RULE NO. 15

GENERATING FACILITY INTERCONNECTIONS

A. GENERAL

1. This Rule describes the interconnection, operating and Metering requirements for Generating Facilities intended to be connected to the Utility's electric distribution system over which the Commission has jurisdiction. This rule applies only to Generating Facilities with a net capacity of 20,000 kilowatts or less unless otherwise required in federal or state law. Subject to the provisions of this Rule, the Utility will allow the interconnection of Generating Facilities with its electrical system.

2. This Rule applies only to Generating Facilities interconnected with the Utility's facilities that will operate in parallel with the Utility's Distribution System. Generating Facilities interconnected prior to the effective date of this Rule shall be governed by the requirements of the Rule in effect at the time the Generating Facilities were installed and their existing interconnection agreements.

3. Capitalized terms used in this Rule, and not defined in the Utility's other tariffs, will have the meaning ascribed to such terms in Section B of this Rule. The definitions set forth in this Rule will apply to this Rule, related tariff riders for standby service and may not apply to the Utility's other Rules.

4. Generating Facilities that are intended for isolated operation and not Parallel Operation with the Utility's distribution system are not addressed in this Rule. Such Generating Facilities shall be addressed in the Utility's Rule 19.

B. DEFINITIONS

The definitions set forth in this Section B are applicable only to this Rule, its corresponding agreements and rate schedules that apply to standby service.

Active Anti-Islanding Scheme: A control scheme installed with the Generating Facility that senses and prevents the formation of an Unintended Island.

Applicant: An Applicant applying for interconnection, under the provisions of Utility's Rule 15.

Application: Documentation submitted to the Utility by the potential Applicant that contains sufficient information necessary to begin the application process.

(Continued)

RULE NO. 15

GENERATING FACILITY INTERCONNECTIONS

B. DEFINITIONS, (Continued)

Certification; Certified; Certificate: The documented results of a successful Certification Testing.

Certification Test: A test adopted by the Utility that verifies conformance of certain equipment with Commission-approved performance standards in order to be classified as Certified Equipment. Certification Tests are normally performed by an NRTL such as the Underwriter's Laboratory.

Certified Equipment: Equipment used in a Generating Facility that has passed the Certification Test.

Commissioning Test: A test performed during the commissioning of all or part of a Generating Facility system to achieve one or more of the following:

Verify specific aspects of its performance;
Calibrate its instrumentation;
Establish instrument or Protective Function set-points.

Dedicated Transformer; Dedicated Distribution Transformer: A transformer that provides Electricity Service to a single Customer. The Customer may or may not have a Generating Facility.

Distribution System: All electrical wires, equipment, and other facilities owned or provided by the Utility by which the Utility provides Distribution Service, including High Voltage Distribution Service as defined in Rule 9, to its Customers. (N) (N)

Emergency: An actual or imminent condition or situation, which jeopardizes the Utility's Distribution System Integrity.

Energy Storage Device: A device that captures energy produced at one time, stores that energy for a period of time, and delivers that energy as electricity for use at a future time. For purposes of this Rule only, an Energy Storage Device can be considered a Generator. While an Energy Storage Device may be paired with a Net Metering System, it does not qualify to be considered as a Net Metering System, either as a stand-alone installation or when paired with a Net Metering System. (N) (N)

Field Testing: Testing performed in the field to determine whether equipment meets the Utility's requirements for safe and reliable Interconnection.

Generating Facility: All Generating Units that are included in a Generating Facility Interconnection Agreement.

Generator or Generating Unit: A device that converts mechanical, chemical or solar energy into electrical energy, including all of its protective and control functions and structural appurtenances. One or more Generators comprise a Generating Facility. (N)

(Continued)

RULE NO. 15

GENERATING FACILITY INTERCONNECTIONS

B. DEFINITIONS, (Continued)

Gross Nameplate Rating: The gross generating capacity of a Generating Unit or the total of the gross generating capacity of the Generating Units comprising a Generating Facility as designated by the manufacturer(s) of the Generating Facility(s).

Host Load: Electrical power that is consumed by the Customer at the property on which the Generating Facility is located.

Inadvertent Export: The unplanned, uncompensated transfer of electrical energy from a Generator or Generating Facility to the Utility's Distribution System across the Point of Common Coupling. (N)

Initial Review: The review by the Utility, following receipt of an Application, to determine the following: If an Generating Facility Application qualifies for Simplified Interconnection, or If an Generating Facility Application can be made to qualify for Interconnection with supplemental review determining any potential additional requirements, or If an Interconnection Study is required, the cost estimate and schedule for performing the Interconnection Study

In-rush Current: The current drawn by the Generating Facility during startup.

Interconnection and Operating Agreement: An agreement between the Utility and the Producer that gives each the certain rights and obligations to effect, operate, modify, or end Interconnection. (N)

Interconnection; (Interconnected): The physical connection of a Generating Facility in accordance with the requirements of these rules so that Parallel Operation with the Utility system can occur (has occurred).

Interconnection Facilities: The electrical wires, switches and related equipment that interconnect a Generating Facility to the Utility's Distribution System.

Interconnection Study: A study to establish the requirements for Interconnection of a Producer.

Island; Islanding: A condition on the Utility's Distribution System in which one or more Generating Facilities deliver power to Customers using a portion of the Utility's Distribution System that is electrically isolated from the remainder of the Utility's Distribution System.

Line Section: That portion of the Utility's Distribution System connected to a Customer bounded by automatic sectionalizing devices or the end of the line.

(Continued)

RULE NO. 15

GENERATING FACILITY INTERCONNECTIONS

B. DEFINITIONS, (Continued)

Metering Equipment: All equipment, hardware, software including meter cabinets, conduit, etc. that is necessary for Metering.

Metering: The measurement of electrical power flow in kW and/or kWh, and, if necessary, kVAR at a point, and its display to the Utility, as required by this Rule.

Momentary Parallel Operation: The interconnection of a Generating Facility to the Distribution System for fifteen seconds (900 cycles) or less. (N)

Nationally Recognized Testing Laboratory (NRTL): A laboratory accredited to perform the Certification Testing requirements under this Rule.

Net Energy Metering: Metering for the receipt and delivery of electricity between the Producer and the Utility pursuant to Nevada Revised Statutes 704.769 and Schedule NMR-A, NMR-B, NMR-G, and NMR-405. Over a given time frame, (typically a one month) the difference between these values yields either net consumption or surplus. The meter registers are ratcheted to prevent reverse registration. If available, a single meter may be allowed to spin backward to yield the same effect as a directional two-meter (or register) arrangement. (N)

Net Generation Metering: The Metering of the net electrical energy output in kW and kWh from a given Generating Facility. This may also be the measurement of the difference between the total electrical energy produced by a Generating Unit and the electrical energy consumed by the auxiliary equipment necessary to operate the Generating Unit. For a Generating Unit with no Host Load, Metering that is located at the point of Common Coupling. For a Generating Unit with Host Load, Metering that is located at the Generating Unit bus after the point of auxiliary load(s) and prior to serving Host Load.

Net Metering Systems: Those systems operating in parallel with the Utility as set forth in NRS 704.766 to 704.775 and Schedule NMR-A, NMR-B, NMR-G, and NMR-405. A Net Metering System is defined in NRS 704.771. Addition of an Energy Storage Device must not result in a violation of any limitations placed on Net Metering Systems in NRS 704.771. (N) (N)

Net Nameplate Rating: The gross generating capacity of a Generating Unit or the total of the gross generating capacity of the Generating Units comprising a Generating Facility as designated by the manufacturer(s) of the Generating Unit(s) minus the consumption of electrical power of the Generating Unit(s). Where the gross generating capacity of a Generating Unit or Units is limited (e.g., through the use of a control system, power relay(s), or other similar device settings or adjustments), the Net Nameplate Rating shall be the maximum specified by the Applicant in the Application. The Net Nameplate Rating will subsequently be contained in the net metering agreement or Interconnection and Operating Agreement. (N) (N)

(Continued)

RULE NO. 15

GENERATING FACILITY INTERCONNECTIONS

B. DEFINITIONS, (Continued)

Network Service: More than one electrical feeder providing Distribution Service at a Point of Common Coupling.

Non-Exporting: Designed to prevent or limit the transfer of electrical energy from a Generating Unit or the Generating Facility to the Utility by any of the five options in Section I.4.b. Non-Exporting includes scenarios where Inadvertent Export could occur. (N) | (N)

Non-Islanding: Designed to detect and disconnect from a stable Unintended Island with matched load and generation. Reliance solely on under/over voltage and frequency trip is not considered sufficient to qualify as Non-Islanding.

Parallel Operation: The simultaneous operation of a Generating Facility with power delivered or received by the Utility while Interconnected. For the purpose of this Rule, Parallel Operation includes only those Generating Facilities that are so interconnected with the Utility's Distribution System for more than 900 cycles (fifteen seconds). (N)

Periodic Test: A test performed on part or all of a Generating Facility at pre-determined time or operational intervals to achieve one or more of the following: 1) Verify specific aspects of its performance, 2) Calibrate instrumentation, 3) Verify and re-establish instrument or Protective Function set-points.

Point of Common Coupling Metering: Metering located at the Point of Common Coupling. This is the same Metering as Net Generation Metering for Generating Facilities with no Host Load.

Point of Common Coupling (PCC): The transfer point for electricity between the electrical conductors of the Utility and the electrical conductors of the Producer.

Point of Interconnection: The electrical transfer point between a Generating Facility and the electrical distribution system. This may or may not be coincident with the Point of Common Coupling.

Producer: The entity that executes an Interconnection and Operating Agreement with the Utility. The Producer may or may not own and operate the Generating Facility, but is responsible for the rights and obligations related to the Interconnection and Operating Agreement.

Production Test: A test performed on each device coming off the production line to verify certain aspects of its performance.

(Continued)

RULE NO. 15

GENERATING FACILITY INTERCONNECTIONS

B. DEFINITIONS, (Continued)

Protective Function(s): The equipment, hardware and/or software in a Generating Facility (whether discrete or integrated with other functions) whose purpose is to protect against Unsafe Operating Conditions.

Prudent Electrical Practices: Those practices, methods, and equipment, as changed from time to time, that are commonly used in prudent electrical engineering and operations to design and operate electric equipment lawfully and with safety, dependability, efficiency, and economy.

Scheduled Operation Date: The date specified in the Generating Facility Interconnection Agreement when the Generating Facility is, by the Producer's estimate, expected to begin Initial Operation.

Secondary Network: A network supplied by several primary feeders suitably interlaced through the area in order to achieve acceptable loading of the transformers under emergency conditions and to provide a system of extremely high service reliability. Secondary networks usually operate at 600 V or lower.

Simplified Interconnection: Interconnection conforming to the minimum requirements under this Rule, as determined by Section I.

Single Line Diagram; Single Line Drawing: A schematic drawing, showing the major electric switchgear, Protective Function devices, wires, Generators, transformers and other devices, providing sufficient detail to communicate to a qualified engineer the essential design and safety of the system being considered.

Short Circuit Contribution Ratio (SCCR): The ratio of the Generating Facility's short circuit contribution to the Utility's short circuit contribution for a three-phase fault at the high voltage side of the distribution transformer connecting the Generating Facility to the Utility's system.

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RULE NO. 15

ENERATING FACILITY INTERCONNECTIONS

B. DEFINITIONS, (Continued)

Special Facilities: Special Facilities are (a) facilities requested by the Producer which are in addition to or in substitution for standard facilities which the Utility would normally provide for delivery of service at one point, through one meter, at one voltage class under its tariff schedules, or (b) a pro rata portion of the facilities requested by an applicant, allocated for the sole use of such applicant, which would not normally be allocated for such sole use. Unless otherwise provided by the Utility's filed tariff schedules, Special Facilities will be installed, owned and maintained or allocated by Utility as an accommodation to the Producer only if acceptable for operation by the Utility and the reliability of service to the Utility's other customers is not impaired.

Stability: The return to normalcy of the Utility's Distribution System, following a disturbance. Stabilization is usually measured as a time period during which voltage and frequency are within acceptable ranges.

Starting Voltage Drop: The percentage voltage drop at a specified point resulting from In-rush Current. The SVD can also be expressed in volts on a particular base voltage, (e.g. 6 volts on a 120-volt base, yielding a 5% drop).

Supplemental Review: A process wherein Utility further reviews an Application that fails one or more of the Initial Review Process screens. The Supplemental Review may result in one of the following: (a) approval of Interconnection; (b) approval of Interconnection with additional requirements; or (c) cost and schedule for an Interconnection Study.

System Integrity: The condition under which a Distribution System is deemed safe and can reliably perform its intended functions in accordance with the safety and reliability rules of the Utility.

Telemetering: The electrical or electronic transmittal of Metering data on a real-time basis to the Utility.

Transfer Trip: A Protective Function that trips a Generating Facility remotely by means of an automated communications link controlled by Utility.

Type Test: A test performed on a sample of a particular model of a device to verify specific aspects of its design, construction and performance.

Unintended Island: The creation of an island, usually following a loss of a portion of the Utility's Distribution System, without the approval of the Utility.

(Continued)

RULE NO. 15

GENERATING FACILITY INTERCONNECTIONS

B. DEFINITIONS, (Continued)

Unsafe Operating Conditions: Conditions that, if left uncorrected, could result in harm to personnel, damage to equipment, loss of System Integrity or operation outside pre-established parameters required by the Interconnection and Operating Agreement.

Visible Disconnect: An electrical switching device that can separate the Generating Facility from Utility's Distribution System and is designed to allow visible verification that separation has been accomplished. This requirement can be met by opening the enclosure to observe the contact separation.

C. RIGHTS AND OBLIGATIONS

1. A Producer shall execute an appropriate agreement with the Utility governing the interconnection and operation of generating facilities.

   a. Pro forma agreements establishing the terms and conditions for interconnections and operation with the Utility's facilities for each applicable class will be provided to the Producer by the Utility. Such agreements may be modified by mutual agreement as necessary to address specific interconnection requirements existent at the time of the execution of the agreement.

   b. Producers having agreements executed prior to the effective date of this Rule that govern interconnection and parallel operation with the Utility's facilities shall be governed by the provisions of those existing agreements.

   c. The agreement shall include any necessary requirements for communications and communications facilities between the Utility and the Producer.

2. A Producer requiring other services not addressed in this Rule may acquire such services in accordance with the Utility's Tariff governing the provision of such services. Specific examples of other such services include, but are not limited to: Supplemental Service for Customer load in excess of what is normally produced by the generating equipment, Backup Service for unscheduled outages of Generating Facilities, and Maintenance Backup Service for scheduled maintenance outages of Generating Facilities. Such services are outside of the scope of this Rule.

(Continued)

RULE NO. 15
GENERATING FACILITY INTERCONNECTIONS

C. RIGHTS AND OBLIGATIONS, (Continued)

3. Interconnection described hereunder shall not provide a Producer with any rights to use the Utility's system for the transmission, distribution, or wheeling of electric power, nor does interconnection described hereunder limit those rights. Interconnection described hereunder does not require the Utility to purchase the output of a generating facility. Such rights to the use of the Utility's system or purchase arrangements must be addressed in separate agreements.

4. A Producer shall ascertain and comply with all applicable Commission-approved tariffs of the Utility; applicable Federal Energy Regulatory Commission (FERC) approved rules, tariffs, and regulations; and any local, state or federal law, statute or regulation that applies to the design, siting, construction, installation, operation, or any other aspect of the Generating Facilities and Interconnection Facilities.

5. Design Reviews and Inspections. Utility shall have the right to review the design of a Producer's Generating Facility and Interconnection Facilities and to inspect a Producer's Generating and/or Interconnection Facilities prior to the commencement of Parallel Operation with Utility's Distribution System. The Utility may require a Producer to make modifications as necessary to comply with the requirements of this Rule. Utility's review and authorization for Parallel Operation shall not be construed as confirming or endorsing the Producer's design or as warranting the Generating and/or Interconnection Facilities' safety, durability or reliability. The Utility shall not, by reason of such review or lack of review, be responsible for the strength, adequacy, or capacity of such equipment.

6. Producers shall not begin parallel operation with the Utility's facilities for the first time until their interconnection facilities have been inspected by the Utility and written approval is provided by the Utility to the Producer. Such approval may be withheld for noncompliance with the requirements of this Rule or any of the Utility's applicable tariffs.

7. Right to Access. A Producer's Generating Facility and Interconnection Facilities shall be reasonably accessible to Utility personnel as necessary for Utility to perform its duties and exercise its rights under its tariffs filed with and approved by the Commission, and any agreement between Utility and the Producer.

(Continued)

RULE NO. 15

GENERATING FACILITY INTERCONNECTIONS

C. RIGHTS AND OBLIGATIONS, (Continued)

8. Confidentiality of Information. Any information pertaining to Generating and/or Interconnection Facilities provided to the Utility by a Producer shall be treated by Utility in a confidential manner.

9. Prudent Operation and Maintenance Required. A Producer shall operate and maintain its Generating Facility and Interconnection Facilities in accordance with Prudent Electrical Practices and shall maintain compliance with Commission adopted standards for the Producer's particular Generation and Interconnection Facilities. Said standards shall be those in effect at the time a Producer executes the Agreement with the Utility.

10. Utility may limit the operation and/or disconnect or require the disconnection of a Producer's Generating Facility from Utility's Distribution System at any time, with or without notice, in the event of an Emergency or to correct Unsafe Operating Conditions. Utility may also limit the operation and/or disconnect or require the disconnection of a Producer's Generating Facility from Utility's Distribution System upon the provision of reasonable notice: 1) to allow for routine maintenance, repairs or modifications to Utility's Distribution System, 2) upon Utility's determination that a Producer's Generating Facility is not in compliance with this Rule, or 3) upon termination of the Agreement.

11. When operating in parallel, the Producer shall comply with all operational direction of the Utility at the time given with such direction subject to any conditions that the Producer and the Utility may mutually agree to incorporate in the interconnection and operating agreement. Any dispute regarding such direction shall be handled after the fact in accordance with the dispute resolution procedures in Section H, below.

12. The operation of the Generating Facility must not reduce the quality of service described in Rule 2 to other Customers and must conform with the Utility's design standards. If the Generating Facility causes service interference, the Utility shall give notice and provide reasonable time for the Producer to take corrective action.

13. Where an interconnection study is required as depicted in the Initial Review Process shown in Section I.3 and described in Section I.4, the Producer shall be responsible for paying to the Utility all reasonable costs incurred by the Utility in performing such a study unless such Parallel Operation has been requested by the Utility.

(Continued)

RULE NO. 15

GENERATING FACILITY INTERCONNECTIONS

D. APPLICATION AND INTERCONNECTION PROCESS

1. APPLICATION PROCESS

a. Upon request, the Utility will provide information and documents (such as the pro forma interconnection and operating agreement and the Application, technical requirements, specifications, listing of Certified Equipment, application fee information, applicable rate schedules and Metering requirements) in response to a potential Applicant's inquiry. Unless otherwise agreed upon, all such information will normally be sent to an Applicant within five (5) business days following the initial request from the Applicant. The Utility will establish an individual representative as the single point of contact for the Applicant, but may allocate responsibilities among its staff to best coordinate the Interconnection of an Applicant's Generating Facility. For Net Metering Systems, the Utility will send a description of the procedures by which a Customer may interconnect with the Utility and a copy of the standard net metering contract with the application form**.**

b. Applicant Completes an Application. All Applicants shall be required to complete and file an Application and supply any relevant additional information requested by Utility. The filing must include the completed Application, a fee for processing the Application and performing the Initial Review to be completed by the Utility pursuant to Section D.1.c. The application fee shall vary with the type of service that will be provided to the customer account to which the proposed Generating Facility will be interconnected as indicated in the following table: (D,T) (N) (D,T)

Generating Facility Capacity	Initial Review Fee	Supplemental Review Fee
<= 1 MW	$119	None*
All Others	Actual Costs Incurred*	Actual Costs Incurred*

(C)

* If an interconnection study is required, pursuant to Section D.1.d, Producer will be charged the actual costs of a Supplemental Review Study pursuant to Section D.1.d.

(Continued)

RULE NO. 15

GENERATING FACILITY INTERCONNECTIONS

D. APPLICATION AND INTERCONNECTION PROCESS

1. APPLICATION PROCESS, (Continued)

Note: The Applicant may propose, and Utility may negotiate specific costs for processing non-standard installations such as multi-units, multi-sites, or otherwise as conditions warrant. The costs for the Initial Review and the Supplemental Review contained in this Section, as well as the language provided in Sections D.1.c and D.1.d do not apply under such circumstances. Within ten (10) business days of receiving the Application, the Utility shall normally acknowledge its receipt and state whether the Application has been completed adequately. If defects are noted, the Utility and Applicant shall cooperate in a timely manner to establish a satisfactory Application. For Net Metering Systems the Utility shall send a standard net metering contract to the Applicant for signature if the data provided is complete and complies with the technical requirements of NRS 704.774. If the application is not complete or does not meet the technical requirements of NRS 704.774 the Utility shall return the application to the Applicant within 10 business days of receipt of the application specifying what is deficient in sufficient detail to enable the Applicant to correct the application for resubmission.

c. Utility Performs an Initial Review and Develops Preliminary Cost Estimates and Interconnection Requirements.

(1) Upon Utility's receipt of a satisfactorily completed Application and any additional information necessary to evaluate the Interconnection of a Generating Facility, the Utility shall perform an Initial Review using the process defined in Section I. The Initial Review determines if (a) the Generating Facility qualifies for Simplified Interconnection, (b) the Generating Facility can qualify for Interconnection subject to minimal additional requirements, or (c) it will be necessary for Utility to perform an Interconnection Study to determine the Interconnection Requirements.

(2) The Utility shall complete its Initial Review, absent any extraordinary circumstances, within 10 business days if the Application qualifies for Simplified Interconnection. If the Initial Review determines that the proposed Generating Facility can be interconnected by means of a Simplified Interconnection, the Utility will provide the Applicant with a written description of the requirements for interconnection and the Interconnection and Operating Agreement pursuant to Section D.1.e.

(Continued)

RULE NO. 15

GENERATING FACILITY INTERCONNECTIONS

D. APPLICATION AND INTERCONNECTION PROCESS

1. APPLICATION PROCESS, (Continued)

(3) If the Application does not qualify for Simplified Interconnection as submitted, the Initial Review will include a Supplemental Review as described in Section I. The Supplemental Review will provide either (a) Interconnection requirements that shall include requirements beyond those for Simplified Interconnection, and an Interconnection and Operating Agreement, or (b) a cost estimate and schedule for an Interconnection Study. The Supplemental Review will be completed, absent any extraordinary circumstances, within 20 business days of receipt of a completed Application. Payment for the Supplemental Review shall be submitted to the Utility within 10 calendar days after the results of the Supplemental Review are provided to the Applicant.

d. When an Initial Review reveals that the proposed facility cannot be interconnected to Utility's system by means of a Simplified Interconnection pursuant to Sections I, below and Attachment 1, Testing and Certification Criteria, and that significant Utility Interconnection Facilities or Distribution System improvements must be installed or made to Utility's Distribution System to accommodate the interconnection of an Applicant's Generating Facility, the Utility and Applicant shall enter into an agreement that provides for the Utility to perform such additional studies, facility design, and engineering and to provide detailed cost estimates for actual cost billing to the Applicant at the Applicant's expense. The Interconnection Study Agreement shall set forth the Utility's schedule for completing such work and the estimated or fixed price costs of such studies and engineering. Upon completion of an Interconnection Study, Utility shall provide the Applicant with the specific requirements, details of violations of any design, planning, or operating criteria or standards including estimated magnitude, duration, and/or frequency, as applicable, costs, and schedule for interconnecting the Generating Facility to accommodate execution of agreements pursuant to Section D.1.e. (N) | (N)

(Continued)

RULE NO. 15

GENERATING FACILITY INTERCONNECTIONS

D. APPLICATION AND INTERCONNECTION PROCESS

1. APPLICATION PROCESS, (Continued)

e. Within 10 business days of being notified by the net metering Applicant that the installation is complete and being provided by the Applicant a copy of any required final inspection clearance from the governmental authority with jurisdiction over the Net Metering System's installation, the Utility must authorize and allow Interconnection by the Applicant or provide to the Applicant a specific written description of the deficiencies that must be corrected prior to Interconnection. For Net Metering Systems the Utility will, at or before the time the Utility authorizes the Interconnection by the Customer, send a copy of the fully executed net metering contract to the Applicant.

f. A separate Rule 3 application will not be required as a result of a Producer's application for interconnection under this Rule. (N) (N)

2. INTERCONNECTION PROCESS

a. Where Applicable, Utility or Producer Installs Required Interconnection Facilities. Modification of the Utility's Distribution System shall be as set forth in Rule 9. If such modification is required as a result of a Producer's application for interconnection under this Rule, a separate Rule 3 application will not be required. After executing the applicable agreements, Utility or Producer will commence construction/ installation of the Distribution System improvements or Interconnection Facilities which have been identified in the agreements. The parties will use good faith efforts to meet schedules and fixed costs or estimated costs as appropriate. (N) | (N)

(Continued)

RULE NO. 15

GENERATING FACILITY INTERCONNECTIONS

D. APPLICATION AND INTERCONNECTION PROCESS

2. INTERCONNECTION PROCESS, (Continued)

b. Producer Arranges for and Completes Commissioning Testing of Generating Facility and Producer's Interconnection Facilities. The Producer is responsible for testing new Generating Facilities and associated Interconnection Facilities according to Attachment 1, Section 5, to ensure compliance with the safety and reliability provisions of this Rule prior to being operated in parallel with Utility's Distribution System. For non-Certified Equipment, the Producer shall develop a written testing plan to be submitted to Utility for its review and acceptance. Alternatively, the Producer and Utility may agree to have Utility conduct the required testing at the Producer's expense. Where applicable, the test plan shall include the installation test procedures published by the manufacturer of the generation or Interconnection equipment. Facility testing shall be conducted at a mutually agreeable time, and depending on who conducts the test, Utility or Producer shall be given the opportunity to witness the tests.

c. Utility Authorizes Parallel Operation or Momentary Parallel Operation. The Producer's Generating Facility shall be authorized for Parallel Operation or Momentary Parallel Operation, as applicable, with Utility's Distribution System upon satisfactory compliance with the terms of all applicable agreements and Utility's express written permission. Compliance may include, but not be limited to, provision of any required documentation and satisfactorily completing any required inspections or tests as described herein or in the agreements formed between the Producer and Utility. A Producer shall not commence Parallel Operation of its Generating Facility with Utility's system unless it has received Utility's express written permission to do so.

(Continued)

RULE NO. 15

GENERATING FACILITY INTERCONNECTIONS

E. GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS

1. General Interconnection And Protection Requirements. The protective functions and requirements of this Rule are designed to protect the Utility's electrical system and not the Generating Facility. A Producer shall be solely responsible for providing adequate protection for its generating facility and interconnection facilities. The Producer's protective devices shall not impact the operation of other protective devices used on the Utility's system in a manner that would affect the Utility's capability to provide reliable service to its Customers. Where there is a conflict between the technical requirements of IEEE 1547 and this Rule, the technical requirements of IEEE 1547 apply.

   a. The requirements in this Section E do not apply to Net Metering Systems as such systems are defined in Nevada Revised Statutes 704.766 to 704.775. Net Metering Systems shall meet all of the requirements of:

      (1) The National Electric Code,

      (2) Underwriters Laboratories Inc., and

      (3) Institute of Electrical and Electronic Engineers with IEEE Standards 929 and 1547 having particular application. The optional and lockable disconnects of IEEE 1547 are required.

   b. The protective functions for generation facilities operating in parallel with the Utility's electrical system shall include:

      (1) An over/under voltage trip function and an over/under frequency trip function:

      (2) A means for disconnecting the Generating Facility from the Utility's electrical system when a protective function initiates a trip:

      (3) A voltage and frequency sensing and time-delay function to prevent the Generating Facility from energizing a de-energized circuit and to prevent the generating facility from reconnecting with the Utility's electrical system unless the Distribution System service voltage and frequency is of specified settings and is stable for a minimum of five minutes; and

(Continued)

RULE NO. 15

GENERATING FACILITY INTERCONNECTIONS

E. GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS, (Continued)

(4) A function to prevent the Generating Facility and associated Protective Functions contributing to the formation of an Unintended Island.

c. Suitable Equipment Required. Circuit breakers or other interrupting devices located at the Point of Common Coupling must be Certified or "Listed" (as defined in Article 100, the Definitions Section of the National Electrical Code) as suitable for their intended application. This includes being capable of interrupting the maximum available fault current expected at their location. Producer's Generating Facility and Interconnection Facilities shall be designed so that the failure of any one device shall not potentially compromise the safety and reliability of Utility's Distribution System.

d. Visible Disconnect Required. The Producer shall furnish and install a manual disconnect device that has a Visible Disconnect to isolate the Generating Facility from Utility's Distribution System. The device must be accessible to Utility personnel and be capable of being locked in the open position. Generating Facilities with Non-Islanding inverters totaling one (1) kilovolt-ampere (kVA) or less are exempt from this requirement.

e. Limits to Single-Phase Generators. For single-phase Generators connected to a shared single-phase secondary system, the maximum Net Nameplate Rating of the Generating Facilities shall be 20 kVA. Generators connected to a center-tapped neutral 240-volt service must be installed such that no more than 6 kVA of imbalanced power is applied to the two "legs" of the 240-volt service. For Dedicated Distribution Transformer services, the maximum Net Nameplate Rating of a single-phase Generating Facility shall be the transformer nameplate rating. If the aggregate Net Nameplate Ratings of the Generating Facilities exceeds the aforementioned 20 kVA and 6 kVA limits, or the transformer nameplate rating, the Utility shall consider the operating characteristics and/or controls of the Generator(s) when determining if the Producer's single-phase Generator violates these limits. (N) (N)

(Continued)

RULE NO. 15

GENERATING FACILITY INTERCONNECTIONS

E. GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS, (Continued)

f. Optional Operating Restrictions. (N)

(1) When an Energy Storage Device is paired with a Net Metering System, the Energy Storage Device, at the election of the Producer, may be programmed with one or both of the following operating restrictions:

(a) Restricted from exporting electricity to the; Distribution System (beyond Inadvertent Export); and/or

(b) Restricted to being charged solely from the Producer's Net Metering System and not from the Utility's Distribution System.

(2) An election to operate an Energy Storage Device with an operating restriction will be stated in the Application, including a description of the operating restriction.

(3) An attestation of the operating restriction shall be provided by both the customer and the operator of the Energy Storage Device.

(4) After the submission of the Application, the presence or absence of an operating restriction may be modified, but not until after an updated attestation is provided to the Utility by the customer and the operator of the Energy Storage Device and the Utility consents in writing to the modification. The Utility's written approval will not be unreasonably withheld or delayed. (N)

g. Drawings Required. Prior to Parallel Operation or Momentary Parallel Operation of the Generating Facility, Utility shall approve the Producer's Protective Function and control diagrams. Generating Facilities equipped with a Protective Function and control scheme previously approved by Utility for system-wide application or only Certified Equipment may satisfy this requirement by reference to previously approved drawings and diagrams. (T)

h. Generating Facility Conditions Not Identified. In the event this Rule does not address the Interconnection requirements for a particular Generating Facility, the Utility may specify other requirements. (T)

(Continued)

RULE NO. 15

GENERATING FACILITY INTERCONNECTIONS

E. GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS, (Continued)

2. The Producer shall not operate Generating or Interconnection Facilities that superimpose a voltage or current upon Utility's Distribution System that interferes with Utility operations, service to Utility customers, or communication facilities. If such interference occurs, the Producer must diligently pursue and take corrective action at its own expense after being given notice and reasonable time to do so by Utility. If the Producer does not take corrective action in a timely manner, or continues to operate the facilities causing interference without restriction or limit, Utility may, without liability, disconnect the Producer's facilities from Utility's Distribution System, in accordance with Section C.9 of this Rule. To eliminate undesirable interference caused by its operation, each Generating Facility shall meet the following criteria:

   a. Normal Voltage Operating Range. The voltage operating range limits for Generating Facilities shall be used as a Protection Function that responds to abnormal conditions on Utility's Distribution System and not as a voltage regulation function.

      (1) Generating Facilities (11 kVA or less). Generating Facilities with a Gross Nameplate Rating of 11 kVA or less shall be capable of operating within the voltage range normally experienced on Utility's Distribution System. The operating range shall be selected in a manner that minimizes nuisance tripping between 106 volts and 132 volts on a 120-volt base. (88%-110% of nominal voltage). Generating Facilities shall cease to energize Utility's circuits whenever the voltage at the Point of Common Coupling deviates from the allowable voltage operating range.

      (2) Generating Facilities (greater than 11 kVA). Utility may have specific operating voltage ranges for Generating Facilities with Gross Nameplate Ratings greater than 11 kVA, and may require adjustable operating voltage settings. In the absence of such requirements, the Generating Facility shall operate at a range between 88% and 110% of the applicable interconnection voltage.

(Continued)

RULE NO. 15

GENERATING FACILITY INTERCONNECTIONS

E. GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS, (Continued)

(3) Voltage Disturbances. Whenever the Utility's Distribution System voltage at the Point of Common Coupling varies from normal (nominally 120 volts) by the predetermined amounts set forth in IEEE 1547, the Generating Facility's Protective Functions shall cause the Generator(s) to become isolated from Utility's Distribution System

b. Flicker. Voltage interference causing a modulation of the light level of lamps sufficient to be irritating to humans, or which causes equipment mis-operation to occur shall be corrected by the Producer. Objectionable may be as defined in any of the publications cited in IEEE 1547 describing objectionable flicker.

c. Frequency. The Generating Facility shall operate in synchronism with the Utility Distribution System as described in IEEE 1547. When the system frequency is in the range given in IEEE 1547, the Generating Facilities shall cease to energize the Utility's Distribution Facilities within the given clearing times. Adjustable under frequency trip settings shall be coordinated with the Utility.

d. Harmonics. When the Producer is serving balanced linear loads, harmonic distortion shall be within the maximum harmonic current distortion percentages given in IEEE 1547. Exception: The harmonic distortion of a Generating Facility located at a Customer's site shall be evaluated using the same criteria as the loads at that site

e. Direct Current Injection. Generating Facilities should not inject direct current greater than 0.5% of rated output current into Utility's Distribution System.

f. Power Factor. Each Generator in a Generating Facility shall be capable of operating at some point within a power factor range from 0.9 leading to 0.9 lagging. Operation outside this range is only acceptable in the case where the reactive power of the Generating Facility is used to meet the reactive power needs of the Host Loads. The Producer shall notify Utility if it is using the Generating Facility for power factor correction. The Utility may request a modification of this requirement for good cause.

(Continued)

RULE NO. 15

GENERATING FACILITY INTERCONNECTIONS

E. GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS, (Continued)

3. CONTROL, PROTECTIVE FUNCTION AND SAFETY EQUIPMENT REQUIREMENTS

a. Technology Specific Requirements

(1) Three-Phase Synchronous Generators. For three-phase Generators, the Generating Facility circuit breakers shall be three-phase devices with electronic or electromechanical control. The Producer shall be responsible for properly synchronizing its Generating Facility with Utility's Distribution System by means of either a manual or automatic synchronizing device. Automatic synchronizing is required for all synchronous Generators that have a Short Circuit Contribution Ratio (SCCR) exceeding 0.05. A Generator whose SCCR exceeds 0.05 shall be equipped with Protective Functions suitable for detecting loss of synchronism and rapidly disconnecting the Generator from Utility's Distribution System. Unless otherwise agreed upon by the Producer and Utility, synchronous Generators shall automatically regulate power factor, not voltage, while operating in parallel with Utility's Distribution System. Power system stabilization is specifically not required for Generating Facilities under 10 MW Net Nameplate Rating. Synchronization means that at the time of connection, the frequency difference shall be less than 0.2 Hertz, the voltage difference shall be less than 10%, and the phase angle difference shall be less than 10 degrees.

(2) Induction Generators. Induction Generators do not require a synchronizing function. Starting or rapid load fluctuations on induction generators can adversely impact Utility's Distribution System's voltage. Corrective step-switched capacitors or other techniques may be necessary and may cause undesirable ferro-resonance. When these counter measures (e.g., additional capacitors) are installed on the Producer's side of the Point of Common Coupling, Utility must review these measures. Additional equipment may be required as determined in a Supplemental Review or an Interconnection Study.

(Continued)

RULE NO. 15

GENERATING FACILITY INTERCONNECTIONS

E. GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS, (Continued)

3. CONTROL, PROTECTIVE FUNCTION AND SAFETY EQUIPMENT REQUIREMENTS, (Continued)

(3) Inverter Systems. Utility-interactive inverters do not require separate synchronizing equipment. Non-utility-interactive or "stand-alone" inverters shall not be used for Parallel Operation with Utility's Distribution System.

b. Supplemental Generating Facility Requirements

(1) Unintended Islanding for Generating Facilities that Fail the Export Screen. Generating Facilities shall not contribute to an Unintended Island. This can be accomplished by one of the following options: (1) incorporating certified Non-Islanding control functions into the Protective Functions, (2) verifying that local loads sufficiently exceed the load carrying capability of the Generating Facility, or (3) incorporating transfer trip or an equivalent function in the Protective Functions.

(2) Fault Detection. A Generating Facility with an SCCR exceeding 0.1 or that does not meet any one of the options for detecting Unintended Islands in E.3.d.1. shall be equipped with Protective Functions designed to detect Distribution System faults, both line-to-line and line-to-ground, and promptly remove the Generating Facility from the Utility's Distribution System in the event of a fault. For a Generating Facility that cannot detect these faults within a half of one second, transfer trip or an equivalent function may be required. Reclose-blocking of the Utility's affected recloser(s) may also be required by the Utility for Generating Facilities that exceed 15% of the peak load on the Line Section.

c. Generating Facility types and conditions not identified or larger than 10 MVA. In the event that Section E of this Rule does not address the interconnection requirements for a particular Generating Facility, the Utility will specify technical requirements to interconnect the Generating Facility.

(Continued)

RULE NO. 15

GENERATING FACILITY INTERCONNECTIONS

F. INTERCONNECTION FACILITY OWNERSHIP, (Continued)

1. Scope And Ownership Of Interconnection Facilities

a. Scope. Parallel Operation of Generating Facilities may require Interconnection Facilities or improvements to be made to Utility's Distribution System ("Distribution System improvements"). The type, extent and costs of Interconnection Facilities and Distribution System improvements shall be consistent with this Rule and determined through the Supplemental Review and/or Interconnection Studies described in Section D.

b. Ownership. Interconnection Facilities installed on Producer's side of the Point of Common Coupling may be owned, operated and maintained by the Producer or Utility. Interconnection Facilities installed on Utility's side of the Point of Common Coupling and Distribution System improvements shall be owned, operated and maintained only by Utility.

2. Responsibility of Costs of Interconnecting a Generating Facility

a. Study and Review Costs. A Producer shall be responsible for the reasonably incurred costs of the Initial Review and any Interconnection Studies conducted pursuant to Section D.2 of this Rule solely to explore the feasibility and determine the requirements of interconnecting a Generating Facility with the Utility's Distribution System. If the Generating Facility's operating characteristics can be modified such that any required Distribution System improvements could be reduced or not required, within ten (10) business days of receipt of the required Distribution System improvements the Producer shall inform Utility of such capability and request Utility to determine the need for and scope of any Distribution System improvements based upon the modified operating characteristics. Utility shall then determine and inform Producer of what modifications, if any, may be made to the required Distribution System improvements based upon Producer's modified operating characteristics, or shall inform the Producer of the time frame to make such a determination, within ten (10) business days of receipt of such modified operating characteristics. Modifications to the initial project scope that do not necessitate a new application will not be assessed an addition study fee. (N) (N)

(Continued)

RULE NO. 15

GENERATING FACILITY INTERCONNECTIONS

F. INTERCONNECTION FACILITY OWNERSHIP, (Continued)

2. Responsibility of Costs of Interconnecting a Generating Facility, (Continued)

b. Facility Costs. A Producer shall be responsible for all costs associated with Interconnection Facilities owned by the Producer. The Producer shall also be responsible for any costs reasonably incurred by Utility in providing, operating, or maintaining the Interconnection Facilities and Distribution System improvements required solely for the Interconnection of the Producer's Generating Facility with Utility's Distribution System. Generating Facilities eligible for Net Energy Metering under Schedule NMR-B are exempt from any costs associated with Distribution System Improvements. Generating Facilities eligible for service under Schedules NMR-A, NMR-G, and NMR-405 are responsible for Distribution System improvements necessary for the interconnections of the Net Metering System pursuant to Rule 9. The cost responsibility for any Interconnection Facilities and/or Distribution System improvements Required solely due to the load aspects of an Energy Storage Device (e.g., the Energy Storage Device is charged by the Utility's Distribution System) shall be as set forth in Rule 9. (L) (T) (L, N) (N)

c. Separation of Costs. Should Utility combine the installation of Interconnection Facilities or Distribution System improvements required for the Interconnection of a Generating Facility with improvements to Utility's Distribution System to serve other Customers or Producers, Utility shall not include the costs of such separate or incremental facilities in the amounts billed to the Producer.

3. Installation Of Interconnection Facilities Owned And Operated By The Utility

a. Agreement Required. The costs for Interconnection Facilities and Distribution System improvements shall be paid by the Producer pursuant to the provisions contained in the Interconnection Agreement. Where the type and extent of the Interconnection Facilities or Distribution System improvements warrant additional detail, Producer and Utility shall execute separate agreement(s) to more fully describe and allocate the parties' responsibilities for installing, owning, operating and maintaining the Interconnection Facilities and Distribution System Improvements.

(Continued)

RULE NO. 15

GENERATING FACILITY INTERCONNECTIONS

F. INTERCONNECTION FACILITY OWNERSHIP (Continued)

3. Installation Of Interconnection Facilities Owned And Operated By The Utility

b. Distribution System Improvements. Interconnection Facilities connected to Utility's side of the Point of Common Coupling and Distribution System improvements shall be provided, installed, owned and maintained by Utility at Producer's expense.

c. Reservation of Unused Facilities. When a Producer wishes to reserve Utility-owned Interconnection Facilities or Distribution System improvements installed and financed as Special Facilities for the Producer, but idled by a change in the operation of the Producer's Generating Facility or otherwise, the Producer may elect to abandon or reserve such facilities consistent with the terms of its agreement with the Utility. If Producer elects to reserve idle Interconnection Facilities or Distribution System improvements, the Utility shall be entitled to continue to charge the Producer for the costs related to the ongoing operation and maintenance of the Special Facilities. (L) (L)

G. METERING, MONITORING AND TELEMETRY

1. General Requirements. All Generating Facilities shall be metered in accordance with this Section G and shall meet all applicable standards of the Utility contained in the Utility's applicable Tariff Schedules and published Utility manuals dealing with Metering specifications. The requirements in this Section G do not apply to Metering of Generating Facilities operating under Schedule No. NMR-A, NMR-B, NMR-G, and NMR-405 established and offered pursuant to Nevada Revised Statutes 704.766 to 704.775. Schedule Nos. NMR-A, NMR-B, NMR-G, and NMR-405 establish separate metering requirements for these Generating Facilities. (N) (N)

2. Metering by non-Utility Parties. The ownership, installation, operation, reading, and testing of Metering for Generating Facilities shall be by the Utility.

(Continued)

RULE NO. 15

GENERATING FACILITY INTERCONNECTIONS

G. METERING, MONITORING AND TELEMETRY, (Continued)

3. To the extent existing Telemetry and Metering at the Point of Common Coupling Generation Metering to the extent that less intrusive and/or more cost effective options for providing the necessary Generating Facility output data are not available. In exercising its discretion to require Net Generation Metering, Utility shall consider all relevant factors, including but not limited to: (L)

   a. Data requirements in proportion to need for information;
   b. Producer election to install equipment that adequately addresses the Utility's operational requirements;
   c. Accuracy and type of required Metering consistent with purposes of collecting data;
   d. Cost of Metering relative to the need for and accuracy of the data;
   e. The Generating Facility's size relative to the cost of the Metering/monitoring;
   f. Other means of obtaining the data (e.g. Generating Facility logs, proxy data etc.);
   g. Requirements under any Interconnection and Operating Agreement with the Producer. (L)

4. Point of Common Coupling Metering. For purposes of assessing Utility charges for service, the Point of Common Coupling Metering shall be a bi-directional meter so that power deliveries to and from the Producer's site can be separately recorded. In order to accurately measure power flow in both directions, multiple Metering points may be required. Such Point of Common Coupling Metering shall be equipped or designed to prevent reverse registration.

5. Telemetering. If the Net Nameplate Rating of the Generating Facility is 1,000 kilowatts or greater, Telemetering equipment at the Net Generator Metering location may be required at the Producer's expense to allow the Utility and the Customer's scheduling coordinator to monitor such large Generators for their impact upon the distribution system. The costs for Telemetering, including equipment, installation, and any costs for leased telephone lines are separate and in addition to other Metering costs addressed in Section G.7 below. If the Generating Facility is interconnected to a Distribution System operating at a voltage below 10 kV, then Telemetering equipment may be required on Generating Facilities 250 kilowatts or greater.

(Continued)

RULE NO. 15

GENERATING FACILITY INTERCONNECTIONS

G. METERING, MONITORING AND TELEMETRY, (Continued)

5. Telemetering (Continued). (L)
The Utility shall only require Telemetering to the extent that less intrusive and/or more cost effective options for providing the necessary data in real time are not available. Charges will be included in an applicable Interconnection and Operating Agreement.

6. Location. Where the Utility-owned Metering is located on the Producer's Premises, the Producer shall provide, at no expense to the Utility, a suitable location for all such Metering.

7. Net Generation Metering. Metering Equipment, including an appropriate revenue-quality Meter, as defined in Rule 1, shall be installed if required in the Producer's applicable standby rate schedule.

   a. All service switches, Meter sockets, Meter enclosures, cutouts and similar devices, irrespective of voltage, required in connection with Net Generation Metering shall be furnished, installed, maintained and owned by the Producer at no cost to the Utility.

   b. The Utility will furnish, install and own the appropriate Meter or Meters used for Net Generation Metering. Such installation location shall be furnished by the Producer and approved by the Utility, and shall, at reasonable times, be accessible for reading, testing and maintaining the Meter. (L)

8. Energy Storage Device Metering. Metering Equipment, including an appropriate utility-owned, bi-directional, Interval Meter, as defined in Rule 1, shall be installed per applicable published Utility manuals and standards dealing with Metering specifications. (N)

   a. All service switches, Meter sockets, Meter enclosures, cutouts and similar devices, irrespective of voltage, required in connection with Energy Storage Device Metering shall be furnished, installed, maintained and owned by the Producer at no cost to the Utility.

   b. The Utility will furnish, install and own the appropriate Meter or Meters used for Energy Storage Device Metering, at its cost. Such installation location shall be furnished by the Producer and approved by the Utility, and shall, at reasonable times, be accessible for reading, testing and maintaining the Meter.

   c. This requirement may be modified or eliminated by the Commission. (N)

(Continued)

RULE NO. 15

GENERATING FACILITY INTERCONNECTIONS

H. DISPUTE RESOLUTION PROCESS (L)

1. The following procedures will apply for disputes arising from this Rule. The Commission shall have initial jurisdiction to interpret, add, delete or modify any provision of this Rule or of any agreements entered into between Utility and the Producer to implement this tariff ("the implementing agreements") and to resolve disputes regarding Utility's performance of its obligations under its Tariff Schedules, the implementing agreements, and requirements related to the interconnection of the Producer's Generating or Interconnection Facilities pursuant to this Rule.

2. Any dispute arising between Utility and the Producer (individually "Party" and collectively "the Parties") regarding Utility's performance of its obligations under its Tariff Schedules, the implementing agreements, and requirements related to the interconnection of Producer's Facilities pursuant to this Rule shall be resolved according to the following procedures.

   a. The dispute shall be reduced to writing by the aggrieved Party in a letter ("the dispute letter") to the other Party containing the relevant known facts pertaining to the dispute, the specific dispute and the relief sought, and express notice by the aggrieved Party that it is invoking the procedures under Section H.2. Within 45 calendar days of the date of the dispute letter, the Parties' authorized representatives will be required to meet and confer to try to resolve the dispute.

   b. If the Parties do not resolve their dispute within 45 calendar days after the date of the dispute letter, the dispute shall, upon demand of either party, be submitted to resolution before the Commission in accordance with the procedures outlined in NAC 703.616 to 703.651.

3. Pending resolution of any dispute under this Section, the Parties shall proceed diligently with the performance of their respective obligations under this Rule and the implementing agreements, unless the implementing agreements have been terminated. Disputes as to the Application and implementation of this Section shall be subject to resolution pursuant to the procedures set forth in this Section. (L)

(Continued)

RULE NO. 15

GENERATING FACILITY INTERCONNECTIONS

I. INITIAL REVIEW PROCESS FOR APPLICATIONS TO INTERCONNECT GENERATING FACILITIES

1. Introduction

This Initial Review Process described in this Section creates a path for selection and rapid approval for the interconnection of those Generating Facilities that do not require an Interconnection Study. Failure to pass any screen of the Initial Review means only that further review and/or studies are required before the Generating Facility can be approved for interconnection with the Utility's Distribution System. It does not mean that the Generating Facility cannot be interconnected. (N)

(N)

2. Purpose

The Initial Review determines:

a. If Generating Facility qualifies for Simplified Interconnection;

b. If a Generating Facility can be made to qualify for Interconnection with a Supplemental Review determining any potential additional requirements, or

c. If an Interconnection Study is required, the cost estimates and schedule for performing the Interconnection Study.

(D)

3. The following flow chart provides a summary of the Initial Review Process that is referenced and more fully described in Section 4:

(L)

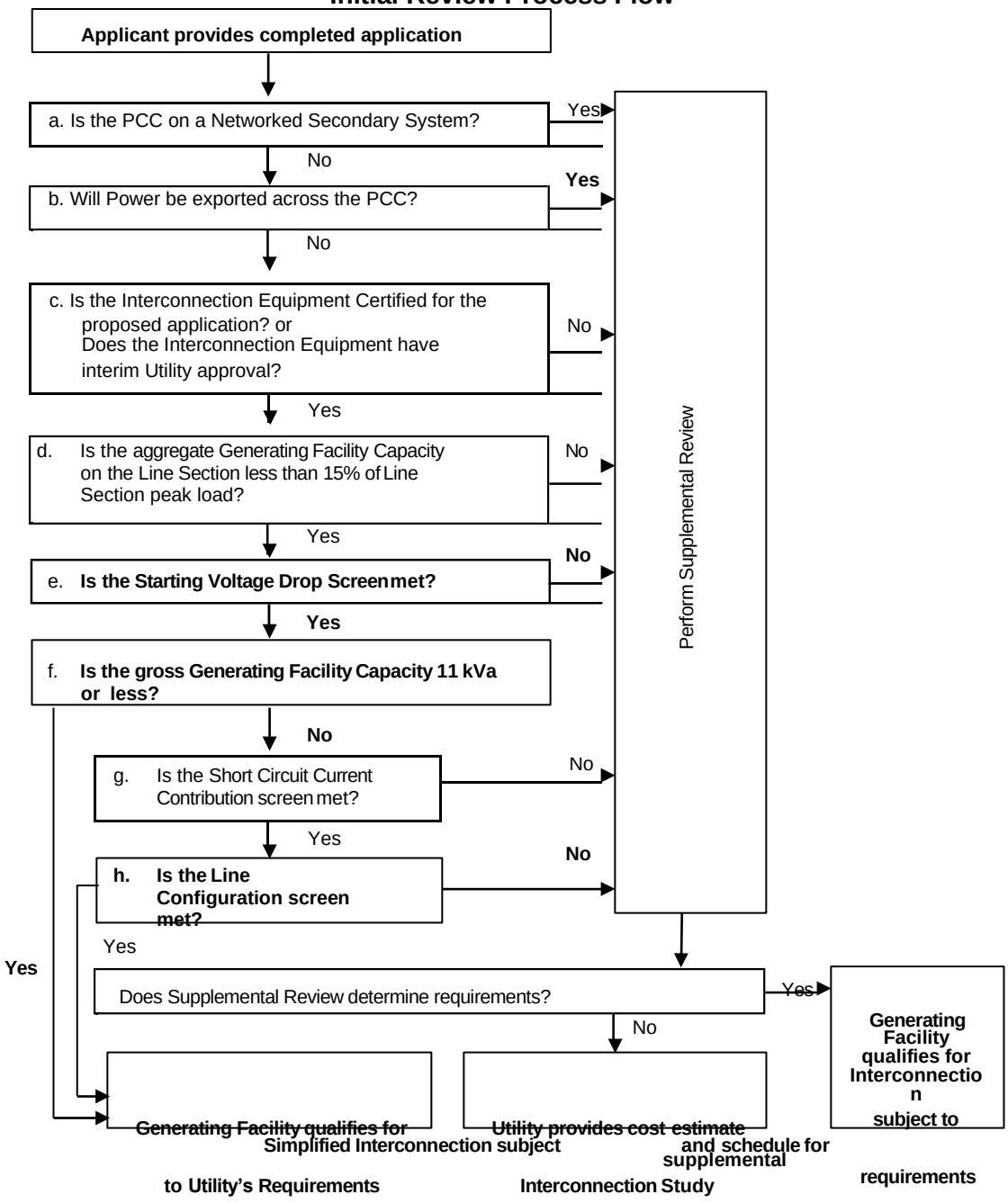
(L)

(Continued)

I. **INITIAL REVIEW PROCESS FOR APPLICATIONS TO INTERCONNECT GENERATING FACILITIES, (Continued)** (L)

3. **Flow Chart, (Continued)**

Initial Review Process Flow



(L)

RULE NO. 15

GENERATING FACILITY INTERCONNECTIONS (L)

4. Initial Review Process Details

a. Is the PCC on a Networked Secondary System?

- If Yes, Generating Facility does not qualify for Simplified Interconnection. Perform supplemental review.
- If No, continue to next screen.

Significance: Special considerations must be given to Generating Facilities proposed to be installed on networked secondary distribution systems because of the design and operational aspects of network protectors. There are no such considerations for radial distribution systems.

b. Will power be exported across the PCC?

- If Yes, Generating Facility does not qualify for Simplified Interconnection. Perform supplemental review.
- If No, Generating Facility must incorporate one of the following five options:

Option 1: ("Reverse Power Protection"): To ensure power is never exported, a reverse power Protective Function must be implemented at the PCC. The default setting for this Protective Function, when used, shall be 0.1% (export) of the service transformer's rating, with a maximum .5 second time delay.

Option 2: ("Minimum Power Protection"): To ensure at least a minimum amount of power is imported at all times (and, therefore, that power is not exported), an under-power Protective Function may be implemented at the PCC. The default setting for this Protective Function, when used, shall be 5% (import) of the Generating Facility's total Gross Nameplate Rating, with a maximum 2.0 second time delay. (L)

(Continued)

RULE NO. 15

GENERATING FACILITY INTERCONNECTIONS

4. Initial Review Process Details, (Continued)

Option 3: ("Certified Non-Islanding Protection"): To ensure that Inadvertent Export of power is limited to acceptable levels, this option, when used, requires that all of the following conditions be met: (a) the total Gross Nameplate Capacity of the Generating Facility must be no more than 25% of the nominal ampere rating of the Producer's service equipment; (b) the total Gross Nameplate Capacity of the Generating Facility must be no more than 50% of the Producer's service transformer capacity rating (this capacity requirement does not apply to customers taking primaryservice without an intervening transformer); and (c) the Generating Facility must be certified as Non-Islanding.

Option 4: ("Relative Unit Size"): This option, when used, requires Net Nameplate Rating of the Generating Facility to be so small in comparison to its host facility's minimum load, that the use of additional Protective Functions is not required to insure that power will not be exported to Utility's Distribution System. This option requires the Generating Facility capacity to be no greater than 50% of the Producer's verifiable minimum Host Load over the past 12 months.

Option 5: ("Inverter as Control System"): To insure that Inadvertent Export of power is limited to acceptable levels, where a Generating Facility including Energy Storage Devices utilizes an inverter as the exclusive control system, all of the following conditions must be met: (a) the Generating Facility mustutilize only UL-1741 certified or UL-1741 SA certified inverters; (b) the Generating Facilitymust monitor that total Inadvertent Export is maintained to be no more than the Generating Facility's Gross Nameplate Rating multiplied by 0.1 hours per day over a rolling 30-day period (e.g., for a 100 kVA-gross nameplate Generating Facility, the maximum energy allowed to be exported for a 30-day period is 300 kWh); (c) the Generating Facility must disconnect from the Distribution System, ceasing to energize the Distribution System or halting energy production within two seconds after the period of continuous Inadvertent Export exceeds 30 seconds; (d) the Generating Facility must enter a safe operating mode where Inadvertent Export will not occur as a result of failure of the control or inverter system for more than 30 seconds, which results in a loss of control signal, loss of control power or a single component failure or related control sensing of the control circuitry.; (e) the Generating Facility must be certified as Non-Islanding.

NOTE: Generating Facilities incorporating any of the five options above pass Screen D.

(Continued)

(L) (T) (T) (L) (N) (N)

RULE NO. 15

GENERATING FACILITY INTERCONNECTIONS

4. Initial Review Process Details, (Continued)

Significance:

(1) If it can be assured that the Generating Facility will not export power beyond Inadvertent Export, the Utility's Distribution System does not need to be studied for load-carrying capability or Generating Facility power flow effects on the Utility voltage regulators, as the Generating Facility will simply be reducing loading on the Utility's Distribution System. (N)

(2) This Screen permits the use of reverse-power relaying at the PCC as positive Anti-Islanding protection.

c. Is the interconnection equipment certified for the application or does the interconnection equipment have interim Utility approval?

- If Yes, continue to next screen.
- If No, Generating Facility does not qualify for Simplified Interconnection. Perform supplemental review. (L)

(Continued)

(L)

RULE NO. 15

GENERATING FACILITY INTERCONNECTIONS

4. Initial Review Process Details, (Continued)

(L)

Significance:

If the Generating and/or Interconnection Facility has been Certified or previously approved by Utility, Utility does not need to repeat its review and/or test of the Generating Facility's Protective Functions scheme. Site Commissioning Testing may still be required to insure that the system is connected properly and that the protective functions are working properly.

Certification or Utility approval indicates the following criteria have been tested and verified:

- Basic protective function requirements met.
- Harmonic distortion limits met.
- Synchronizing requirements met.
- Power Factor regulation requirements met.
- Non-Islanding requirements met.
- If used, reverse power function requirement met.
- If used, under-power function requirement met.

d. Is the aggregate generating facility capacity on the line section less than 15% of line section peak load?

- If Yes, continue to next screen.
- If No, Generating Facility does not qualify for Simplified Interconnection. Perform supplemental review to determine cumulative impact on Line Section.

Significance:

(1) Low penetration of Generating Facility installations will have a minimal impact on the operation and load restoration efforts of Utility's Distribution System.

(2) The operating requirements for a high penetration of Generating Facilities may be different since the impact on the Utility's Distribution System will no longer be minimal, therefore requiring additional study or controls.

(L)

(Continued)

RULE NO. 15

GENERATING FACILITY INTERCONNECTIONS

4. Initial Review Process Details, (Continued) (L)

e. Is the starting voltage drop screen met?

- If Yes, continue to next screen.
- If No, Generating Facility does not qualify for Simplified Interconnection. Perform Supplemental Review.

Note: This screen only applies to Generating Facilities that start by motoring the Generating Unit(s) such as induction generators.

Utility has two options in determining whether Starting Voltage Drop could be a problem. The option to be used is at the Utility's discretion:

Option 1: The Utility may determine that the Generating Facility's starting Inrush Current is equal to or less than the continuous ampere rating of the Producer's Service Equipment.

Option 2: The Utility may determine the impedances of the service distribution transformer (if present) and the secondary conductors to Producer's Service Equipment and perform a voltage drop calculation. Alternatively, the Utility may use tables or monographs to determine the voltage drop. Voltage drops caused by starting a Generating Unit as a motor must be less than 2.5% for primary interconnections and 5% for secondary interconnections.

Significance:

(1) This screen addresses potential voltage fluctuation problems for Generating Units that start by motoring.

(2) When starting, Generating Facilities should have minimal impact on the service voltage to other Utility Customers.

(3) Passing this screen does not relieve the Producer from ensuring that its Generating Facility complies with the flicker requirements of Section E.2.f. (L)

(Continued)

RULE NO. 15

GENERATING FACILITY INTERCONNECTIONS

4. Initial Review Process Details, (Continued) (L)

f. Is the gross nameplate capacity of the generating facility 11 kVA or less?

- If Yes, Generating Facility qualifies for Simplified Interconnection. Skip remaining screens.
- If No, continue to next screen.

Significance:

The Generating Facility will have a minimal impact on fault current levels and any potential line over-voltages from loss of system neutral grounding.

g. Is short circuit current contribution screen met?

- If Yes, continue to next screen. Inverter-based Generating Facilities with a Gross Nameplate Rating of less than 25 kVA automatically pass this screen. (N) (N)
- If No, Generating Facility does not qualify for Simplified Interconnection. Perform supplemental review.

The Short Circuit Current Contribution Screen consists of two criteria; both of which must be met when applicable:

(1) When measured at primary side (high side) of a Dedicated Distribution Transformer serving a Generating Facility, the sum of the Short Circuit Contribution Ratios (SCCR) of all generating facilities connected to the particular Distribution System circuit that serves the Generating Facility must be less than or equal to 0.1.

(2) When measured at the secondary side (low side) of a shared distribution transformer, the short circuit contribution of the proposed Generating Facility must be less than or equal to 2.5% of the interrupting rating of the Producer's Service Equipment.

Significance:

If the Generating Facility passes this screen it can be expected that it will have no significant impact on the Utility's Distribution System's short circuit duty, fault detection sensitivity, relay coordination or fuse-saving schemes (L)

(Continued)

RULE NO. 15

GENERATING FACILITY INTERCONNECTIONS (L)

4. Initial Review Process Details, (Continued)

h. Is the line configuration screen acceptable for Simplified Interconnection?

- If Yes, Generating Facility qualifies for Simplified Interconnection. Skip remaining screens. Single-phase inverter-based Generating Facilities automatically pass this screen. (N)
- If No, then Generating Facility does not qualify for Simplified Interconnection. Perform supplemental review. (N)

Line Configuration Screen: Identify primary distribution line configuration that will serve the proposed Generating Facility. Based on the type of interconnection to be used for the Generating Facility, determine from table if the proposed Generating Facility passes the screen.

Primary Distribution Line Type	Type of Interconnection to be made to Primary Distribution Line	Results/Criteria
Three-phase, three wire	Any type	Pass Screen
Three-phase, four wire	Single-phase line-to-neutral	Pass Screen
Three-phase, four wire (For any line that has such a section OR mixed 3 wire & 4 wire)	All Others	To pass, aggregate Generating Facility Capacity must be less than or equal to 10% of Line Section Peak Load

Significance:

If the primary distribution circuit serving the Generating Facility is of a "three-wire" type, or if the Generating Facility's interconnection transformer is single-phase and connected in a line-to-neutral configuration, then there is no concern about over-voltages to Utility's, or other Customer's equipment caused by loss of system neutral grounding during the operating time of Anti-Islanding protection. (L)

(Continued)

RULE NO. 15

GENERATING FACILITY INTERCONNECTIONS

Attachment 1 – Testing and Certification Criteria (L)

1. Introduction

a. This Section describes the test procedures and requirements for equipment used for the Interconnection of Generating Facilities to Utility's Distribution System. Included are Type Testing, Production Testing, Commissioning Testing, and Periodic Testing. The procedures listed rely heavily on those described in appropriate Underwriters Laboratory (UL), Institute of Electrical and Electronic Engineers (IEEE), and International Electrotechnical Commission (IEC) documents—most notably UL 1741 and IEEE 929, as well as the testing described in *May 1999 New York Standardized Interconnection Requirements.* These procedures and requirements were developed prior to the completion of IEEE 1547 *Standard for Distributed Resources Interconnected with Electric Power System*s, and may be revisited once that standard is published.

b. The tests described here, together with the technical requirements in Section E of this Rule, are intended to provide assurance that the Generating Facility's equipment will not adversely affect the Utility's Distribution System and that a Generating Facility will cease providing power to Utility's Distribution System under abnormal conditions. The tests were developed assuming a low level of Generating Facility penetration or number of connections to Utility's Distribution System. At high levels of Generating Facility penetration, additional requirements and corresponding test procedures may need to be defined.

b. This test specification also provides a means of "certifying" equipment. Once a Generating Unit or device has been Certified per this Certification process, it may be considered to be suitable for use as part of a Generating Facility interconnected with the Utility's Distribution System. Subject to the exceptions described in this Appendix, the Utility will not require a Producer to repeat the design review or test the Protective Functions of equipment that has been Certified. It should be noted the Certification process is intended to facilitate Generating Facility interconnections. Certification is not a prerequisite to interconnect a Generating Facility. The use of non-certified equipment may be acceptable to the Utility subject to testing and approval by the Utility as discussed below. (L)

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Attachment 1 – Testing and Certification Criteria

2. Certification Criteria

a. Equipment tested and approved (e.g. "Listed") by an accredited, nationally recognized testing laboratory ("NRTL") as having met both the Type Testing and Production Testing requirements described in this document is considered to be "Certified Equipment" for purposes of Interconnection with Utility's Distribution System. Certification may apply to either a pre-packaged system or an assembly of components that address the necessary functions. Type Testing may be done in the manufactures' factory or test laboratory, or in the field. At the discretion of the testing laboratory, field-certification may apply only to the particular installation tested. In such cases, some or all of the tests may need to be repeated at other installations.

b. Proof of Certification by a NRTL will consist of a certificate with the following information for each device:

(1) Administrative

(a) The effective date of certification or applicable serial number (range or first in series), and/or other proof that certification is current
(b) Equipment model number(s) of the Certified equipment
(c) The software version utilized in the equipment, if applicable
(d) Test procedures specified (including date or revision number)
(e) Laboratory accreditation (by whom and to what standard)

(2) Technical (As Appropriate)

(a) Device ratings (kW, kVA, Volts, Amps, etc.)
(b) Maximum available fault current in Amps
(c) In-rush Current in Amps
(d) Trip points, if factory set (trip value and timing)
(e) Trip point and timing ranges for adjustable settings
(f) Nominal power factor or range if adjustable
(g) If the device/system is certified for non-export and the method used (reverse power or under power)
(h) If the device/system is Certified as Non-Islanding

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Attachment 1 – Testing and Certification Criteria (L)

It is the responsibility of the Applicant to ensure that the equipment manufacturer ensure that certification information is made publicly available by the manufacturer, the testing laboratory, or by a third party.

3. TYPE TESTING

a. Type Tests and Requirements for Interconnection Equipment Certification. Type Testing provides a basis for determining that equipment is designed appropriately and meets the specifications for being designated as Certified Equipment under this Rule. The requirements described in this Section cover only issues related to Interconnection and are not intended to address device safety or other issues outside the needs of the relationship between Utility and the Producer operating a Generating Facility.

The following table defines the test requirements by Generator or inverter technology. While UL 1741 was written specifically for inverters, the requirements are readily adaptable to synchronous Generators, induction Generators, as well as single/multi-function controllers and protection relays. Until a universal test standard is developed, Utility or NRTL shall adapt the procedures referenced in the following table as appropriate and necessary for a Generating and/or Interconnection Facility or associated equipment performance and its control and protection system functions. (L)

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Type Test and Requirements for Interconnection Equipment Certification

Type Test	Reference (1)	Inverter	Synchronous Machine	Induction Machine
Utility Interaction	UL 1741-39	X	X	X
DC Isolation	UL 1741 – 40.1	X	-	-
Simulated PV Array (Input) Requirements	UL 1741 – 41.2	X	-	-
Dielectric Voltage Withstand	UL 1741 - 44	X	X	X
Power Factor	UL 1741 – 45.2.2	X	X	X
Harmonic Distortion	UL 1741 – 45.4	X	X	X
DC Injection	UL 1741 – 45.5	X	-	-
Utility Voltage and Frequency Variation	UL 1741 – 46.2	X	X	X
Reset Delay	UL 1741 – 46.2.3	X	X	X
Loss of Control Circuit	UL 1741 – 46.4	X	X	X
Short Circuit	UL 1741 – 47.3	X	X	X
Load Transfer	UL 1741 – 47.7	X	X	X
Surge Withstand	3.a	X	X	X
Anti-islanding	3.b	(2)	(2)	(2)
Non-export	3.c	(3)	(3)	(3)
In-rush Current	3.d	(4)	(4)	(4)
Synchronization	3.e	(5)	X	-

Table Notes:

(1) References are to section numbers in either UL 1741 (Inverters, Converters and Charge Controllers for use in Independent Power Systems) or this Rule. References in UL 1741 to "photovoltaics" or "inverter" may have to be adapted to the other technologies by the testing laboratory to appropriately apply in the tests to other technologies.

(2) Required only if Non-Islanding designation.

(3) Required only if Non-Export designation is desired.

(4) Required for Generators that use Utility power to motor to speed.

(5) Required for all synchronous Generators as well as Inverters that operate as voltage sources when connected to Utility.

Note:
X = Required
— = Not Required

UL 1741, *Inverters, Converters and Charge Controllers for use in Independent Power Systems*, Revised January 2001.

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b. Anti-Islanding Test

Devices that pass the Anti-Islanding test procedure described in UL 1741 Section 46.3 will be considered Non-Islanding for the purposes of these interconnection requirements. The test is required only for devices for which a Certified Non-Islanding designation is desired.

c. Non-Export Test

Devices that pass the Non-Export test procedure described in Section 7.a. will be considered Non-Exporting for the purposes of these Interconnection requirements. This test is required only for devices for which a Certified Non-Export designation is desired.

d. In-Rush Current Test

Generation equipment that utilizes Utility power to motor up to speed will be tested using the procedure defined in Section J.7.b. to determine the maximum current drawn during this startup process. The resulting In-rush Current is used to estimate the Starting Voltage Drop.

e. Surge Withstand Capability Test

Interconnection equipment shall be tested for surge withstand capability (SWC), both oscillatory and fast transient, in accordance with the test procedure defined in IEEE/ANSI C62.45 using the peak values defined in IEEE/ANSI C62.41 Tables 1 and 2 for location category B3. An acceptable result occurs even if the device is damaged by the surge, but is unable to operate or energize Utility's Distribution System. If the device remains operable after being subject to the surge conditions, previous Type Tests related to Utility's protection and power quality will need to be repeated to ensure the unit will still pass those tests following the surge test. (L)

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Attachment 1 – Testing and Certification Criteria

f. Synchronization Test

This test verifies that the unit synchronizes within the specified voltage/ frequency/phase angle requirements. It is applied to synchronous Generators and inverters capable of operating as voltage-source while connected to Utility's Distribution System. This test is not necessary for induction Generators or current-source inverters. The test will start with only one of the three parameters: (1) voltage difference between Generating Facility and Utility's Distribution System; (2) frequency difference; or (3) phase angle outside of the synchronization specification. Initiate the synchronization routine and verify that the Generating Facility is brought within specification prior to synchronization. Repeat the test five times for each of the three parameters. For manual synchronization with synch check or manual control with auto synchronization, the test must verify that paralleling does not occur until the parameters are brought within specifications.

4. PRODUCTION TESTING

As a minimum, the Utility Voltage and Frequency Variation Test procedure described in UL1741 under Manufacturing and Production Tests, Section 68 shall be performed as part of routine production (100 percent) on all equipment used to interconnect Generating Facilities to Utility's Distribution System. This testing may be performed in the factory or as part of a Commissioning Test (Section 5.).

5. COMMISSIONING TESTING

a. Commissioning Testing, where required, will be performed on-site to verify protective settings and functionality. Upon initial Parallel Operation of a Generating Facility, or any time interface hardware or software is changed that may affect the functions listed below, a Commissioning Test must be performed. An individual qualified in testing protective equipment (professional engineer, factory-Certified technician, or licensed electrician with experience in testing protective equipment) must perform Commissioning Testing in accordance with the manufacturer's recommended test procedure to prove the settings and requirements of this Rule. (L)

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Attachment 1 – Testing and Certification Criteria

5. COMMISSIONING TESTING, (Continued)

Utility has the right to witness Commissioning Tests as described below, or to require written Certification by the installer describing which tests were performed and their results. Protective Functions to be tested during commissioning, particularly with respect to non-Certified Equipment, may consist of the following:

- Over and under voltage
- Over and under frequency
- Anti-Islanding function (if applicable)
- Non-Export function (if applicable)
- Inability to energize dead line
- Time delay on restart after utility source is stable
- Utility system fault detection (if used)
- Synchronizing controls (if applicable)
- Other Interconnection Protective Functions that may be required as part of the Interconnection Agreement

b. Other checks and tests that may need to be performed include:

- Verifying final Protective Function settings
- Trip test
- In-service test

c. Certified Equipment

Generating Facilities qualifying for Simplified Interconnection incorporate Certified Equipment that have, at a minimum, passed the Type Tests and Production Tests described in this Rule and are judged to have little or no potential impact on Utility's Distribution System. For such Generating Facilities, it is necessary to perform only the following tests:

(1) Protective Function settings that have been changed after factory testing will require field verification. Tests shall be performed using injected secondary frequencies, voltages and currents, applied waveforms, a test connection using a Generator to simulate abnormal utility voltage or frequency, or varying the set points to show that the device trips at the measured (actual) utility voltage or frequency. (L)

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5. COMMISSIONING TESTING, (Continued)

(2) The Non-Islanding function will be checked by operating a load break disconnect switch to verify the Interconnection equipment ceases to energize Utility's Distribution System and does not re-energize for the required time delay after the switch is closed.

(3) The Non-Exporting function shall be checked using secondary injection techniques. This function may also be tested by adjusting the Generating Facility output and local loads to verify that the applicable Non-Exporting criteria (i.e., reverse power or under power) are met.

The Supplemental Review or an Interconnection Study may impose additional components or additional testing.

d. Non-Certified Equipment
Non-Certified Equipment shall be subjected to the appropriate tests described in Type Testing (Section 3.) as well as those described in Certified Equipment Commissioning Tests (Section 5.c.). With Utility's approval, these tests may be performed in the factory, in the field as part of commissioning, or a combination of both. Utility, at its discretion, may also approve a reduced set of tests for a particular application or, for example, if it determines it has sufficient experience with the equipment.

e. Verification of Settings
If the testing is part of the commissioning process, then, at the completion of such testing, the Producer shall confirm all devices are set to Utility-approved settings. This step shall be documented in the Commissioning Test Certification.

f. Trip Tests
Interconnection Protective Functions and devices (e.g., reverse power relays) that have not previously been tested as part of the Interconnection Facility with their associated interrupting devices (e.g., contactor or circuit breaker) shall be trip tested during commissioning. The trip test shall be adequate to prove that the associated interrupting devices open when the protective devices operate. Interlocking circuits between Protective Function devices or between interrupting devices shall be similarly tested unless they are part of a system that has been tested and approved during manufacture. (L)

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Attachment 1 – Testing and Certification Criteria

5. COMMISSIONING TESTING, (Continued)

g. In-Service Tests

Interconnection Protective Functions and devices that have not previously been tested as part of the Interconnection Facility with their associated instrument transformers or that are wired in the field shall be given an in-service test during commissioning. This test will verify proper wiring, polarity, CT/PT ratios, and proper operation of the measuring circuits. The in-service test shall be made with the power system energized and carrying a known level of current. A measurement shall be made of the magnitude and phase angle of each Alternating Current (AC) voltage and current connected to the protective device and the results compared to expected values. For protective devices with built-in Metering functions that report current and voltage magnitudes and phase angles, or magnitudes of current, voltage, and real and reactive power, the metered values may be used for in-service testing. Otherwise, portable ammeters, voltmeters, and phase-angle meters shall be used.

6. PERIODIC TESTING

Periodic Testing of Interconnection-related Protective Functions shall be performed as specified by the manufacturer, or at least every four years. All periodic tests prescribed by the manufacturer shall be performed. The Producer shall maintain periodic test reports or a log for inspection by Utility. Periodic Testing conforming to Utility test intervals for the particular line section may be specified by Utility under special circumstances, such as high fire hazard areas. Interconnection Facilities that depend upon a battery for Protective Function shall be checked and logged once per month for proper voltage. Once every four years, the battery must be either replaced or a discharge test performed.

7. SUPPLEMENTAL TESTING PROCEDURES

This section describes the additional Type Tests necessary to qualify a device as Certified for use on Utility's Distribution Systems. These Type Tests are not contained in Underwriters Laboratories UL 1741 Standard *Inverters, Converters and Controllers for Use in Independent Power Systems,* or other referenced standards, but are considered necessary for Certification by Utility. (L)

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Attachment 1 – Testing and Certification Criteria

7. SUPPLEMENTAL TESTING PROCEDURES, (Continued)

a. Non-Exporting Test Procedures

The Non-Exporting test is intended to verify the operation of relays, controllers and inverters designed to limit the export of power and certify the equipment as meeting the requirements of Screen 2, Options 1 and 2, of the review process. Tests are provided for discrete relay packages and for controllers and inverters that include the intended function.

(1) Discrete Reverse Power Relay Test

This version of the Non-Exporting test procedure is intended for discrete reverse power and under power relay packages provided to meet the requirements of Options 1 and 2 of Screen 2. It should be understood that in the reverse power application, the relay will provide a trip output with power flowing in the export (toward the Utility Distribution System) direction.

Step 1: Power Flow Test at Minimum, Midpoint and Maximum Pickup Level Settings

Determine the corresponding secondary pickup current for the desired export power flow of 0.5 secondary watts (the minimum pickup setting, assumes 5 Amps and 120V CT/PT secondary). Apply nominal voltage with minimum current setting at zero (0) degrees phase angle in the trip direction. Increase the current to pickup level. Observe the relay's (LCD or computer display) indication of power values. Note the indicated power level at which the relay trips. The power indication should be within 2% of the expected power. For relays with adjustable settings, repeat this test at the midpoint, and maximum settings. Repeat at phase angles of 90, 180 and 270 degrees and verify that the relay does not operate (measured watts will be zero or negative). (L)

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Attachment 1 – Testing and Certification Criteria

7. SUPPLEMENTAL TESTING PROCEDURES, (Continued)

Step 2: Leading Power Factor Test

Apply rated voltage with a minimum pickup current setting (calculated value for system application) and apply a leading power factor load current in the non-trip direction (current lagging voltage by 135 degrees). Increase the current to relay rated current and verify that the relay does not operate. For relays with adjustable settings, this test should be repeated at the minimum, midpoint and maximum settings.

Step 3: Minimum Power Factor Test

At nominal voltage and with the minimum pickup (or ranges) determined in Step 1, adjust the current phase angle to 84 or 276 degrees. Increase the current level to pickup (about 10 times higher than at 0 degrees) and verify that the relay operates. Repeat for phase angles of 90, 180 and 270 degrees and verify that the relay does not operate.

Step 4: Negative Sequence Voltage Test

Using the pickup settings determined in Step 1, apply rated relay voltage and current at 180 degrees from tripping direction, to simulate normal load conditions (for three-phase relays, use I_a at 180, I_b at 60 and I_c at 300 degrees). Remove Phase-1 voltage and observe that the relay does not operate. Repeat for Phases-2 and 3.

Step 5: Load Current Test

Using the pickup settings determined in Step 1, apply rated voltage and current at 180 degrees from the tripping direction, to simulate normal load conditions (use I_a at 180, I_b at 300 and I_c at 60 degrees). Observe that the relay does not operate. (L)

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Attachment 1 – Testing and Certification Criteria

7. SUPPLEMENTAL TESTING PROCEDURES, (Continued)

Step 6: Unbalanced Fault Test

Using the pickup settings determined in Step 1, apply rated voltage and two times rated current, to simulate an unbalanced fault in the non-trip direction (use V_a at 0 degrees, V_b and V_c at 180 degrees, I_a at 180 degrees, I_b at 0 degrees, and I_c at 180 degrees). Observe that the relay, especially single-phase, does operate properly.

Step 7: Time Delay Settings Test

Apply Step 1 settings and set time delay to minimum setting. Adjust the current source to the appropriate level to determine operating time, and compare against calculated values. Verify that the timer stops when the relay trips. Repeat at midpoint and maximum delay settings.

Step 8: Dielectric Test

Perform the test described in IEC 414 using 2 kV RMS for one minute.

Step 9: Surge Withstand

Perform the surge withstand test described in IEEE C37.90.1.1989 or the surge withstand test described in Section 3.e.

(2) Discrete Under-Power Relay Test

This version of the Non-Exporting test procedure is intended for discrete under-power relay packages and meets the requirements of Option 2 of Screen 2. A trip output will be provided when import power (toward the Producer's Load) drops below the specified level.

Note: For an under-power relay, pickup is defined as the highest power level at which the relay indicates that the power is less than the set level. (L)

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Attachment 1 – Testing and Certification Criteria

7. SUPPLEMENTAL TESTING PROCEDURES, (Continued)

Step 1: Power Flow Test at Minimum, Midpoint and Maximum Pickup Level Settings

Determine the corresponding secondary pickup current for the desired power flow pickup level of 5% of peak load minimum pickup setting). Apply rated voltage and current 0 (zero) degrees phase angle in the direction of normal load current.

Decrease the current to pickup level. Observe the relay's (LCD or computer display) indication of power values. Note the indicated power level at which the relay trips. The power indication should be within 2% of the expected power. For relays with adjustable settings, repeat the test at the midpoint and maximum settings. Repeat at phase angles of 90, 180 and 270 degrees and verify that the relay operates (measured watts will be zero or negative).

Step 2: Leading Power Factor Test

Using the pickup current setting determined in Step 1, apply rated voltage and rated leading power factor load current in the normal load direction (current leading voltage by 45 degrees). Decrease the current to 145 percent of the pickup level determined in Step 1 and verify that the relay does not operate. For relays with adjustable settings, repeat the test at the minimum, midpoint and maximum settings.

Step 3: Minimum Power Factor Test

At nominal voltage and with the minimum pickup (or ranges) determined in Step 1, adjust the current phase angle to 84 or 276 degrees. Decrease the current level to pickup (about 10 percent of the value at 0 degrees) and verify that the relay operates. Repeat for phase angles 90, 180 and 270 degrees and verify that the relay operates for any current less than rated current.

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Attachment 1 – Testing and Certification Criteria

7. SUPPLEMENTAL TESTING PROCEDURES, (Continued)

Step 4: Negative Sequence Voltage Test

Using the pickup settings determined in Step 1, apply rated relay voltage and 25 percent of rated current in the normal load direction, to simulate light load conditions. Remove Phase-1 voltage and observe that the relay does not operate. Repeat for Phases-2 and 3.

Step 5: Unbalanced Fault Test

Using the pickup settings determined in Step 1, apply rated voltage and two times rated current, to simulate an unbalanced fault in the normal load direction (use V_a at 0 degrees, V_b and V_c at 180 degrees, I_a at 0 degrees, I_b at 180 degrees, and I_c at 0 degrees). Observe that the relay, especially single-phase types, operates properly.

Step 6: Time Delay Settings Test

Apply Step 1 settings and set time delay to minimum setting. Adjust the current source to the appropriate level to determine operating time and compare against calculated values. Verify that the timer stops when the relay trips. Repeat at midpoint and maximum delay settings.

Step 7: Dielectric Test

Perform the test described in IEC 414 using 2 kV RMS for one minute.

Step 8: Surge Withstand

Perform the surge withstand test described in IEEE C37.90.1.1989 or the surge withstand test described in Section 3.e. (L)

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Attachment 1 – Testing and Certification Criteria

7. SUPPLEMENTAL TESTING PROCEDURES, (Continued)

(3) Tests for Inverters and Controllers with Integrated Functions

Inverters and controllers designed to provide reverse, under-power, or Inadvertent Export functions shall be tested to certify the intended operation of this function. Three testing methods are acceptable: (N)

Method 1: If the inverter or controller utilizes external current/voltage measurement to determine the reverse or under-power condition, then the inverter or controller shall be functionally tested by application of appropriate secondary currents and potentials as described in the Discrete Reverse Power Relay Test, Section 7.a.(1) of this Rule.

Method 2: If external secondary current or voltage signals are not used, then unit-specific tests must be conducted to verify that power cannot be exported across the PCC for a period exceeding 0.5 seconds for Option 1 or exceeding two seconds for Option 2 of Section I.4.b. These may be factory tests if the measurement and control points are integral to the unit, or they may be performed in the field. (N) | (N)

Method 3: For Option 5 of Section I.4.b, the tests will verify that the Generating Facility controls the generation and/or load to limit Inadvertent Export events as specified in Option 5 subsections (a)-(e). These may be factory tests if the measurement and control points are integral to the unit, or they may be performed in the field. (N) | (N)

b. In-Rush Current Tests Procedures

This test will determine the maximum In-rush Current drawn by the Generator.

(1) Locked-Rotor Method

Use the test procedure defined in NEMA MG-1 (manufacturer's data is acceptable if available). (L)

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Attachment 1 – Testing and Certification Criteria

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7. SUPPLEMENTAL TESTING PROCEDURES, (Continued)

(2) Start-Up Method

Install and setup the Generating Facility equipment as specified by the manufacturer. Using a calibrated oscilloscope or data acquisition equipment with appropriate speed and accuracy, measure the current draw at the Point of Interconnection as the Generating Facility starts up and parallels with Utility's Distribution System. Startup shall follow the normal, manufacturer-specified procedure. Sufficient time and current resolution and accuracy shall be used to capture the maximum current draw within five percent. In-rush Current is defined as the maximum current draw from Utility during the startup process, using a 10-cycle moving average. During the test, the utility source, real or simulated, must be capable of maintaining voltage within +/- 5% of rated at the connection to the unit under test. Repeat this test five times. Report the highest 10-cycle current as the In-rush Current. A graphical representation of the time-current characteristic along with the certified In-rush Current must be included in the test report and made available to Utility.

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