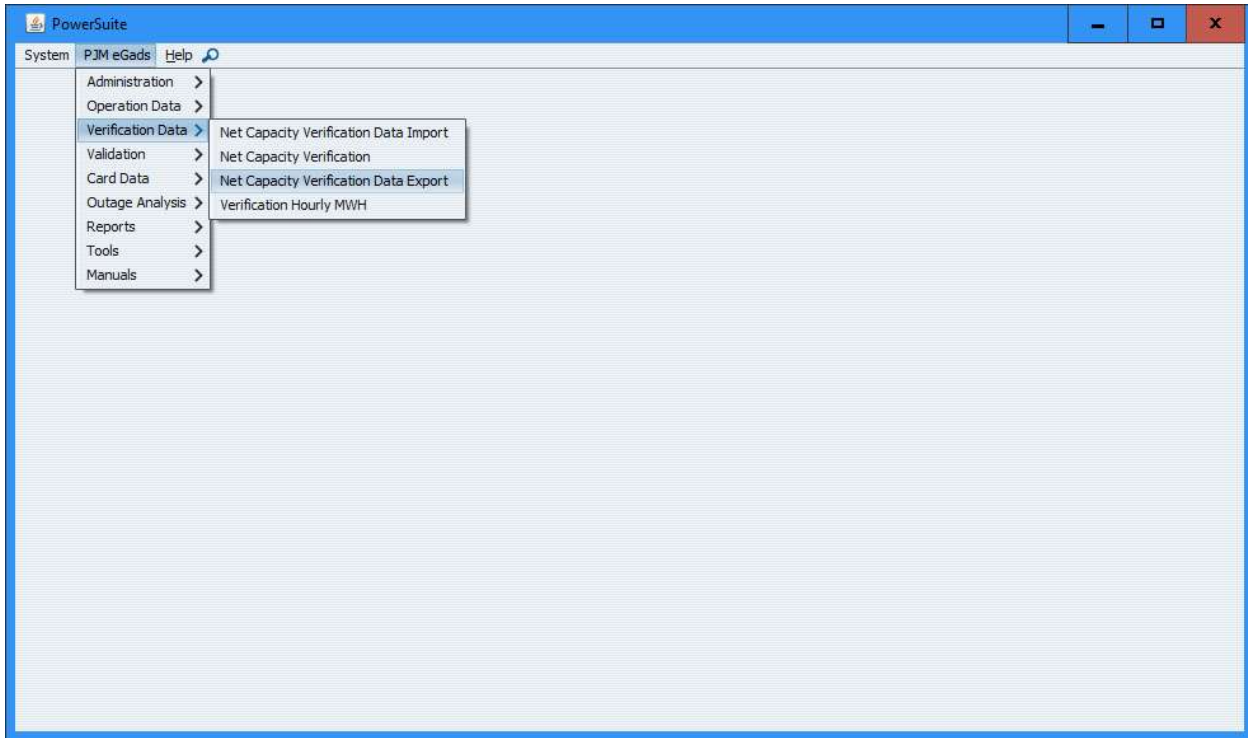
- Dry bulb temperature
- Relative Humidity
- Wet bulb temperature
- Cooling water temperature
- Intake water temperature
- Barometric pressure

Weather station information will also be collected. The source of the weather data must be delineated for all units that are sensitive to ambient conditions.

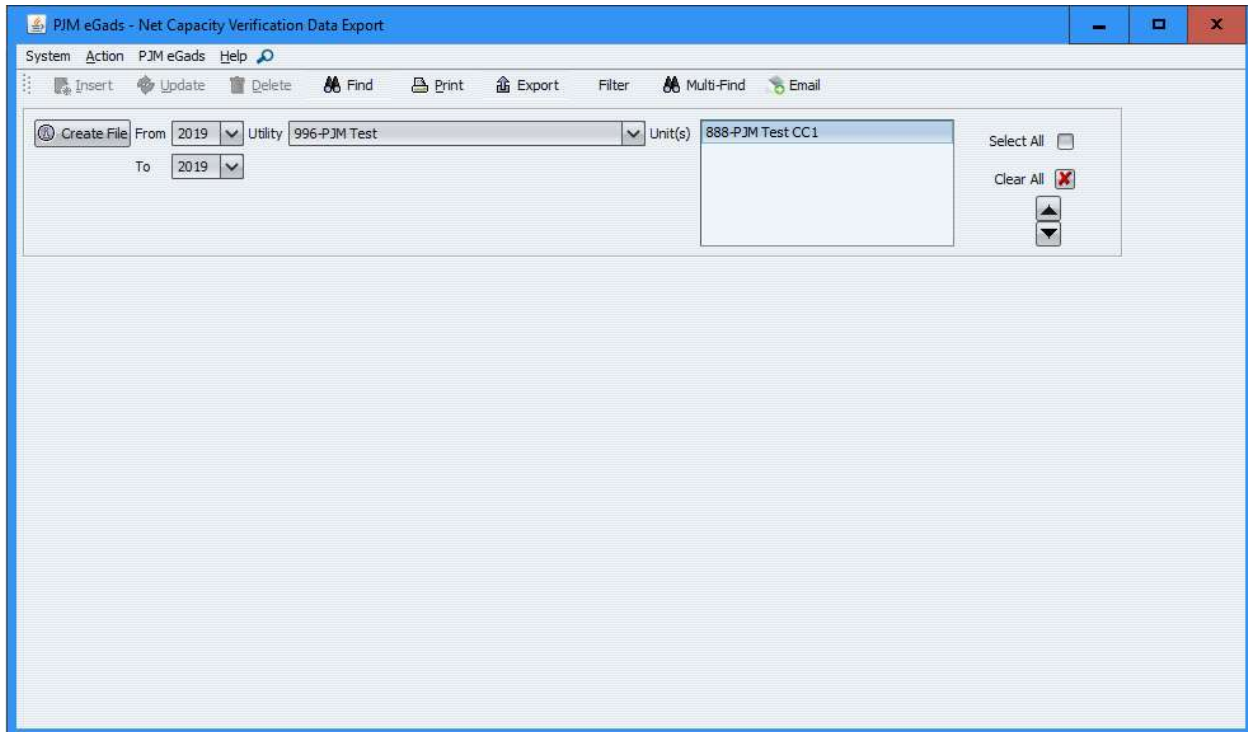
Test data upload file format

Parameters have been added to collect more pertinent information

If test data is uploaded to PJM eGADS, a new upload format needs to be downloaded. Please download a new test upload file from PJM eGADS. To do this, log into PJM eGADS and navigate to PJM eGADS/Verification Data and select Net Capacity Verification Export as shown below:



After you have selected Net Capacity Verification Export, this screen should appear:



Select one or more of your units from last year and click on create file to download a new upload format. The file will be in a csv format and must be uploaded to PJM eGADS in that format. It can be edited in a text editor, Excel or any other spreadsheet application.

Instructions for completing the upload file can be found at this link: <https://www.pjm.com/-/media/planning/res-adeq/pjm-capacity-verification-test-upload-file-instructions.ashx?la=en>

If you enter your generators test manually, please review the document at the above link as the content and formatting should be followed irrespective of test entry method.

Frequently Asked Questions

Pertaining to capacity verification tests

- 1) ***What is the summer test period?*** – The summer test period runs from June 1 thru August 31 annually. All PJM Capacity Verification Tests must be performed between these dates.
- 2) ***What is the winter test period?*** – The winter test period runs from December 1 thru February 28/29 annually. All PJM Capacity Verification Tests must be performed between these dates; if a test is not performed, the test performed in the prior summer can be used and it must be corrected to winter conditions.
- 3) ***What are summer and winter conditions?*** – Summer conditions are the generator site ambient conditions coincident with the last 15 years' PJM summer peaks; Winter conditions are the generator site ambient conditions coincident with the last 15 years' PJM winter peaks.
- 4) ***What test start date do I use if I correct a summer test for winter conditions?*** – Use a start date of 12/1/YYYY @0000 hours.
- 5) ***What is an out of period test?*** – An out of period summer test is a test that is performed on or after September 1 and completed prior to December 1, annually. An out of period winter test is a test that is performed on or after March 1 and completed prior to June 1, annually. Out of period tests are required for any unit that did not perform an in period test or to lessen or alleviate an in period test shortfall after repairs are made.
- 6) ***What is the duration of the Capacity Verification Test?*** – The duration of the Capacity Verification Test is *exactly* one hour for diesel and reciprocating engine, fuel cell, combustion turbine (not part of a combined cycle unit), hydroelectric and pumped storage generators; the duration of the Capacity Verification Test is *exactly* two hours for steam, combined cycle (or its individual components), nuclear and fluidized bed units. If the test start and end times do not render a one or two hour test exactly, the test will not be accepted.
- 7) ***What is a test shortfall?*** – A test shortfall occurs when the Corrected Net Test Capacity is less than the Claimed Installed Capacity of the unit. If a test has a shortfall, PJM eGADS will show the test information highlighted in red.
- 8) ***What is a test shortfall derating?*** – A test shortfall derating event is a forced derating that needs to be submitted to PJM eGADS for the amount of the shortfall.

- 9) ***When do tests need to be entered?*** – Any test can be submitted during its respective test period. Summer tests need to be submitted to PJM eGADS by September 20 annually; winter tests need to be submitted to PJM eGADS by March 20, annually.
- 10) ***When do test shortfall derating events need to be entered in PJM eGADS?***
 - Summer test shortfall derating events need to be submitted to PJM eGADS by September 20 annually; winter test shortfall derating events need to be submitted to PJM eGADS by March 20, annually.
- 11) ***If a unit cannot test, since it is on a forced outage, does a test need to be submitted?*** – Yes. Any unit that cannot test due to a forced outage, must enter a null test and when the unit returns to service, the unit must enter an out-of-period test; a forced outage must also be entered into the PJM eGADS system until the out-of-period test has been completed and submitted to PJM eGADS.
- 12) ***What happens if no test shortfall derating event is entered into PJM eGADS?*** - PJM will enter a shortfall derating event on your behalf and the unit will be subject to a Generation Resource Rating Test Failure Charge (Manual 18, section 9.1.5).

Capacity Verification Test Data

Below are the values and parameters entered and calculated in the verification test data screen. These values and parameters include their respective definitions and instructions for entry.

Corrected Net Test Capacity - This is the net result of the test and it gets compared to the PJM ICAP value. This value cannot be entered on the PJM eGADS screen and it does not need to be input in the upload file; leave the value null; the application will calculate this value.

Claimed Installed Capacity - This is the official PJM ICAP value of the unit. This value cannot be entered on the PJM eGADS screen and it does not need to be input in the upload file; leave the value null; the application will populate this field automatically.

Difference - This is the difference between the Net Corrected Test Capacity and the Claimed Installed Capacity. If it is negative, a shortfall exists. This value cannot be entered on the PJM eGADS screen and it does not need to be input in the upload file; leave the value null; the application will calculate this value.

Gross - This is the hourly gross generation during the test.

Station Service - This is the combined hourly station service load and hourly auxiliary load consumed during the units test.

Auxiliary Load – This is load connected when generator is online related to producing power (i.e. fans, pumps, excitation system, etc.) that would not be present when generator is offline

Station Service Load – This is load that is not considered auxiliary that remains connected to the transmission system when the plant is offline (i.e. lighting, building HVAC, etc.); If there are

multiple units at a generating station each units' test must include a consistent pro-rata portion of the station service load.

Host/Process Load - This is primarily for co-generators, CHP units (Combined Heat and Power), and units that have host or other onsite load. It is the load consumed during the test by the host or onsite customer; this includes both electrical and thermal load (thermal load must be converted to electrical load in some cases). Typically, topping units need to have their thermal load converted to electrical load (MW) to demonstrate what the unit's full gross capability would be without the host or process load; bottoming units typically use waste heat from the host process and need only to include electrical load sent to the host. There are exceptions to these situations, contact the PJM eGADS team if you need to discuss your facilities specific situation. Also, Manual 14D and Manual 14G, delineate how to calculate host/process load under their respective BTMG sections. Typically, the highest integrated hourly host/process load in the most recent 36 months is the amount to be entered on the test form; however, if host/process load at test time is higher, then the load at test time should be entered.

Net Test Capacity - This is the gross capability less auxiliary load, host/process load, and station service load. This value cannot be entered on the PJM eGADS screen; the application will calculate this value. If you are uploading a file, this value must be populated.

Reactive Gen MVAR - This is the hourly reactive generation during the test.

Total Power MVA - This is the total hourly power of the unit. This value cannot be entered on the PJM eGADS screen; the application will calculate this value. If you are uploading a file, this value must be populated and it is the vector sum of the gross generation and reactive generation.

Power Factor - This is the power factor at the time of the test. This value cannot be entered on the PJM eGADS screen; the application will calculate this value. If you are uploading a file, this value must be populated and it is the reactive gen MVAR divided by the total power MVA. This must be input on the verification test upload file and it must be entered and rounded to 4 decimal places.

Test Start Date and Time - This is the date and time of the start of the test. Summer tests must start on or after June 1 @0000 hours and end before September 1 @0000 hours annually. Winter tests must start on or after December 1 @0000 hours and end before March 1 @0000 hours annually. All test times are to be in terms of local plant time (LPT or Local Prevailing Time).

Test End Date and Time - This is the date and time of the end of the test. Summer tests must end after June 1 @0000 hours and end before September 1 @0000 hours annually. Winter tests must end after December 1 @0000 hours and end before March 1 @0000 hours annually. All test times are to be in terms of local plant time (LPT or Local Prevailing Time).

On the verification test screen, all times are entered in 24 hour format and all dates and time parameters have separately delineated values that are input individually.

In the verification test upload file, the start and end dates and times are entered in a date time format of MM/DD/YYYY HH:MM Please remember to enter the year as four digits; the upload file will fail if entered as two digits.

Please ensure that your test start times and test end times are correct; they should only be 1 or 2 hours in duration. Any tests that are not exactly one or two hours will be rejected. Please refer to question #4 above, under frequently asked questions, to determine the correct test duration for your unit.

Dry Bulb Air Temperature

Observed – This is the dry bulb air temperature at the generator site at the time of the test. This value can be an integrated value over the test duration, it can be the value at the half way point of the test, or it can be the average of the value at the start of the test and the end of the test.

Rated – This is the median dry bulb air temperature at the generator site coincident with the dates and times of the last 15 years' summer PJM peaks. These conditions shall be based on plant records or local weather bureau records coincident with the dates and times of the last 15 years' summer PJM peaks, updated no less than every five years. The median can be approximated by the mean.

Correction – This is the correction in MW to rated dry bulb temperature for the test. Typically, if observed dry bulb air temperature is less than rated dry bulb air temperature, corrections are negative.

Relative Humidity

Observed – This is the relative humidity at the generator site at the time of the test. This value can be an integrated value over the test duration, it can be the value at the half way point of the test, or it can be the average of the value at the start of the test and the end of the test.

Rated – This is the median relative humidity at the generator site coincident with the dates and times of the last 15 years' summer PJM peaks. These conditions shall be based on plant records or local weather bureau records coincident with the dates and times of the last 15 years' summer PJM peaks, updated no less than every five years. The median can be approximated by the mean.

Correction – This is the correction in MW to rated relative humidity for the test. Typically, corrections for relative humidity are small and there is no rule of thumb for all units.

Cooling Water Temperature – this parameter was, at one time, the temperature of the cooling water entering the condenser from the cooling body (i.e. Intake water temperature). With the change to close loop cooling for environmental reasons many folks replaced the value with the temperature of the condensate exiting the condenser returning to the boiler, steam generator, or HRSG. This set of parameters is being retired commencing with the summer 2021 test period; no entries in the observed or rated fields will be allowed. If your unit has once thru or multi-pass cooling use the intake water

temperature fields; if your unit has wet cooling towers use the wet bulb temperature fields since the correction for cooling should be based on both condenser performance and cooling tower performance; if your unit has dry cooling towers use the dry bulb temperature fields since the correction for cooling should be based on both condenser performance and cooling tower performance.

Intake Water Temperature – this parameter was incorporated into the testing information commencing with the 2020 summer testing period.

Observed – This is the temperature of the cooling water entering the condenser (on the dirty side) from the cooling pond, river, bay, lake, cooling tower, etc. This value can be an integrated value over the test duration, it can be the value at the half way point of the test, or it can be the average of the value at the start of the test and the end of the test.

Rated – This is the median temperature of the cooling water entering the condenser (on the dirty side) from the cooling pond, river, bay, lake, cooling tower, etc., coincident with the dates and times of the last 15 years' summer PJM peaks. These conditions shall be based on plant records coincident with the dates and times of the last 15 years' summer PJM peaks, updated no less than every five years. The median can be approximated by the mean.

Correction – This is the correction in MW to rated intake water temperature for the test. Typically, if observed intake water temperature is less than rated intake water temperature, corrections are negative.

Wet Bulb Air Temperature – this parameter was incorporated into the testing information commencing with the 2020 summer testing period. This parameter is a function of dry bulb temperature, relative humidity and barometric pressure.

Observed – This is the wet bulb air temperature at the generator site at the time of the test. This value can be an integrated value over the test duration, it can be the value at the half way point of the test, or it can be the average of the value at the start of the test and the end of the test.

Rated – This is the median wet bulb air temperature at the generator site coincident with the dates and times of the last 15 years' summer PJM peaks. These conditions shall be based on plant records or local weather bureau records coincident with the dates and times of the last 15 years' summer PJM peaks, updated no less than every five years. The median can be approximated by the mean.

Correction – This is the correction in MW to rated wet bulb temperature for the test. Typically, if observed wet bulb air temperature is less than rated wet bulb air temperature, corrections are negative.

Barometric Pressure – this parameter was incorporated into the testing information commencing with the 2020 summer testing period. If other than a plant weather station is used for weather data and

barometric pressure is used for corrections or entered on the test form, the weather station barometric pressure values must be corrected to the plant elevation.

Observed – This is the barometric pressure at the generator site at the time of the test. This value can be an integrated value over the test duration, it can be the value at the half way point of the test, or it can be the average of the value at the start of the test and the end of the test.

Rated – This is the median barometric pressure at the generator site coincident with the dates and times of the last 15 years' summer PJM peaks. These conditions shall be based on plant records or local weather bureau records coincident with the dates and times of the last 15 years' summer PJM peaks, updated no less than every five years. The median can be approximated by the mean. Again, if other than the plant weather station data is used, the barometric pressure values must be corrected to plant elevation.

Correction – This is the correction in MW to rated barometric pressure for the test. Typically, corrections for barometric pressure are small and there is no rule of thumb for all units.

Weather Station Data – these parameters were added commencing with the 2020 summer testing period and augmented in the 2021 summer testing period.

Observed – If the weather data observed during the test is determined by a plant weather station, data recorders or determined by plant employees manually at the generator site, please select 'Plant weather station'; there is no need to elaborate in the 'Specify' field; If the weather data observed during the test is determined by use of a local, city or airport weather station, please select 'Local/City/Airport' and specify, in the 'Specify' field, the locale name, city name, airport code or name, NOAA WBAN number, website such as wunderground.com and the site name or other standard weather station name and identifier. Entry in the 'Specify' field is mandatory. If the weather data is determined from another means or the weather data is a blend of plant and weather station data please select 'Other' and provide a description in the 'Specify' field. If more space is needed, please use the notes area. If the generating unit is not affected by ambient conditions please select 'No Weather Data Needed.'

Rated – If the rated weather data is determined by a plant weather station, data recorders or determined by plant employees manually at the generator site, please select 'Plant weather station'; there is no need to elaborate in the 'Specify' field; If the rated weather data is determined by use of a local, city or airport weather station, please select 'Local/City/Airport' and specify, in the 'Specify' field, the locale name, city name, airport code or name, NOAA WBAN number, website such as wunderground.com and the site name or other standard weather station name and identifier. Entry in the 'Specify' field is mandatory. If the rated weather data is determined from another means or the weather data is a blend of plant and weather station data please select 'Other' and provide a description in the 'Specify' field. If more space is needed, please use the notes area. If the generating unit is not affected by ambient conditions please select 'No Weather Data Needed.'

Note – this area is for further elaboration of the weather station information and to supply any notes, descriptions, and information that is pertinent to the verification test.

Reminders about the verification test and its parameters

Determination of any observed parameter, such as: dry bulb air temperature, relative humidity, intake water temperature, wet bulb air temperature, or barometric pressure, must be consistent. These values can be an integrated value over the test duration, they can be the value at the half way point of the test, or they can be the average of the value at the start of the test and the end of the test. However, all parameters must be determined using the same methodology and that methodology must be used season after season and year after year. Determination of rated parameters should also use similar consistent methods.

If a particular set of parameters are used to correct the test output, the same set of parameters must be used to determine the Claimed Installed Capacity.

Claimed Installed Capacity (also known as Rated ICAP) should be also determined in accordance with Manual 21, Section 1.2.

Generating units that are sensitive to ambient conditions must test within the temperature and humidity limits delineated in Manual 21, section 1.3. If it is impractical to test within the aforementioned limits, testing can occur without adherence to the temperature and humidity limits as long as the testing start time is 10 am or later (local plant time) and the testing end time is 10 pm or earlier (local plant time) on any day from July 7th through August 31st.

Depending upon the generating unit type and equipment, you may be required to enter a certain set of ambient parameters. However, in any case, if a parameter is entered, its corresponding rated or observed parameter will be required.

CT Temp Corr

CT w/evap w curves

 w/o curves assume 85%

ST w/cooling twrs (wet)

 w/once thru/multipass

 w/dry cooling

Rev Meter Proof

 Not telemetry

 Rev meter scaled w telemetry

Weather Station

 If plant has weather station

 Both obs & rated from weather station

 If plant has weather station but only data for generating hours

 Both obs & rated from 'proxy' weather station

Test MWs obs&rated

 Include aux load (even if not affecting unit perf (i.e. supplemental cooling/thermal discharge abatement))

Twb both obs & rated must have specifically delineated baro....if not std pressure will be used.

Twb will be used to correct wet cooling.....if only Tdb and RH curves are available they can also be used.

Circ water and Intake water temps will be accepted....and corrections must be for intake water.

Aux/black start gens cannot be online at time of test...and cannot be used to lessen aux load.