DISTRIBUTION INTERCONNECTION POLICY FOR GENERATOR FACILITIES (DG SYSTEM POLICY)

June 1, 2019
Revision 2

Local people.
OMU
Local service.

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Attachments

1. General Procedure and Standards

1.1 Introduction and Scope

Owensboro Municipal Utilities (OMU) recognizes the desire of some customers (Customer) to generate their own electricity on-site while maintaining electrical connection to the OMU Electric Distribution System (OMU System). This Policy (Policy) contains the general requirements and technical operating parameters for interconnecting generation facilities (Generator) and the associated equipment to the OMU System for non-utility generation or co-generation.

Renewable Distributed Generation are those facilities considered to be "green" and renewable in nature. They typically produce power by the means of photovoltaic systems (PV), wind, hydro, methane by-products, etc. Applications for these types of facilities will be evaluated by the processes defined in Section 2 for residential customers and Section 3 for commercial/industrial customers. Residential customers shall be limited to a maximum of 25 kW at any single property. Generating facilities producing power by the means of diesel, natural gas, coal, or other fossil fuels are considered non-renewable and will be evaluated by the process as defined in Section 4. Non-renewable generation facilities are limited to customers on Commercial or General Service Rates. Non-renewable generation facilities will not be allowed for Residential Rate customers.

The operation of non-utility generation in parallel with the OMU System poses important safety concerns for OMU personnel and equipment. The safe, reliable operation of the OMU System for all customers is of the utmost importance to OMU. Accordingly, any interconnected Generation must meet the requirements set forth by the latest version of the applicable standards IEEE 1547, IEEE C62, UL 1741, NFPA 70, FERC Order 2006, and all applicable federal, state, and local safety codes and regulations. More stringent requirements and guidelines may be included as part of this Policy.

The requirements contained in this Policy generally do not apply to "separately operating" systems. Separately operating systems typically include small emergency generating units for residential and commercial use and certain uninterruptable power systems (UPS) which do not energize the OMU System in the normal course of operation. These systems have no capability or possibility of connecting and operating in parallel with the OMU System. Where these systems utilize open-transition switching (break-before-make), the requirements

of this Policy do not apply. Standards and requirements for such systems can be found in OMU's *Rules and Regulations for Electric Utility Service.*

Where separately operating systems require close-transition switching (make-before-break) for synchronizing or other purposes, the system should be considered as a parallel operation to OMU's system and shall be subject to all of the requirements of this Policy and all criteria's set by OMU for parallel operation. If there is a question on whether the customer's installation meets the criteria as a separately operated system, OMU's Delivery Engineering Department shall review the installation, equipment, and switching procedure and make the final decision as to whether it meets the separately operating criteria.

This Policy is currently the only arrangement for "net" metering services offered by OMU although this Policy is not strictly a net metering program as offered by some other utilities. This Policy supplements the provisions for net metering contained in the Electric Rate Ordinance. Requirements for interconnection to the OMU system will be based on the size of the system and will be broken down into four categories:

Residential Renewable Fast Track
Residential Renewable-Greater than 8 kW to 25 kW
Commercial/Industrial Renewable
Commercial/Industrial Non-Renewable

1.2 Application Process

Each Customer requesting interconnection for Generation onto the OMU System shall obtain and submit a completed *Interconnection Application* (Attachment 1 or 2), based upon the type and size of the proposed installation, to the OMU Delivery Engineering Department. In addition to the completed application, Customer shall pay the nonrefundable study cost per Table 1. Customer should supply any drawings, equipment list, and single line diagrams of the proposed Generation that would provide the necessary information required for OMU Delivery Engineering to perform an accurate analysis. Submittal of the completed application shall serve as customer's acceptance of the terms, conditions, and requirements set forth and included in this policy.

DG Size	Operating Characteristics	Cost
Residential Renewable Fast Track	Parallel Operation, Parallel Export	$50
Residential Renewable Greater than 8 kW to 25 kW	Parallel Operation, Parallel Export	$100
Commercial/ Industrial Renewable	Parallel Operation, Parallel Export	$250
Commercial/ Industrial Non-Renewable	Parallel Operation, Parallel Export	$1,000

Table 1

Once a completed application is received, the OMU Delivery Engineering Department will review the application within twenty (20) business days to ensure that the application has all the required and appropriate information necessary for OMU to properly analyze the proposed system. If the application is found to be incomplete, OMU will notify the Customer by one of the contact means listed on the application. The application process will be considered suspended until OMU receives any requested information. Customer should not purchase any equipment until the Generation is approved by the OMU Delivery Engineering Department. OMU will not be responsible for any cost incurred by the customer for any purchased equipment, engineering services, or study cost for Generation not approved for parallel operation to the OMU System.

Within thirty (30) business days of receiving a completed application, OMU will evaluate the proposed Generation using the guidelines set forth by FERC Order 2006. OMU will evaluate each system per the Small Generator Interconnection Procedure (SGIP) as laid out in the FERC order. Residential customers proposing Generation that is under the Fast Track process will be notified within forty-five (45) business days of the completed application on whether the proposed Generation is approved. All other proposed Generation will require a Complete Study Process and Customer will be notified within sixty (60) business days of OMU's decision on the Generation application. If OMU finds issues with the proposed Generation, OMU will request Customer to investigate mitigation options and provide proposed solutions. OMU will run up to two analyses with proposed solutions under the initial study cost. Customer will be required to pay for any additional analysis that may be required after OMU's review of two proposed solutions at the rate of $50 per analysis. OMU may limit the number of analyses after three proposed solutions have been considered. Once OMU approves the installation, OMU and the Customer will complete the Small

Generator Interconnection Agreement (SGIA) (Attachment 3). Once the SGIA is complete, it shall serve as written notification to the Customer that Customer may purchase and install the proposed Generation. However, Customer shall not attempt to parallel the Generation to OMU's system until all provisions of this Policy and any additional requirements identified during the complete study process have been met.

OMU reserves the right to witness any functionality and commissioning testing of the installed Generation. A ten (10) day written notification should be provided to OMU prior to testing. All testing shall be in accordance with IEEE 1547.1 for renewable systems. A copy of all testing and installation reports shall be submitted to the OMU Delivery Engineering Department along with the Certificate of Completion (Attachment 4). Once OMU reviews and approves the Certificate of Completion and all testing and commissioning reports, OMU will give final written notification stating that the Generation is approved for parallel operation with OMU's System. Only after the Customer receives this final notification shall the parallel operation occur. Under no circumstances shall a Customer operate any unapproved Generation in parallel operation with OMU's System.

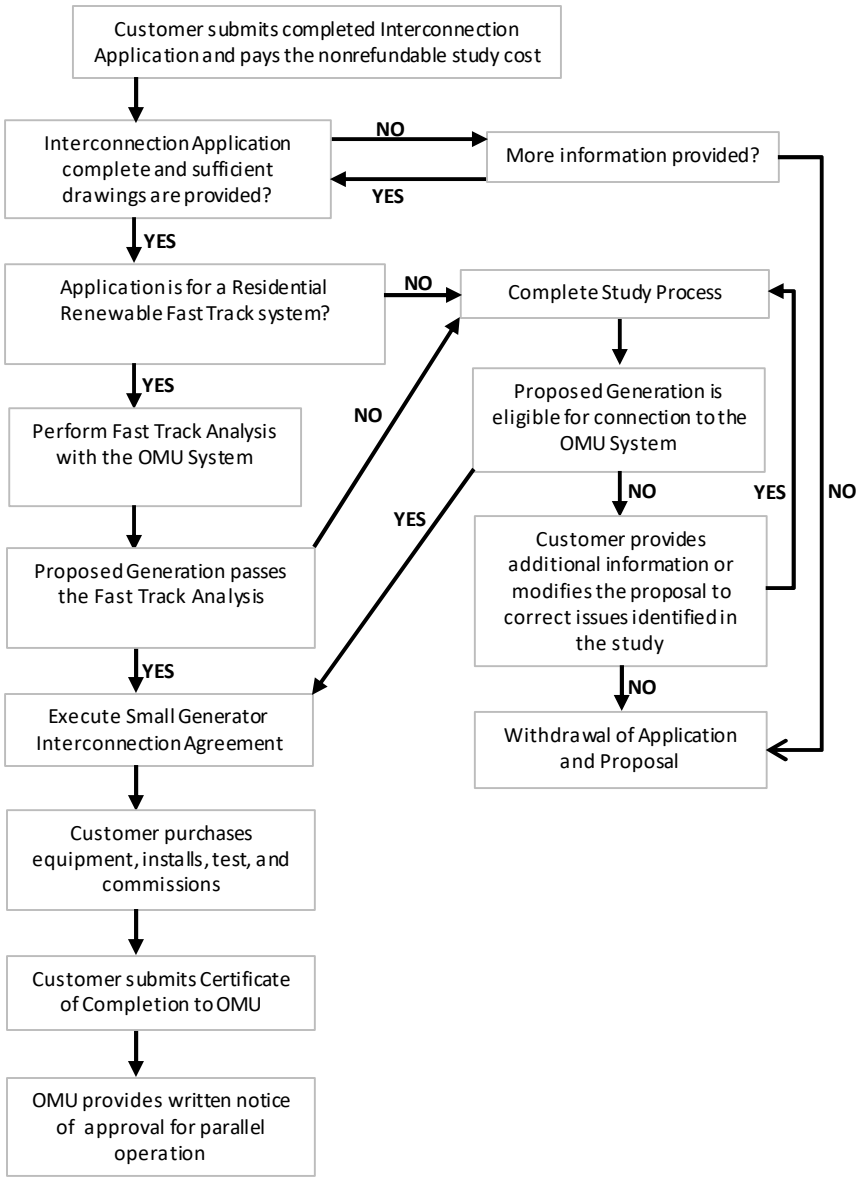

Figure 1: Application Process

2. Residential Renewable Distributed Generation

2.1 Fast Track Process

The Fast Track Process is used for all residential renewable distributed generation applications that are 8 kW or less. Experience has shown that smaller systems do not cause a great amount of adverse effects to a utility's system. Therefore, a full study process is typically not required for these systems. However, if OMU determines that a small proposed system may adversely affect the OMU System, OMU may determine that a Complete Study Process for the application is necessary. All of the requirements of the OMU system and the Generation that are provided in Section 5 of this Policy shall apply to all applications studied under the Fast Track Process.

2.2 Greater than 8 kW to 25 kW

Residential Renewable Distributed Generation shall be limited to a maximum of 25 kW for any single property. Aggregate residential renewable generation shall be limited to 500 kW on any single circuit and may not exceed 1 MW if circuit serves commercial/industrial customers with renewable generation. Notwithstanding, the total aggregate renewable generation across the entire OMU System shall be limited to ten percent (10%) of OMU's peak demand. This limit may be reduced at OMU's discretion for areas with transient stability limitations or other operational issues.

For residential customers proposing distributed generation greater than 8 kW to 25 kW, at minimum an Engineering Review will occur. If analysis from the Engineering Review determines the need, a System Impact Study will be performed in accordance with Section 5.2.

All approved installations of renewable generation shall be subject to Section IX: *NET ENERGY METERING FOR RENEWABLE GENERATION* of Section 26-82 of Article IV of Chapter 26 of the Owensboro Municipal Code, entitled, "Electric Utility" ("Electric Rate Ordinance"). In any instance of discrepancy between this Policy and the Electric Rate Ordinance, the Ordinance takes precedence.

3. Commercial/Industrial Renewable Distributed Generation

Commercial/Industrial Customers desiring to install Generation shall be limited to 250 kW at any meter location. Additionally, the aggregate of renewable on any single circuit shall not exceed 1 MW. The total aggregate renewable generation across the entire OMU system shall be limited to ten percent (10%) of OMU's peak demand. This limit may be reduced at OMU's discretion for areas with transient stability limitations or other operational issues.

Commercial/Industrial customers with Generation shall be served by a transformer designated specifically for their service as to limit flicker and other power quality concerns of other customers.

All approved installations of renewable generation shall be subject to Section IX: *NET ENERGY METERING FOR RENEWABLE GENERATION* of Section 26-82 of Article IV of Chapter 26 of the Owensboro Municipal Code, entitled, "Electric Utility" ("Electric Rate Ordinance"). In any instance of discrepancy between this Policy and the Electric Rate Ordinance, the Ordinance takes precedence.

4. Commercial/Industrial Non-renewable Generation

Commercial/Industrial Customers desiring to install and interconnect non-renewable generation to OMU will be subject to the Complete Study Process. Non-renewable generation that is to be connected to OMU's distribution-level voltage system shall be limited to 7 MW at any single meter location and per circuit. The total aggregate generation provided to OMU's System by non-renewable resources shall be limited to ten percent (10%) of OMU's peak demand. These limits may be reduced at OMU's discretion for areas with transient stability limitations or other operational issues. As stated in Section 1.1, generation that is designed to operate as a separately operating system under emergency or loss of power situations shall not be eligible to interconnect to the OMU system under the terms of this Policy. Generation approved under this policy shall be for those units that are designed to provide part or all of a facilities power needs at least 90% of the time.

All provisions for interconnection to the OMU system under this Policy shall be subject to the requirements defined in Section X: *Cogeneration Metering Service* and Section XI: *Supplemental and Standby Service* of Section 26-82 of Article IV of Chapter 26 of the Owensboro Municipal Code, entitled, "Electric Utility" ("Electric Rate Ordinance"). In any instance of discrepancy between this Policy and the Electric Rate Ordinance, the Ordinance takes precedence.

5. Complete Study Process

The Complete Study Process shall comply with FERC Order 2006 and will consist of the Engineering Review, System Impact Study, and Facilities Study. If a Complete Study Process is required, OMU Delivery Engineering may require a meeting with the Customer to discuss the entire scope of the project and review any drawings and other information that the Customer may be able to supply OMU to assist in the analysis. Depending on the size of the proposed Generation, OMU may determine that components of the Complete Study Process are not required.

5.1 Engineering Review

The Engineering Review is designed to identify any adverse system impacts that would result from the interconnection of the proposed Generation. Examples of such negative impacts would include exceeding short circuit capability ratings of any breakers, violation of the thermal overload or voltage limits, and a review of grounding requirements and electric system protection.

5.2 System Impact Study

The System Impact Study is designed to identify and detail the electric system impacts that would result if the proposed project were interconnected without project modification or electric system modifications. This study focuses more deeply on the adverse system impacts identified in the Engineering Review. The System Impact Study shall also evaluate the impact of the proposed Generation on the reliability of the electric system.

5.3 Facilities Study

The Facilities Study is designed to identify what modifications to the OMU System and its facilities are needed, including the detailed cost and scheduled completion date for these modifications. The Customer shall be responsible for the cost of any necessary OMU System or facility upgrades in addition to the nonrefundable study cost paid at the time of application.

Once the Customer agrees to the requirements resulting from the study, and the Customer agrees to pay for all charges associated with any system or facility upgrades, OMU and the Customer will execute the Small Generator Interconnection Agreement (SGIA) (Attachment 3). Once the SGIA is executed and returned to OMU, it shall serve as written notification to the Customer that Customer may purchase and install the proposed Generation. Customer will have ninety (90) days from the time the SGIA is executed to start the installation of the approved Generation. Unless waived by OMU, if installation has not begun within the ninety (90) day period, the SGIA shall become void and customer shall pay a restudy fee of $50 to ensure no system changes have occurred. A new SGIA must then be executed. Customer shall not attempt to parallel any Generation to OMU's System until all provisions of this Policy and any additional requirements identified during the Complete Study Process have been met.

OMU reserves the right to witness any functionality and commissioning testing of the installed Generation. All testing for renewable generation shall be in accordance with IEEE 1547.1. A copy of all testing and installation reports shall be submitted to the OMU Delivery Engineering Department along with the Certificate of Completion

(Attachment 4). Once OMU reviews and approves the Certificate of Completion and all testing and commissioning reports, OMU will give final written notification stating that the Generation is approved for parallel operation with OMU's system. Only after the customer receives this final notification shall the parallel operation occur. Under no circumstances shall a customer operate any unapproved Generation in parallel operation with OMU's system.

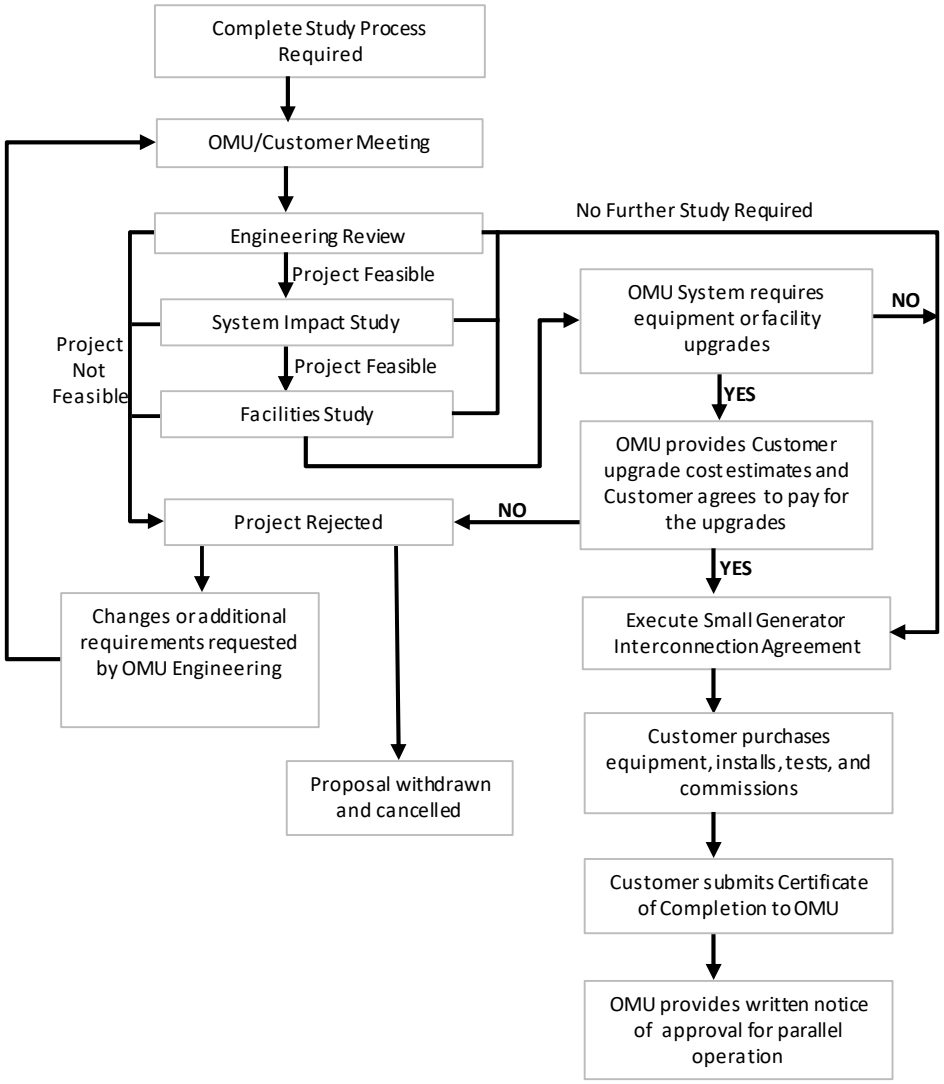

Figure 2: The Study Process

6. General System Information and Generation Equipment Requirements

6.1 All Customer requests for interconnection to the OMU system will be handled on a first come, first considered basis. An application suspended for incomplete information will not be removed from the order of consideration, unless requested information is not provided by the Customer to OMU within twenty (20) business days.

6.2 OMU will not serve as the Engineer for the Customer for any proposed Generation nor recommend manufacturers, vendors, or technical experts to the Customer.

OMU's sole responsibility is to evaluate any proposed Generation for any possible negative impact upon the OMU System. Should a potentially negative impact be discovered during one of the evaluation methods, OMU will notify the Customer of the issues that the proposed system may cause to the OMU System. OMU will not be responsible for providing mitigation options or redesign of the proposed Generation to resolve any issues.

6.3 All Generation shall be designed for interconnection at the Customer secondary-service voltage level. Generation for a single, residential transformer will be limited to the smaller of 20 kVA or transformer nameplate rating for single-phase shared secondary. If a residential Customer desires to install Generation to a transformer that has already met the above limits, but the system has not met the limits set in Section 2, Customer will be responsible for all costs to install an isolated OMU transformer. Customer will be responsible for the cost of any installation of poles, transformers, and other equipment required to isolate the service of their facilities from other OMU customers.

6.4 A dedicated transformer shall be required for all Commercial/Industrial Customers regardless of size. A dedicated transformer shall be required for all residential Customers if the Engineering Review, System Impact Study, or field commissioning indicates a primary voltage fluctuation greater than 2.5% or a secondary voltage fluctuation greater than 5%. Customer shall pay for the installation of poles, transformers, and other equipment required to isolate the service of their facilities from other OMU customers.

6.5 All renewable Generation shall have a manual, lockable, system disconnect switch located on the outside of the building as close as possible (10 feet or less) to the existing OMU meter. This disconnect switch shall be able to handle full-load

breaking and completely isolate the Generation from the OMU System. Though the switch will typically be operated by the Customer, OMU reserves the right to disconnect the Generation from the OMU System for emergencies or system abnormalities at any time without prior notification. OMU will not be liable to Customer for any power cost, lost revenue, etc. resulting from the disconnection.

6.6 All non-renewable generation shall provide the means to isolate it from OMU's system through a series of relays, breakers, and disconnect switches. Customer shall provide OMU the ability to monitor, but not control, the status of any breaker associated with the interconnect. Customer shall provide an emergency contact for the Customer that is available 24 hours and who has the knowledge and ability to disconnect any of the Generation. In the instance OMU needs to disconnect from Customer's Generation and the Customer contact is not available, OMU will perform any work necessary to isolate the Generation from the OMU system. This work may result in Customer being disconnected from the OMU system for an extended period of time and until after the OMU System is returned to normal. Customer shall reimburse OMU for the cost of any work OMU performs or incurs due to Customer's emergency contact not being available.

6.7 If OMU determines that abnormalities on the OMU System are caused by the Generation, OMU will place a lock on the disconnect switch in the open position. OMU will notify the Customer in writing that the Generation has been locked out from paralleling with the OMU System and why. Customer shall be responsible for determining the cause of the disturbance and providing OMU Delivery Engineering proof that the issue has been resolved. Once OMU is satisfied with the resolution, OMU will remove the lock and allow interconnection operations to resume. The switch and enclosure should conform to NEMA, NESC, and NEC guidelines for such equipment.

6.8 OMU's "net" metering will be achieved through a single, bi-directional watt hour meter. Metering for residential and commercial/industrial renewable customers will be in compliance with Section IX: *NET ENERGY METERING FOR RENEWABLE GENERATION* of Section 26-82 of Article IV of Chapter 26 of the Owensboro Municipal Code, entitled, "Electric Utility" ("Electric Rate Ordinance"). Metering for commercial/industrial customers with non-renewable generation will be in compliance with Section X: *Cogeneration Metering Service* and Section XI: *Supplemental and Standby Service* of Section 26-82 of Article IV of Chapter 26 of

the Owensboro Municipal Code, entitled, ”Electric Utility” (“Electric Rate Ordinance”).

6.9 The proposed Generation, in aggregation with any other generation on the same distribution circuit, shall not contribute more than ten percent (10%) to the distribution circuit’s maximum fault current at the point of interconnection to the primary voltage level.

6.10 The proposed Generation, in aggregate with other generation on the same distribution circuit, shall not cause any OMU distribution protective devices and equipment or Customer owned equipment to exceed 85% of the short circuit interrupting capability. Additionally, a Generation shall not be proposed for an OMU circuit that already exceeds 85% of the short circuit interrupting capability.

6.11 All Generation proposed to connect to the OMU System shall either be a three-phase or single-phase, phase-to-phase connection where the primary distribution line type is three-phase, three wire (Delta connection); or an effectively grounded three-phase or single-phase, line-to- neutral connection where the primary distribution line type is three-phase, four wire (Wye connection). These criteria shall be met to limit the potential for creating over-voltage issues on the OMU System due to a loss of ground during the operating time of any anti-islanding function.

6.12 If the proposed Generation is single-phase and it is to be connected to a delta or open-delta service via a center tap neutral, its addition shall not create an imbalance between the two sides of the 240 volt service of more than 20% of the nameplate rating of the transformer. Additionally, it shall not cause the load of any of the individual phases to exceed twice the load of any of the other transformers.

6.13 All steady-state and transient operating limits for voltage, flicker voltage, frequency, harmonic contents, etc. shall comply with the most recent versions of IEEE 519, IEEE 141, and ANSI C84. OMU requires that Generation shall cease parallel operation to OMU’s System within six (6) cycles when any of the following criteria are met:

a. OMU line voltage is less than or equal to 80% of nominal voltage (100 volts secondary)

b. OMU line voltage is equal to or more than 110% of nominal voltage (137 volts secondary)
c. Frequency is below 59.5 Hz for 60 cycles.

6.14 Subsequent to the occurrence of events which causes the Generator to cease power production to the Customer or OMU System, OMU's System voltage shall remain stable in voltage and frequency for a time not less than five (5) minutes prior to the Generation reconnecting to the OMU System again.

6.15 OMU may request periodic testing of the Generator to ensure compliance with the designed and permitted interconnected equipment. This testing shall be done by a qualified tester at the Customer's expense and test reports shall be provided to OMU. The testing shall be done within thirty (30) business days of written notification from OMU. Failure to test and provide reports to OMU within this time frame will suspend the SGIA and OMU may disconnect the Generation from interconnection to the OMU system via the disconnect switch and place a lock on the switch until such test is performed.

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