All DG Applications

Reference: DG Job ID#:
DG Job location:
DG Application Size:

Substation Engineering C&P has reviewed the above referenced application and requires the following technical information to be submitted in order to review the application. Please request the customer to, pursuant to the standards explained below, provide the following:

The following are 14 technical verification points that the Interconnecting Customer or designated alternate must confirm and verify as they pertain to a distributed generation installation's interconnection application at the time the application is submitted to NSTAR. All technical confirmation and verification document submittals are required to be stamped and signed by a Professional Electrical Engineer registered and licensed to practice in the Commonwealth of Massachusetts. In responding to each of the technical confirmation and verification points, responses such as "confirmed" or "agreed" are not sufficient. Please respond with adequate detail and information for each point.

Please note that, for Technical Verification Point #9, you must only acknowledge and provide verification for that generator size/type which most closely matches your proposed Facility. Regarding Technical Verification Points #s 10, 11 and 12, you are not required to provide or perform the witness test or the final protection design in order for your Interconnection Application to be deemed complete. In order to satisfy Technical Verification Points #s 10, 11 and 12, you need only acknowledge that you will provide and perform the necessary tests and protection design at the appropriate time. Technical Verification Points #s 13 and 14 only apply to Facilities above 1MW and above 5MW respectively. If your Facility is at or below 1MW, you do not need to provide any information under #s 13 and 14 in order for your Interconnection Application to be deemed complete.
Failure to respond adequately to any or all of these technical confirmation and verification points will result in the application being deemed incomplete. The application will not be deemed complete until all verification points have been responded to adequately in accordance with the explanatory notes provided prior to each question. Following the Interconnecting Customer or designated alternate's detailed response to each and every technical confirmation and verification point, the 25 Business Day engineering review will commence.

1. Provide technical specification information for the specific Inverter or Generator used in design.

2. Confirm and provide documentation that Generator protection system conforms to IEEE-1547 and all applicable standards.

3. Confirm that Electrical and protection design complies with NSTAR's Standard for Distributed Generation Interconnection document, in particular 4.1-4.3. Available at: http://www.nstar.com/business/rates_tariffs/interconnections/documents.asp

4. Confirm that Facility's generation and interconnection installation shall meet all applicable national, state and local construction codes.

5. Confirm and provide protection and control documentation to support the export/non-export design.

6. Confirm and provide documentation that Electrical design includes a lockable, gang operated, load-break switch with a visible open air gap that is accessible to NSTAR company personnel at all times. Also, permanent labeling of utility disconnect switch shall be installed so switch can be easily located by NSTAR personnel.

7. Confirm that the submitted One-line protection diagram including the relay system is stamped by a Professional Electrical Engineer registered to practice in The Commonwealth of Massachusetts. (Any/all other design documents submitted by the customer throughout interconnection process shall also be PE stamped).

8. Provide written documents to describe the protection and control system.

Technical Verification Point #9 - Please note that Technical Verification Point #9 has 4 subparts which correspond to different sizes and types of generators. You only need to respond to the subpart that most closely corresponds to your facility. If required and upon request from the Interconnecting Customer, NSTAR will provide protective relay set points of upstream device, as well as available short circuit current at point of common coupling.

9a. If generator is inverter based and under 1 MW:

Confirm that the relay system described consists of UL1741 listed inverters with 27, 59, 81U and 81O relay functionality.

9b. If generator is inverter based and 1M or greater:

Confirm that relay system described consists of UL1741 listed inverters and includes one additional utility grade relay with 27, 59, 59N, 81U and 81O relay functionality.

9c. If generator is asynchronous under 500kW:

Confirm that the relay system described consists of at least one utility grade relay with 27, 59, 81U and 81O relay functionality. Generators with built-in utility grade relays with the functionality above may be adequate.

9d. If Generator is asynchronous and 500kW or greater or Synchronous of any size:

Confirm that the relay system described consists of at least two utility grade relays with 27, 59, 59N 81U and 81O relay functionality. Generators with built-in utility grade relays with the functionality above may be adequate for primary protection.

Technical Verification Points #s 10, 11 and 12 - For Technical Verification points 10, 11 and 12, you must only agree to provide what is being asked for in the specific clarification.

10. Agree to provide, at the appropriate time following completion of all necessary interconnection application steps, a test plan and profile which include procedures to functionally test all protective elements of the system including tripping of the generator and the interconnection point. Witness test shall not be scheduled until this test plan is received and accepted by NSTAR.

11. Agree to perform, at the appropriate time following completion of all necessary interconnection application steps, the test/s as per above Paragraph 10. NSTAR representative will witness the test which shall not be scheduled until this test plan has been received and accepted by NSTAR.

12. Agree to submit, at the appropriate time following completion of all necessary interconnection applicable steps, a final protection design to contain detailed AC/DC schematics showing relay connections and associated ANSI protective functions, proper polarity marks on all relay related potential transformers and current transformers, as well as a three line diagram.

Technical Verification Points #s 13 and 14 - The following requirements only apply to Facilities above 1MW and above 5MW respectively. You are not required to provide the technical information requested below if your Facility is at or below 1MW.

13. <u>For Facilities above 1MW</u>

If your Facility will produce 1MW AC or greater, ISO-New England requires that an application be submitted to and approved by them as a condition of interconnection to the transmission grid, either through the distribution system or directly. NSTAR will submit this application on behalf of the customer. However, the customer must provide information on the attached ISO application form and submit it with their interconnection application. NSTAR will complete the questions italicized and in red font.

14. <u>For Facilities above 5MW</u>

If your Facility will produce 5MW AC or more, in addition to the form required for Facilities greater than 1MW, the ISO application must be submitted with evidence that a stability test was performed with your system connected to the grid, either directly or through a distribution interconnection. NSTAR will perform this test at the customer's expense, but in order to do so, the customer is required to submit a stability model for its

equipment in PSEE format. This stability model is available from the manufacturer of your equipment. The stability model must be submitted with your interconnection application. This analysis and application to the ISO is done after the system impact study and requires study time and time for ISO review and approval.