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**RULE 21**  
**GENERATING FACILITY INTERCONNECTIONS**

A. **APPLICABILITY AND INTRODUCTION**

1. **Applicability.** This Rule describes the interconnection, operating and metering requirements for Generating Facilities that are intended to be connected to the Distribution System over which the California Public Utilities Commission (CPUC) has jurisdiction. Subject to the requirements of this Rule, Liberty Utilities (CalPeco Electric) LLC ("Liberty") will allow the interconnection of Generating Facilities with its Distribution System.
2. **Definitions.** Capitalized terms used in this Rule, and not otherwise defined, shall have the meaning ascribed to such terms in Section H. The definitions in the Rule shall only apply to this Rule and shall not apply to Liberty's other tariffs.
3. **Enabling Documents.** It is contemplated that the Applicant will be required to execute various enabling documents, such as the Application and Interconnection Agreement. Such documents shall be in the form on file with the CPUC, as may be amended from time to time.

B. **GENERAL RULES, RIGHTS AND OBLIGATIONS**

1. **Authorization Required to Interconnect.** An Electricity Producer must comply with this Rule, form an Interconnection Agreement with Liberty, and receive Liberty's express written permission to interconnect before connecting or operating a Generating Facility in parallel with Liberty's Distribution System. Liberty shall apply this Rule in a non-discriminatory manner and shall not unreasonably withhold its permission to interconnect an Electric Producer's Generating Facility.
2. **Separate Arrangements Required for Other Services.** An Electricity Producer requiring other electric services from Liberty including, but not limited to, Distribution Service provided by Liberty during periods of curtailment or interruption of a Generating Facility, must enter into separate arrangements with Liberty for such services in accordance with CPUC approved tariffs.
3. **Transmission Service Not Provided with Interconnection.** Interconnection with Liberty's Distribution System under this Rule does not provide an Electricity Producer any rights to utilize Liberty's Distribution System for the transmission or distribution of electric power, nor does it limit those rights.

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B. GENERAL RULES, RIGHTS AND OBLIGATIONS (Continued)

4. Compliance with Laws, Rules, and Tariffs. An Electricity Producer shall ascertain and comply with applicable CPUC approved rules, tariffs, and regulations of Liberty; applicable FERC approved rules, tariffs, and regulations; and any local, state or federal law, statute or regulation which applies to the design, siting, construction, installation, operation, or any other aspect of the Electricity Producer's Generating Facility and Interconnection Facilities.
5. Design Reviews and Inspections. Liberty shall have the right to review the design of an Electricity Producer's Generating Facility and Interconnection Facilities and to inspect an Electricity Producer's Generating and/or Interconnection Facilities prior to the commencement of Parallel Operation with Liberty's Distribution System. Liberty may require an Electricity Producer to make modifications as necessary to comply with the requirements of this Rule. Liberty's review and authorization for Parallel Operation shall not be construed as confirming or endorsing the Electricity Producer's design or as warranting the Generating and/or Interconnection Facility's safety, durability or reliability. Liberty shall not, by reason of such review or lack of review, be responsible for the strength, adequacy, or capacity of such equipment.
6. Right to Access. An Electricity Producer's Generating Facilities and Interconnection Facilities shall be reasonably accessible to Liberty's personnel as necessary for Liberty to perform its duties and exercise its rights under its tariffs and rules filed with and approved by the CPUC, and any agreement between Liberty and the Electricity Producer.
7. Confidentiality of Information. Any information pertaining to Generation and/or Interconnection Facilities provided to Liberty by an Electricity Producer shall be treated by Liberty in a confidential manner. Liberty shall not use information contained in the Application to propose discounted tariffs to the customer unless authorized to do so by the customer or the information is provided to Liberty by the customer through other means.

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**B. GENERAL RULES, RIGHTS AND OBLIGATIONS (Continued)**

8. Prudent Operation and Maintenance Required. An Electricity Producer shall operate and maintain its Generating Facility and Interconnection Facilities in accordance with Prudent Electrical Practices and shall maintain compliance with CPUC adopted standards for the Electricity Producer's particular Generation and Interconnection Facilities. Said standards shall be those in effect at the time an Electricity Producer executes an Interconnection Agreement with Liberty.
9. Curtailment and Disconnection. Liberty may limit the operation and/or disconnect or require the disconnection of an Electricity Producer's Generating Facility from Liberty's Distribution System at any time, with or without notice, in the event of an Emergency, or to correct Unsafe Operating Conditions. Liberty may also limit the operation and/or disconnect or require the disconnection of an Electricity Producer's Generating Facility from Liberty's Distribution System upon the provision of reasonable notice: 1) to allow for routine maintenance, repairs or modifications to Liberty's Distribution System; 2) upon Liberty's determination that an Electricity Producer's Generating Facility is not in compliance with this Rule; or, 3) upon termination of the Interconnection Agreement.

**C. GENERATING FACILITY APPLICATION AND INTERCONNECTION PROCESS**

1. Generating Facility Application Process
  - a. Applicant Initiates Contact with Liberty. Upon request, Liberty will provide information and documents (such as the Application form, Agreement, technical requirements, specifications, listing of Certified Equipment, application fee information, applicable rate schedules and metering requirements) in response to the potential Applicant's inquiry. Unless otherwise agreed upon, all such information and a copy of Liberty's standardized interconnection requirements shall normally be sent to the Applicant within three (3) business days following the initial request from the Applicant. Liberty 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 a Applicant's Generating Facility.

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C. **GENERATING FACILITY APPLICATION AND INTERCONNECTION PROCESS**

1. Generating Facility Application Process (Continued)

- b. Applicant Completes an Application Document. All Applicants shall be required to complete and file an Application document and supply any additional information requested by Liberty. The filing must include the completed standardized Application, which may be either in paper or electronic form, and a fee for processing the application and performing the Initial Review to be completed by Liberty pursuant to Section C.1.c. The application fee shall vary with the nature of the proposed Generating Facility as follows:

| Type of Generating Facility                                     | Initial Review | Supplemental Review |
|-----------------------------------------------------------------|----------------|---------------------|
| Net Energy Metering<br>(per Public Utilities Code Section 2827) | None           | None                |
| All others                                                      | \$800          | \$600               |

*Note: Allocation of cost between Generating Facility Applicant and LibertyLiberty to be determined by CPUC in Phase 2 of R.99-10-025. The total cost borne by the Applicant should be reduced by the cost allocated to the utility's distribution function.*

Fifty percent of the fees associated with the Initial Review will be returned to the Applicant if the application is rejected by Liberty or the Applicant retracts the application.

The Applicant may propose and Liberty 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 C.1.c and C.1.d do not apply under these circumstances.

Within ten (10) business days of receiving an Application, Liberty shall normally acknowledge its receipt and whether the Application has been completed adequately. If defects are noted, Liberty and Applicant shall cooperate in a timely manner to establish a satisfactory Application.

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**FACILITY INTERCONNECTIONS**

C. **GENERATING FACILITY APPLICATION AND INTERCONNECTION PROCESS**

1. Generating Facility Application Process (Continued)

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

- 1) Upon receipt of a satisfactorily completed Application and any additional information necessary to evaluate the Interconnection of a Generating Facility, Liberty shall perform an Initial Review using the process defined in Appendix A. The Initial Review determines if the Generating Facility qualifies for Simplified Interconnection, if the Generating Facility can qualify for Interconnection subject to additional requirements, or if it will be necessary for Liberty to perform an Interconnection Study to determine Interconnection Requirements.
- 2) Liberty 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 facility can be interconnected by means of a Simplified Interconnection, Liberty will provide the Applicant with a written description of the requirements for interconnection and a draft Interconnection Agreement pursuant to Section C.1.e.
- 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 provides either (a) Interconnection Requirements that may include requirements beyond those for Simple Interconnection, and a draft Interconnection Agreement, or (b) a cost estimate and schedule for an Interconnection Study. The supplemental review shall 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 Liberty within 10 calendar days after the results of the Supplemental Review are provided to the Applicant.

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**GENERATING FACILITY INTERCONNECTIONS**

C. **GENERATING FACILITY APPLICATION AND INTERCONNECTION PROCESS**

1. Generating Facility Application Process (Continued)

- d. When Required, Applicant and Liberty Commit to Additional Interconnection Study Steps. When an Initial Review reveals that the proposed facility cannot be interconnected to Liberty's system by means of a Simplified Interconnection pursuant to Section D and Section J, and that significant Liberty Interconnection Facilities or Distribution System Improvements must be installed or made to Liberty's electric system to accommodate the interconnection of an Applicant's Generating Facility, Liberty and Applicant shall enter into an agreement that provides for Liberty to perform such additional studies, facility design, and engineering and to provide detailed cost estimates for fixed price or actual cost billing, to the Applicant at the Applicant's expense. The Interconnection Study Agreement shall set forth Liberty's schedule for completing such work and the estimated or fixed price costs of such studies and engineering. Upon completion of an Interconnection Study, Liberty shall provide the Applicant with the specific requirements, costs and schedule for interconnecting the Generating Facility to accommodate execution of agreements pursuant to Section C.1.e.
- e. Applicant and Liberty enter into a Generation Interconnection Agreement and, where required, a Financing and Ownership Agreement for Interconnection Facilities or Electric System Modifications. Liberty shall provide the Applicant with an executable version of the Interconnection Agreement, Net Energy Metering Agreement, or Power Purchase Agreement appropriate for the Applicant's Generating Facility and desired mode of operation. Where the Initial Review or Interconnection Study performed by Liberty has determined that modifications or additions are required to be made to its Electric System, or that additional metering, monitoring, or protection devices will be necessary to accommodate a Applicant's Generating Facility, Liberty shall also provide the Applicant with an interconnection facilities financing and ownership agreement. These Agreements shall set forth the respective parties' responsibilities, completion schedules, and estimated or fixed price costs for the required work.

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**GENERATING FACILITY INTERCONNECTIONS**

C. **GENERATING FACILITY APPLICATION AND INTERCONNECTION PROCESS**

1. Generating Facility Application Process (Continued)

- f. Electricity Producer Installs or Constructs the Generating Facility; where applicable, Liberty or Electricity Producer Installs Required Interconnection Facilities or Modifies Liberty's Electric System. After executing the appropriate Generating Facility Interconnection Agreement, the Electricity Producer may install or construct its Generating Facility in accordance with the provisions of this rule and the terms of the specific agreements formed between the Electricity Producer and Liberty. Where appropriate, Liberty will commence construction/installation of the system modifications and/or metering and monitoring requirements which have been identified. The parties will use good faith efforts to meet the schedules and fixed costs or estimated costs as appropriate.
- g. Electricity Producer arranges for and completes testing of Generating Facility and, where applicable, Electricity Producer Installed Interconnection Facilities. New Generating Facilities and associated Interconnection Facilities must be tested to ensure compliance with the safety and reliability provisions of the CPUC approved rules and regulations prior to being operated in parallel with Liberty's electric system. Certified Equipment will be subject to the tests specified in Section J. For non-Certified Equipment, the Electricity Producer will develop a written testing plan to be submitted to Liberty for its review and acceptance. Alternatively, the Electricity Producer and Liberty may agree to have Liberty conduct the required testing at the Electricity Producer's expense. Where applicable, the test plan shall include the installation test procedure(s) published by the manufacturer(s) of the generation or interconnection equipment. Facility testing shall be conducted at a mutually agreeable time, and depending on who conducts the tests, Liberty or Electricity Producer shall be given the opportunity to witness the tests.

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**RULE 21**  
**GENERATING FACILITY INTERCONNECTIONS**

C. **GENERATING FACILITY APPLICATION AND INTERCONNECTION PROCESS**

1. Generating Facility Application Process (Continued)

- h. Liberty Authorizes Interconnection. The Electricity Producer's Generating Facility shall be allowed to commence parallel operation with Liberty's electric system upon satisfactory compliance with the terms of the Generating Facility Interconnection Agreement. 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 Electricity Producer and Liberty. An Electricity Producer shall not interconnect a Generating Facility unless it has received Liberty's express written permission to do so.
- i. Liberty Reconciles Costs and Payments. If the Electricity Producer selected a fixed price cost for the Interconnection Facilities or Electric System Modifications, no reconciliation will be necessary. If the Electricity Producer selected actual cost billing, a true-up will be required. Within a reasonable time after the interconnection of a Electricity Producer's Generating Facility, Liberty will reconcile its actual costs related to the Electricity Producer's facility against the application fee and any other advance payments made by the Electricity Producer. The Electricity Producer will receive either a bill for any balance due or a reimbursement for overpayment as determined by Liberty's reconciliation. The Electricity Producer shall be entitled to a reasonably detailed and understandable report detailing Liberty's reconciliation process.

D. **GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS**

1. General Interconnection and protection requirements

- a. Protective Functions shall be equipped with automatic means to prevent the Generating Facility from re-energizing a de-energized Distribution System circuit.
- b. The Protective Functions of a Generating Facility must include an over/under voltage trip function, an over/under frequency trip function, and a means for disconnecting the Generating Facility from Liberty when a protective function initiates a trip.

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**GENERATING FACILITY INTERCONNECTIONS**

D. GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (Continued)

1. General Interconnection and protection requirements (Continued)

- c. The Generating Facility and associated Protective Functions shall not contribute to the formation of an Unintended Island.
- d. The Electricity Producer's protection and control diagrams for the interconnection shall be approved by Liberty prior to completion of the Generating Facility Interconnection, unless the Electricity Producer uses a protection and control scheme previously approved by Liberty for system-wide application or uses only Certified Equipment.
- e. Protective Functions shall be equipped with automatic means to prevent reconnection of the Generating Facility with the Distribution System unless the Distribution System service voltage and frequency is of specified settings and is stable for 60 seconds.
- f. Certified Equipment contains certified functions that are accepted by all California Electrical Corporations. This equipment may be installed on a Distribution System in accordance with an Interconnection control and protection scheme approved by Liberty.
- g. These requirements are designed to protect Liberty's Distribution System and not the Generating Facility. An Electricity Producer shall be solely responsible for providing adequate protection for the Electricity Producer's Generating Facility and Interconnection Facilities connected to Liberty's Distribution System. The Electricity Producer's protective equipment shall not impact the operation of other protective devices utilized on the Distribution System in a manner that would affect Liberty's capability of providing reliable service to Customers.
- h. Circuit breakers or other interrupting devices 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 the application. This includes being capable of interrupting maximum available fault current. The Generating Facility shall be designed so that the failure of any one device shall not potentially compromise the safety and reliability of the Distribution System.

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**GENERATING FACILITY INTERCONNECTIONS**

D. GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (Continued)

1. General Interconnection and protection requirements (Continued)

- i. The Electricity Producer will furnish and install a manual disconnect device that has a visual break to isolate the Generating Facility from the Distribution System. The device must be accessible to Liberty personnel and be capable of being locked in the open position. Generating Facilities with non-islanding inverters totaling 1kVA or less are exempt from this provision.
- j. This section is not intended to address the requirements for Generating Facilities that parallel momentarily (60 cycles or less) or Generating Facilities that operate independently of Liberty's Distribution System.

2. Prevention of interference.

The Electricity Producer shall not operate equipment that superimposes upon the Distribution System a voltage or current that interferes with Liberty's operations, service to Liberty customers, or Liberty communication facilities. If such interference occurs, the Electricity Producer must diligently pursue and take corrective action at its own expense after being given notice and reasonable time to do so by Liberty. If the Electricity Producer does not take timely corrective action, or continues to operate the equipment causing interference without restriction or limit, Liberty may, without liability, disconnect the Electricity Producer's equipment from the Distribution System, in accordance with Section B.9 of this rule.

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**RULE 21**  
**GENERATING FACILITY INTERCONNECTIONS**

D. GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (Continued)

2. Prevention of interference (Continued)

To eliminate undesirable interference caused by operation of the Generating Facility, each Distributed Generator in a Generating Facility shall meet the following criteria:

- a. Normal voltage operating range. The voltage operating range for a Generating Unit shall be selected as a protection function that responds to abnormal Distribution System conditions and not as a voltage regulation function.
  - 1) Small systems (11 kVA or less). Generating Units connected to a Generating Facility with a Gross Nameplate capacity of 11 kVA or less shall be capable of operating within the limits normally experienced on the Distribution System. The operating window shall be selected in a manner that minimizes nuisance tripping and range between 106 volts and 132 volts (88-110% of nominal voltage) on a 120-volt base. Generating Facilities shall cease to energize Liberty lines whenever the voltage at the PCC deviates from the allowable voltage operating range.
  - 2) Systems larger than 11 kVA. Liberty may have specific operating voltage ranges for larger Generating Facilities, and may require adjustable operating voltage settings for these larger systems. In the absence of such requirements, the above principles of operating between 88% and 110% of the appropriate interconnection voltage should be followed.

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**RULE 21**  
**GENERATING FACILITY INTERCONNECTIONS**

D. GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (Continued)

2. Prevention of interference (Continued)

a. Normal voltage operating range. (Continued)

- 3) Voltage Disturbances. System voltage assumes a nominal 120 V base. For the convenience of those wishing to translate these guidelines to voltage bases other than 120 volts, the limits will also be provided as approximate percentages. The Generating Units should sense abnormal voltage and respond. The following conditions should be met, with voltages in RMS at the Point of Common Coupling:

| Voltage at Point of Common Coupling            | Maximum Trip Time (Assuming 60 Cycles per Second)        |
|------------------------------------------------|----------------------------------------------------------|
| Less than 60 Volts                             | 10 Cycles                                                |
| Greater than 60 volts but less than 106 volts  | 120 Cycles                                               |
| Greater than 106 volts but less than 132 volts | Normal Operation                                         |
| Greater than 132 volts but less than 165 volts | 120 Cycles (30 cycles for facilities greater than 11kVA) |
| Greater than 165 volts                         | 6 Cycles                                                 |

*\*"Trip time" refers to the time between the abnormal condition being applied and the Generating Facility unit ceasing to energize Liberty's Distribution System. Certain circuits will actually remain connected to the Distribution System to allow sensing of electrical conditions for use by the "reconnect" feature. The purpose of the allowed time delay is to ride through short-term disturbances to avoid excessive nuisance tripping. For Generating Facilities with a Gross Nameplate Rating of 11 kVA peak capacity or less, the above set points are to be non-user adjustable. For Generating Facilities with a Gross Nameplate Rating larger than 11 kVA, different voltage set points and trip times from those in Table 4.1 may be negotiated Liberty.*

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**RULE 21**  
**GENERATING FACILITY INTERCONNECTIONS**

D. GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (Continued)

2. Prevention of interference (Continued)

- b. Flicker. Any voltage flicker at the Point of Common Coupling caused by the Generating Facility should not exceed the limits defined by the "Maximum Borderline of Irritation Curve" identified in IEEE 519 (*IEEE Recommended Practices and Requirements for Harmonic Control in Electric Power Systems*, IEEE STD 519-1992, Institute of Electrical and Electronic Engineers, Piscataway, NJ. April 1992. This requirement is necessary to minimize the adverse voltage effects to other customers on the Distribution System. Induction generators may be connected and brought up to synchronous speed (as an induction motor) provided these flicker limits are not exceeded.
- c. Frequency. Liberty controls system frequency, and the Generating Facility unit shall operate in synchronism with the Distribution System. Small Generating Facilities should have a fixed operating frequency range of 59.3-60.5 Hertz. The Generating Facility must cease to energize the system in a maximum of ten cycles should Liberty remain outside of the frequency limits. The purpose of the time delay is to allow the Generating Facility to ride through short-term disturbances to avoid excessive nuisance tripping. Liberty may require adjustable operating frequency settings for systems larger than 11 kVA to assist the system during serious capacity shortages. For Generating Facilities larger than 11 kVA, low frequency settings of 59.3 Hz and 58.0 Hz may be used with the consent of Liberty.
- d. Harmonics. Harmonic distortion shall be in compliance with IEEE 519. Exception: The harmonic distortion of a Generating Facility at a Customer's site shall be evaluated using the same criteria as the loads at that site.
- e. Direct Current Injection. The Generating Facility should not inject Direct Current greater than 0.5% of rated output current into Liberty's Distribution System under either normal or abnormal operating conditions.

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**GENERATING FACILITY INTERCONNECTIONS**

D. GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (Continued)

2. Prevention of interference (Continued)

- f. Power Factor. Each Generating Unit in a Generating Facility shall be capable of operating at some point within a range of a power factor of 0.9 (either leading or lagging). Operation outside this range is acceptable provided the reactive power of the Generating Facility is used to meet the reactive power needs of on-site loads or that reactive power is otherwise provided under tariff by Liberty. The Electricity Producer shall notify Liberty if it is using the Generating Facility for power factor correction.

3. Control, Protection and Safety Equipment Requirements

a. Basic Requirements

- 1) Protective Function Requirements. The Protective Functions of a Generating Facility must include a visual open disconnect device (except as exempted in Section D.1.i) a fault interrupting device, and over/under voltage trip function, and an over/under frequency trip function.
- 2) Limits specific to single-phase generators. For single-phase generators connected to a shared single-phase secondary system, the maximum capacity shall be 20 kVA. Generating Facilities applied on a center-tap neutral 240-volt service must be installed such that no more than 6 kVA of imbalance in capacity exists between the two sides of the 240-volt service. For dedicated distribution transformer services, the limit of a single-phase Generating Facility shall be the transformer nameplate rating.

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D. GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (Continued)

3. Control, protection and safety equipment requirements (Continued)

b. Technology Specific Requirements

- 1) Three-phase synchronous generators: The Generating Facility circuit breakers shall be three-phase devices with electronic or electromechanical control. The Electricity Producer shall be responsible for properly synchronizing its Generating Facility with Liberty's Distribution System by means of either a manual or automatic synchronizing function. Automatic synchronizing is required for all synchronous generators, which have a Short Circuit Contribution Ratio (SCCR) exceeding 0.05. A Generating Facility whose SCCR exceeds 0.05 shall be equipped with Protective Functions suitable for detecting loss of synchronism and rapidly disconnecting the Generating Facility from the Distribution System.

Unless otherwise agreed to between the Electricity Producer and Liberty, synchronous generators shall automatically regulate power factor, not voltage, while operating in parallel with the Distribution System. Power system stabilization is specifically not required for Generating Facilities under 10 MW.

Synchronization means that at the time of connection, the frequency difference shall be less than 0.2 Hz, 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 separate synchronizing equipment. Starting or rapid load fluctuations on induction generators can adversely impact Liberty's Distribution System's voltage. Corrective step-switched capacitors or other techniques may be necessary and may cause undesirable ferroresonance. When these counter measures (e.g. additional capacitors) are installed on the Electricity Producer's side of the Point of Common Coupling, Liberty must review these measures. Additional equipment may be required to resolve this problem as a result of an Interconnection Study.

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D. GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (Continued)

3. Control, protection and safety equipment requirements (Continued)

b. Technology Specific Requirements (Continued)

- 3) Inverter Systems. Utility-interactive inverters do not require separate synchronizing equipment. Non-utility-interactive stand-alone inverters shall not be used for parallel operation with Liberty's Distribution System.

c. Initial Review process

- 1.) Section I of this Rule defines the Initial Review process. The Initial Review process evaluates the specific characteristics of the Interconnection, including those specific to the location of the Generating Facility, and whether additional requirements are necessary.

d. Supplemental Generating Facility Requirements

- 1) Unintended Islanding For Generating Facilities that fail the Export Screen. Generating Facilities must mitigate their potential contribution to an Unintended Island. This can be accomplished by one of the following options:
- (a) incorporating certified non-islanding control functions into the Protective Functions, or
  - (b) verifying that local loads sufficiently exceed the load carrying capability of the Generating Facility, or
  - (c) incorporating transfer trip or equivalent function in the Protective Functions.

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D. GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (Continued)

3. Control, protection and safety equipment requirements (Continued)

d. Supplemental Generating Facility Requirements

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 D.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 Distribution System in the event of a fault. For a Generating Facility that cannot detect these faults within two seconds, transfer trip or equivalent function may be required. Reclose-blocking of Liberty's affected recloser(s) may also be required by Liberty for generators that exceed 15% of the peak load on the Line Section.

- e. Generating Facility types and conditions not identified. In the event that Section D of this rule does not address the interconnection requirements of a Generating Facility, Liberty and Electricity Producer may interconnect a Generating Facility using mutually agreed upon technical requirements.

E. INTERCONNECTION FACILITY OWNERSHIP AND FINANCING

1. Scope and Ownership of Interconnection Facilities

- a. Scope. The interconnection of an Electricity Producer's Generating Facility with Liberty's Distribution System is made through the use of Interconnection Facilities. Such interconnection may also require Distribution System Improvements. The nature, extent and costs of Interconnection Facilities and Distribution System Improvements shall be consistent with this Rule and determined through the Initial Review and/or Interconnection Studies described in Section C.

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**GENERATING FACILITY INTERCONNECTIONS**

E. INTERCONNECTION FACILITY OWNERSHIP AND FINANCING (Continued)

1. Scope and Ownership of Interconnection Facilities (Continued)

- b. Ownership. Subject to the limitations set forth in this Rule, Interconnection Facilities which may be installed on Electricity Producer's side of the Point of Common Coupling may be owned, operated and maintained by the Electricity Producer or Liberty. Interconnection Facilities installed on Liberty's side of the Point of Common Coupling and Distribution System Improvements may be owned, operated and maintained only by Liberty.

2. Responsibility for Costs of Interconnecting a Generating Facility

- a. Study and Review Costs. An Electricity Producer shall be responsible for the reasonably incurred costs of the Initial Review and any Interconnection Studies conducted pursuant to Section C.2 of this Rule solely to explore the feasibility and determine the requirements of interconnecting a Generating Facility with Liberty's Distribution System.
- b. Facility Costs. An Electricity Producer shall be responsible for all costs associated with Interconnection Facilities owned by the Electricity Producer. The Electricity Producer shall also be responsible for any costs reasonably incurred by Liberty in providing, operating, or maintaining Interconnection Facilities and Distribution System Improvements required solely for the interconnection of the Electricity Producer's Generating Facility with Liberty's Distribution System.
- c. Separation of Costs. Should Liberty combine the installation of Interconnection Facilities, or Distribution System Improvements with modifications or additions to Liberty's Distribution System to serve other Customers or Electricity Producers, Liberty shall not include the costs of such separate or incremental facilities in the amounts billed to the Electricity Producer for the Interconnection Facilities or Distribution System Improvements required pursuant to this Rule.

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**RULE 21**  
**GENERATING FACILITY INTERCONNECTIONS**

E. INTERCONNECTION FACILITY OWNERSHIP AND FINANCING (Continued)

3. Installation and Financing of Interconnection Facilities Owned and Operated by Liberty
  - a. Agreement Required. Costs for Added Facilities shall be paid by Electricity Producer pursuant to the provisions contained in the Interconnection Agreement or, where the nature and extent of the Interconnection Facilities and Distribution System Improvements warrant additional detail, in a separate Interconnection Facility Financing and Operating Agreement between the Electricity Producer and Liberty, and Liberty's applicable tariffs and rules for Added Facilities.
  - b. Attachments and Modifications to Distribution System. Except as provided for in Section E.3.c of this Rule, Interconnection Facilities connected directly to Liberty's Distribution System and Distribution System Improvements shall be provided, installed, owned and maintained by Liberty as Added Facilities.
  - c. Third-Party Installations. Subject to the approval of Liberty, an Electricity Producer may, at its option, employ a qualified contractor to provide and install Interconnection Facilities or Distribution System Improvements to be owned and operated by Liberty. Such Interconnection Facilities and Distribution System Improvements shall be installed in accordance with Liberty's design and specifications. Upon final inspection and acceptance by Liberty, the Electricity Producer shall transfer ownership of such Electricity Producer installed Interconnection Facilities or Distribution System Improvements to Liberty and such facilities shall thereafter be owned and maintained by Liberty at Electricity Producer's expense as Added Facilities. The Electricity Producer shall pay Liberty's reasonable costs of design, administration, and monitoring the installation of such facilities to ensure compliance with Liberty's requirements. Electricity Producer shall also be responsible for all costs, including any income tax liability, associated with the transfer of Electricity Producer installed Interconnection Facilities and Distribution System Improvements to Liberty.

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**RULE 21**  
**GENERATING FACILITY INTERCONNECTIONS**

E. INTERCONNECTION FACILITY OWNERSHIP AND FINANCING (Continued)

3. Installation and Financing of Interconnection Facilities Owned and Operated by Liberty (Continued)
  - d. Reservation of Unused Facilities. When a Electricity Producer wishes to reserve Liberty owned Interconnection Facilities or Distribution System Improvements installed and financed as Added Facilities for the Electricity Producer, but idled by a change in the operation of the Electricity Producer's Generating Facility or otherwise, Electricity Producer may elect to abandon or reserve such facilities consistent with the terms of its Interconnection Facility Financing and Operating Agreement with Liberty. If Electricity Producer elects to reserve idled Interconnection Facilities or Distribution System Improvements, Liberty shall be entitled to continue to charge Electrical Producer for the costs related to the ongoing operation and maintenance of the Special Facilities.
  - e. Refund of Salvage Value. When a Electricity Producer elects to abandon the Added Facilities for which it has either advanced the installed costs or constructed and transferred to the Liberty, the Electricity Producer shall, at a minimum, receive from the Liberty a credit for the net salvage value of the Special Facilities.

F. METERING, MONITORING AND TELEMETRY

1. General Requirements. All Generating Facilities shall be metered in accordance with this Section F and shall meet all applicable standards of Liberty contained in Liberty's applicable tariffs and published Liberty manuals dealing with metering specifications. The requirements in this Section F do not apply to metering of Generating Facilities operating under Liberty's Net Energy Metering tariff pursuant to California Public Utilities Code Section 2827.
2. Metering by Non-Liberty Parties. The ownership, installation, operation, reading, and testing of metering for Generating Facilities shall be by Liberty except to the extent that the CPUC has determined that all these functions, or any of them, may be performed by a non Liberty party as authorized by the CPUC.

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**RULE 21**  
**GENERATING FACILITY INTERCONNECTIONS**

F. **METERING, MONITORING AND TELEMETRY** (Continued)

3. Net Generation Metering. For purposes of monitoring Generating Facility operation for determination of standby charges and applicable non-bypassable charges as defined in Liberty's tariffs, and for Distribution System planning and operations, consistent with Section B.4 of these Rules, Liberty shall have the right to specify the type, and require the installation of, Net Generation Metering. Liberty shall require the provision of generator output data to the extent reasonably necessary to provide information for the utility to administer its tariffs or to operate and plan its system. Liberty shall only require Net Generation Metering to the extent that less intrusive and/or more cost effective options for providing the necessary generator output data are not available. In exercising its discretion to require Net Generation Metering, Liberty shall consider all relevant factors, including but not limited to:

- a. Data requirements in proportion to need for information;
- b. Producer election to install equipment that adequately addresses Liberty'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 Facilities size relative to the cost of the metering/monitoring;
- f. Other means of obtaining the data (e.g. generator logs, proxy data etc.);
- g. Requirements under any Generating Facility Interconnection Agreement with the Producer.

Liberty will report to the CPUC or designated authority, on a quarterly basis, the rationale for requiring net generation equipment in each instance along with the size and location of the facility.

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**RULE 21**  
**GENERATING FACILITY INTERCONNECTIONS**

F. **METERING, MONITORING AND TELEMETRY** (Continued)

4. Point of Common Coupling Metering. For purposes of assessing Liberty charges for retail service, the Electricity Producer's Point of Common Coupling Metering shall be a bi-directional meter so that power deliveries to and from the Electricity Producer's site can be separately recorded. Alternately, the Electricity Producer may, at its sole option and cost, require Liberty to install multi-metering equipment to separately record power deliveries to the Distribution System and retail purchases from Liberty. Such Point of Common Coupling Metering shall be equipped with detents to prevent reverse registration.
5. Telemetering. If the nameplate rating of the Generating Facility is 1 MW or greater, Telemetering equipment at the Net Generator Metering location may be required at the Electricity Producer's expense. If the Generating Facility is interconnected to a Distribution System operating at a voltage below 10kV, then Telemetering equipment may be required on Generating Facilities 250 kW or greater. Liberty 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. Liberty will report to the CPUC or designated authority, on a quarterly basis, the rationale for requiring telemetering equipment in each instance along with the size and location of the facility.
6. Sunset Provision. Sections F.3 and F.5 are interim provisions only. Liberty shall file permanent metering requirements with the CPUC on or by December 31, 2004. At that time, Liberty shall serve its application for approval of permanent metering requirements on the service list in Rulemaking 99-10-025.
7. Location. Where Liberty owned metering equipment is located on the Electricity Producer's premises, Electricity Producer shall provide, at no expense to Liberty, a suitable location for all such metering equipment.
8. Costs of metering. The Electricity Producer will bear all costs of the metering required by this Rule 21, including the incremental costs of operating and maintaining the Metering.

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**RULE 21**  
**GENERATING FACILITY INTERCONNECTIONS**

**G. DISPUTE RESOLUTION PROCESS**

1. The following procedures will apply for disputes arising from this Rule. The CPUC shall have initial jurisdiction to interpret, add, delete or modify any provision of this Rule or of any agreements entered into between Liberty and the Electricity Producer to implement this tariff ("the implementing agreements") and to resolve disputes regarding Liberty's performance of its obligations under its electric rules and tariffs, the implementing agreements, and requirements related to the interconnection of the Electricity Producer's Facilities pursuant to this Rule .
2. Any dispute arising between Liberty and the Electricity Producer (individually "Party" and collectively "the Parties") regarding Liberty's performance of its obligations under its electric rules and tariffs, 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 G.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 Commission's rules, regulations and procedures applicable to the resolution of such disputes.
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.

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**RULE 21**  
**GENERATING FACILITY INTERCONNECTIONS**

H. **DEFINITIONS**

The definitions set forth in this Section H are applicable only to this Rule and its corresponding agreements including Interconnection Facilities Financing and Ownership Agreement and Interconnection Application Form.

**Accredited, Nationally Recognized Testing Laboratory (NRTL):** A laboratory approved to perform the certification testing requirements.

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

**Applicant:** The entity submitting an Application for Interconnection under the provisions of Liberty's Rule 21 and the Application to Interconnect a Customer-owned Generating Facility.

**Application:** The standard form CPUC approved document submitted to Liberty for electrical interconnection of a Generator with Liberty.

**Certification Test:** A test adopted by Liberty that verifies conformance of certain equipment with CPUC 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.

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

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

**CPUC:** The Public Utilities Commission of the State of California.

**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.

**Customer:** The entity that receives or is entitled to receive Distribution Service through the Distribution System.

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**RULE 21**  
**GENERATING FACILITY INTERCONNECTIONS**

H. **DEFINITIONS** (Continued)

**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.

**Distributed Generation:** Electrical power generation by any means, including from stored electricity, that is interconnected to Liberty at a Point of Common Coupling under the jurisdiction of the CPUC.

**Distribution Service:** All services required by, or provided to, a Customer pursuant to the approved tariffs and rules of Liberty.

**Distribution System:** All electrical wires, equipment, and other facilities owned or provided by Liberty by which Liberty provides Distribution Service to its Customers.

**Electricity Producer (EP):** The entity that executes an Interconnection Agreement with the Electrical Corporation. The Electricity Producer may or may not own or operate the Generating Facility, but is responsible for the rights and obligations related to the Interconnection Agreement.

**Emergency:** An actual or imminent condition or situation, which jeopardizes the Distribution system Integrity.

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

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

**Generating Unit:** An individual electrical generator or generating system (including required equipment, appurtenances, protective equipment and structures) that is connected to and made a part of a Generating Facility.

**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 Unit(s).

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

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**RULE 21**  
**GENERATING FACILITY INTERCONNECTIONS**

H. **DEFINITIONS** (Continued)

**Initial Operation:** The first time the Generating Facility is in Parallel Operation.

**Initial Review:** The review by Liberty, following receipt of an Application, to determine the following: If an Application qualifies for Simplified Interconnection, or If an 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 Agreement:** An agreement between Liberty and the Electricity Producer that gives each the certain rights and obligations to effect or end Interconnection.

**Interconnection Study:** A study to establish the requirements for Interconnection of an Electricity Producer.

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

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

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

**ISO:** The California Independent System Operator, responsible for the management of electrical power flow through California's electrical transmission network.

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

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

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**GENERATING FACILITY INTERCONNECTIONS**

H. **DEFINITIONS** (Continued)

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

**Net Energy Metering:** Metering for the mutual purchase and sale of electricity between the Electricity Producer and Liberty pursuant to the net metering tariff approved by the CPUC.

**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 and/or Section 218 Load, Metering that is located at the point of Common Coupling. For a Generating Unit with Host Load and/or Section 218 Load, Metering that is located at the Generating Unit bus after the point of auxiliary load(s) and prior to serving Host Load and/or Section 218 Load.

**Net Metering:** Where electricity at a point may flow in both directions, the measurement of the net, or the algebraic sum, of electrical energy in kWh, that flows through that point in a given time-interval. Net Metering typically uses two meters, or in some cases a single meter with two or more registers, to individually measure a Customer's electric deliveries to, and consumption of retail service from, the Distribution System. Over a given time frame (typically a month) the difference between these two values yield either net consumption or net surplus. The meter registers are ratcheted to prevent reverse registration. If available, a single meter may be allowed spin backward to yield the same effect as a two meter (or register) arrangement.

**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).

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

**Non-Exporting:** Designed to prevent the transfer of electrical energy from the EP to Liberty.

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H. **DEFINITIONS** (Continued)

**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 Liberty while Interconnected. For the purpose of this rule, Parallel Operation includes only those generators that are so interconnected with the Distribution System for more than 60 cycles.

**Periodic Test:** A test performed on part or all of a Generating Facility system at pre-determined time or operational intervals to achieve one or more of the following:

- Verify specific aspects of its performance;
- Calibrate instrumentation;
- 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 and/or Section 218 Load.

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

**Point of Interconnection:** The electrical transfer point between an electrical power plant and the electrical distribution system. This may or may not be coincident with the Point of Common Coupling.

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

**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.

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**RULE 21**  
**GENERATING FACILITY INTERCONNECTIONS**

H. **DEFINITIONS** (Continued)

**Scheduled Operation Date:** The date specified in the Interconnection Agreement when the Generating Facility is, by the Electricity 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.

**Section 218 Load:** Electrical power that is supplied in compliance with California Public Utilities Code (PU Code) section 218. PU Code 218 defines an "Electric Corporation" and provides conditions under which a generator transaction would not classify a generating entity as an Electric Corporation. These conditions relate to "over-the-fence" sale of electricity from a generator without using the Distribution System.

**Simplified Interconnection:** Interconnection conforming to the minimum requirements under these rules, as determined by Section I.

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

**Stabilization; Stability:** The return to normalcy of Liberty'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, (eg. 6 volts on a 120-volt base, yielding a 5% drop).

**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 Liberty.

**Telemetry:** The electrical or electronic transmittal of Metering data on a real-time basis to Liberty.

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**GENERATING FACILITY INTERCONNECTIONS**

H. **DEFINITIONS** (Continued)

**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 Distribution System, without the approval of Liberty.

**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 Agreement.

I. **INITIAL REVIEW PROCESS FOR APPLICATIONS TO INTERCONNECT DISTRIBUTED GENERATION**

1. Introduction:

This Initial Review Process was developed to create a path for selection and rapid approval of those Applications for Interconnection that do not require an Interconnection Study. The capitalized phrases used in this Section I have the same meanings as those in Section H of the proposed Rule 21.

2. Purpose:

The Initial Review determines:

- a. If a Generating Facility qualifies for Simplified Interconnection;
- b. If a Generating Facility can be made to qualify for Interconnection with supplemental review determining any potential additional requirements, or
- c. If an Interconnection Study is required, the cost estimate and schedule for performing the Interconnection Study.

NOTE:

Failure to pass any screen means only that further review, and/or studies, are required before the Generating Facility can be approved for interconnection with Liberty. It does not mean that the Generating Facility cannot be interconnected.

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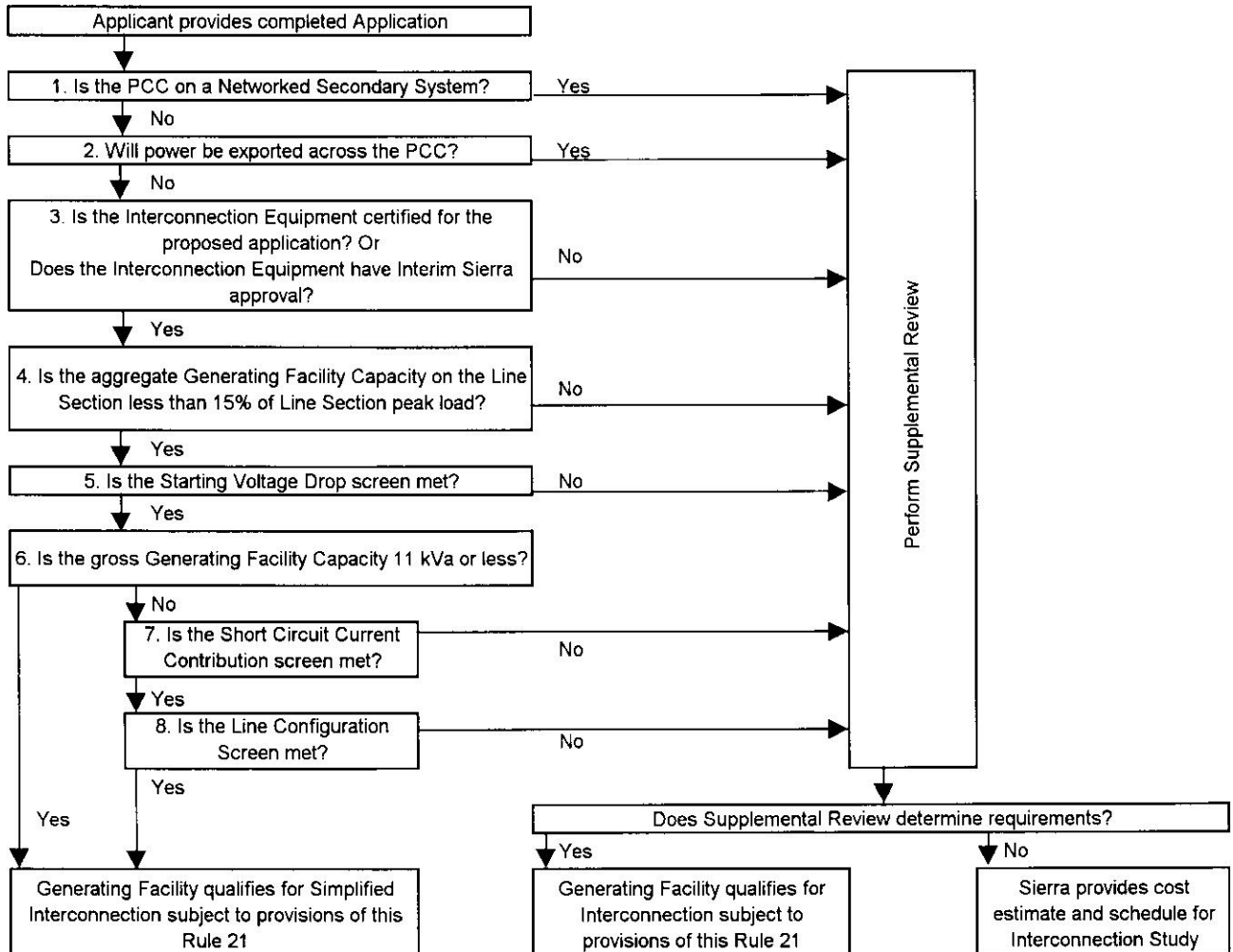
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**RULE 21**  
**GENERATING FACILITY INTERCONNECTIONS**

I. INITIAL REVIEW PROCESS FOR APPLICATIONS TO INTERCONNECT DISTRIBUTED GENERATION (Continued)

2. Purpose: (Continued)

Initial Review Process Flow Chart



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**RULE 21**  
**GENERATING FACILITY INTERCONNECTIONS**

I. **INITIAL REVIEW PROCESS FOR APPLICATIONS TO INTERCONNECT DISTRIBUTED GENERATION** (Continued)

3. Initial Review Process Details

a. Is the PCC on a Networked Secondary System?

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

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

4. 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 four options:

Option 1: To insure power is never exported, a reverse power Protective Function must be implemented at the PCC. Default setting shall be 0.1% (export) of transformer rating, with a maximum 2.0 second time delay.

Option 2: To insure at least a minimum import of power, an under-power Protective Function must be implemented at the PCC. Default setting shall be 5% (import) of Generating Facility Gross Nameplate Rating, with maximum 2.0 second time delay.

Option 3: To limit the incidental export of power, all of the following conditions must be met: a) The aggregate Generating Facility capacity of the Generating Facility must be no more than 25% of the nominal ampere rating of the Customer's Service Equipment; b) The total aggregate Generating Facility capacity must be no more than 50% of the service transformer rating (This capacity requirement does not apply to customers taking primary service without an intervening transformer); c) The Generating Facility must be certified as Non-Islanding.

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I. **INITIAL REVIEW PROCESS FOR APPLICATIONS TO INTERCONNECT DISTRIBUTED GENERATION** (Continued)

4. Will power be exported across the PCC? (Continued)

Option 4: To insure that the relative size (capacity) of the Generating Facility compared to facility load results in no export of power without the use of additional devices, the Generating Facility capacity must be no greater than 50% of the Customer's verifiable minimum annual load.

Significance: If it can be assured that the Generating Facility will not export power, Liberty's Distribution System does not need to be studied for load-carrying capability or Generating Facility power flow effects on Liberty voltage regulators since the Generating Facility will simply be reducing load on Liberty's Distribution System. This screen permits use of reverse-power relaying at the PCC as positive anti-islanding protection.

5. Is the Interconnection Equipment Certified for the Application or does the Interconnection Equipment have Interim Liberty Approval?

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

Significance: If the Generating Facility has been Certified or previously approved by Liberty, Liberty does not need to review, or test, the Generating Facility's Protective Function 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 Liberty approval indicates the following criteria have been tested and verified:

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

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**RULE 21**  
**GENERATING FACILITY INTERCONNECTIONS**

I. **INITIAL REVIEW PROCESS FOR APPLICATIONS TO INTERCONNECT DISTRIBUTED GENERATION** (Continued)

6. 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: Low penetration of Generating Facility installations will have a minimal impact on operation and load restoration. The operating requirements for a high penetration of Generating Facilities may be different since the system impact will no longer be minimal, therefore requiring additional study or controls.

7. 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.

NOTICE: This screen only applies to Generating Facilities that start by motoring the Generating Unit(s).

Liberty has two options in determining whether Starting Voltage Drop could be a problem; which option to use is at Liberty's discretion.

Option 1: Liberty may determine that the Generating Facility's starting Inrush Current must be equal to or less than the continuous ampere rating of the Customer's Service Equipment.

Option 2: Liberty may determine the impedances of service distribution transformer (if present) and secondary conductors, from primary to Producer's Service Equipment, and perform a voltage drop calculation. Alternately, Liberty may use tables or nomographs. Voltage drop caused by the starting of a Generating Unit must be less than 2.5% for primary interconnection and 5% for secondary interconnection.

Significance:

- This screen addresses potential voltage fluctuation problems for Generating Units that start by motoring.

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**RULE 21**  
**GENERATING FACILITY INTERCONNECTIONS**

I. **INITIAL REVIEW PROCESS FOR APPLICATIONS TO INTERCONNECT DISTRIBUTED GENERATION** (Continued)

7. Is the Starting Voltage Drop screen met? (Continued)

Significance: (Continued)

- When starting, Generating Facilities should have minimal impact on the service voltage to other Liberty Customers.
- Passing this screen does not relieve the Producer from compliance with the flicker requirements of Section D.2.b.

8. 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: Generating Facility has minimal impact on fault current levels and any potential line overvoltages from loss of system neutral grounding.

9. Is Short Circuit Current Contribution screen met?

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

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

- a. When measured at primary side (high side) of the 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.
- b. When measured at secondary (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 Producers Service Equipment.

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I. **INITIAL REVIEW PROCESS FOR APPLICATIONS TO INTERCONNECT DISTRIBUTED GENERATION** (Continued)

9. Is Short Circuit Current Contribution screen met? (Continued)

Significance:

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

10. Is the Line Configuration screen met?

- If No, then Generating Facility does not qualify for Simplified Interconnection. Perform supplemental review.
- If Yes, then Generating Facility qualifies for Simplified Interconnection. Skip remaining screens.

Line Configuration Screen: Identify primary distribution line configuration. Based on proposed interconnection type, determine from table whether Generating Facility passes screen.

| Primary Distribution Line Type                                                            | Type of Interconnection to Primary Distribution Line | Result/Criteria                                                                                              |
|-------------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
|                                                                                           |                                                      |                                                                                                              |
| Three-phase, three wire                                                                   | Any                                                  | Pass screen                                                                                                  |
| Three-phase, four wire                                                                    | Single-phase, line-to-neutral                        | Pass screen                                                                                                  |
| Three-phase, four wire<br>(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 Liberty's primary system is three-wire or the Generating Facility interconnection transformer is single-phase (line-to-neutral), then there is no concern about overvoltages to Liberty's, or Customer, equipment caused by loss of system neutral grounding during the operating time of anti-islanding protection.

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**RULE 21**  
**GENERATING FACILITY INTERCONNECTIONS**

J. TESTING AND CERTIFICATION CRITERIA (Continued)

1. Introduction

This Appendix describes the test procedures and requirements for equipment used for the Interconnection of Generating Facilities to Liberty'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 P1547 *Standard for Distributed Resources Interconnected with Electric Power Systems*, and should be revisited once that standard is published.

The tests described here, together with the technical requirements in Section D of Rule 21, are intended to provide assurance that the Generating Facility's equipment will not adversely affect Liberty's Distribution System and that it will cease providing power to the grid under abnormal conditions. The tests were developed assuming a low level of Generating Facility penetration. At high levels of Generating Facility penetration, other requirements and corresponding test procedures may need to be defined.

This test specification also provides a means of certifying equipment. Liberty does not need to review the design or test Protective Functions of Certified Equipment. The use of non-certified equipment may be acceptable subject to testing and approval by Liberty as discussed below.

2. Certification Criteria

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 is considered Certified Equipment for purposes of Interconnection. 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 factory/test lab 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.

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**GENERATING FACILITY INTERCONNECTIONS**

J. TESTING AND CERTIFICATION CRITERIA (Continued)

2. Certification Criteria (Continued)

For non-certified equipment, some or all of the tests described in this document may be required by Liberty. The manufacturer or other lab acceptable to Liberty may perform these tests. Test results must be submitted to Liberty with the Interconnection Application for review and approval under the supplemental review. Approval by Liberty for use in a particular application does not guarantee approval for use in other applications or by other Electrical Corporations.

The NRTL shall provide to the manufacturer, at a minimum, a Certificate with the following information for each device certified:

a. Administrative:

- 1) Effective date of certification or applicable serial number (range or first in series), other proof that certification is current
- 2) Equipment model number (s)
- 3) Software version, if applicable
- 4) Test procedures specified (including date or revision number)
- 5) Laboratory accreditation (by whom and to what standard)

b. Technical (As appropriate):

- 1) Device rating (kW, kVA, V, A, etc.)
- 2) Maximum available fault current, A
- 3) In-rush current, A
- 4) Trip points, if factory set (trip value and timing)
- 5) Trip point and timing ranges for adjustable settings
- 6) Nominal power factor or range if adjustable
- 7) If the device/system is certified for non-export and the method used (reverse power or under power)
- 8) If the device/system is certified non-islanding

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

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**RULE 21**  
**GENERATING FACILITY INTERCONNECTIONS**

J. TESTING AND CERTIFICATION CRITERIA (Continued)

3. Type Testing (Continued)

a. Inverters (Continued)

Static power inverters shall meet all of the Type Tests and requirements appropriate for a utility interactive inverter as specified in UL 1741 *Static Inverters and Charge Controllers for Use in Photovoltaic Power Systems*, and listed below. These requirements may be applied to inverters used with electric energy sources other than PV. The specific section number from the May

1999 version of UL1741 is provided for each test and requirement. The titles for some sections were added for clarity. These section numbers are subject to change by UL. A revised version of 1741 is expected to be published around Nov 2000. The utility interconnection-related procedures and requirements of that version will need to be reviewed to determine if they should be adopted into these testing and certification rules.

The requirements described below cover only issues related to Interconnection and are not intended to address device safety and other issues outside the need and relationship between Liberty and EP.

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**GENERATING FACILITY INTERCONNECTIONS**

J. TESTING AND CERTIFICATION CRITERIA (Continued)

3. Type Testing (Continued)

a. Inverters (Continued)

Table 1, UL1741 (May 1999 Version)  
Type Tests and Requirements Appropriate for Utility Interactive Inverter Systems

| <u>Section Number</u> | <u>Section Title</u>                           |
|-----------------------|------------------------------------------------|
| 39.1                  | Utility Disconnect Switch                      |
| 39.2                  | Field Adjustable Trip-points                   |
| 39.3                  | Field Adjustable Trip-points                   |
| 39.4                  | Field Adjustable Trip-points                   |
| 39.5                  | Field Adjustable Trip-points, Marking          |
| 40.1                  | DC Isolation                                   |
| 41.2                  | Simulated PV Array (Input Source) requirements |
| 44                    | Dielectric Voltage Withstand Test              |
| 45.2.2                | Power Factor                                   |
| 45.4                  | Harmonic Distortion                            |
| 45.5                  | DC Injection                                   |
| 46.2                  | Utility Voltage and Frequency Variation Test   |
| 46.2.3                | Reset Delay                                    |
| 46.4                  | Loss of Control circuit                        |
| 47.3                  | Short Circuit Test                             |
| 47.7                  | Load Transfer Test                             |

A description of key aspects of these procedures is provided in the Testing Procedures Section K.

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**GENERATING FACILITY INTERCONNECTIONS**

J. TESTING AND CERTIFICATION CRITERIA (Continued)

3. Type Testing (Continued)

a. Inverters (Continued)

Separate test procedures are provided to certify non-islanding function (J.3.d.) and non-export function (J.3.e.), to determine the in-rush current J.3.f., to subject the device to voltage surge conditions J.3.g., and to verify the inverter's ability to synchronize with the Distribution System (J.3.h.).

b. Synchronous Generators

Until a standardized test procedure, written specifically for synchronous generators, is identified, an EC or NRTL shall determine which of the tests described in this Section are appropriate and necessary to certify the performance of the control and protection system functions of the synchronous machine, and how to perform them. The following tests, defined in UL 1741, shall be performed as applicable to a synchronous generator.

Table 2, UL1741 (May 1999 Version)  
Type Tests and Requirements Appropriate for Synchronous Generators

| <u>Section Number</u> | <u>Section Title</u>                         |
|-----------------------|----------------------------------------------|
| 39.1                  | Utility Disconnect Switch                    |
| 39.2                  | Field Adjustable Trip-points                 |
| 39.3                  | Field Adjustable Trip-points                 |
| 39.4                  | Field Adjustable Trip-points                 |
| 39.5                  | Field Adjustable Trip-points, Marking        |
| 44                    | Dielectric Voltage Withstand Test            |
| 45.2.2                | Power Factor                                 |
| 45.4                  | Harmonic Distortion                          |
| 46.2                  | Utility Voltage and Frequency Variation Test |
| 46.2.3                | Reset Delay                                  |
| 46.4                  | Loss of Control circuit                      |
| 47.3                  | Short Circuit Test                           |

Separate test procedures are provided to certify non-islanding function and non-export function, to determine in-rush current, to subject the device to voltage surge conditions, and to verify the generator's ability to synchronize with the Distribution System.

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**GENERATING FACILITY INTERCONNECTIONS**

J. TESTING AND CERTIFICATION CRITERIA (Continued)

3. Type Testing (Continued)

c. Induction Generators

Until a standardized test procedure, written specifically for induction generators is identified, Liberty or NRTL shall determine which of the tests described in this Appendix are appropriate and necessary to certify the performance of the control and protection system functions of the induction generator, and how to perform them. The following tests, defined in UL 1741, shall be performed as applicable to a induction generator.

Table 3, UL1741 (May 1999 Version)  
Type Tests and Requirements Appropriate for Induction Generators

| <u>Section Number</u> | <u>Section Title</u>                         |
|-----------------------|----------------------------------------------|
| 39.1                  | Utility Disconnect Switch                    |
| 39.2                  | Field Adjustable Trip-points                 |
| 39.3                  | Field Adjustable Trip-points                 |
| 39.4                  | Field Adjustable Trip-points                 |
| 39.5                  | Field Adjustable Trip-points, Marking        |
| 44                    | Dielectric Voltage Withstand Test            |
| 45.2.2                | Power Factor                                 |
| 45.4                  | Harmonic Distortion                          |
| 46.2                  | Utility Voltage and Frequency Variation Test |
| 46.2.3                | Reset Delay                                  |
| 46.4                  | Loss of Control circuit                      |
| 47.3                  | Short Circuit Test                           |
| 47.7                  | Load Transfer Test                           |

Separate test procedures are provided to certify non-islanding function and non-export function, to determine the in-rush current, and to subject the device to voltage surge conditions.

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J. TESTING AND CERTIFICATION CRITERIA (Continued)

3. Type Testing (Continued)

d. Anti-Islanding Test

In addition to the above Type Tests, devices that pass the Anti-Islanding test procedure described in this Appendix will be considered Non-Islanding for the purposes of these interconnection requirements.

e. Non-Export Test

In addition to the above Type Tests, devices that pass the Non-Export test procedure described in Section K.1 a. will be considered Non-Exporting for the purposes of these interconnection requirements.

f. In-rush Current Test

Generation equipment that utilizes Liberty power to motor up to speed will be tested using the procedure defined in Section K.1.b. to determine the maximum current drawn during this startup process. The resulting in-rush current is used to estimate the starting voltage drop.

g. Surge Withstand Capability Test

Interconnection equipment shall 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 Liberty. If the device remains operable after being subject to the surge conditions, previous type tests related to Liberty's protection and power quality will need to be repeated to ensure the unit will still pass those tests following the surge test.

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**GENERATING FACILITY INTERCONNECTIONS**

J. TESTING AND CERTIFICATION CRITERIA (Continued)

3. Type Testing (Continued)

h. 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 Liberty. This test is not necessary for induction generators or current-source inverters.

The test will start with only one of the three parameters--voltage difference between Generating Facility and Liberty, frequency difference, or 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 spec.

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 Liberty. This testing may be performed in the factory or as part of a Commissioning Test (J.5.a.).

5. Commissioning Testing

Commissioning Testing, where required, will be performed on-site to verify protective settings and functionality. Upon initial Parallel Operation of a generating system, 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

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**GENERATING FACILITY INTERCONNECTIONS**

J. TESTING AND CERTIFICATION CRITERIA (Continued)

5. Commissioning Testing (Continued)

document. Liberty 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. 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 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

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

- Verifying final protective settings
- Trip test
- In-service test

a. Certified Equipment

Systems qualifying for Simplified Interconnection incorporate Certified Equipment that have, at a minimum, passed the Type and Production Tests described in this document, and are judged to have little or no potential impact on Liberty's distribution system. For such systems, it is necessary to perform only the following tests:

- 1) Protection settings that have been changed after factory testing will require field verification. Tests will be performed using injected secondary quantities, 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.

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**GENERATING FACILITY INTERCONNECTIONS**

J. TESTING AND CERTIFICATION CRITERIA (Continued)

5. Commissioning Testing (Continued)

a. Certified Equipment (Continued)

2. Non-Islanding function will be checked by operating a load break disconnect switch to verify the interconnection equipment ceases to energize the line and does not re-energize for the required time delay after the switch is closed
3. Non-Export function will 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-export criteria (i.e., reverse power or under power) are met.

The supplemental review or an Interconnection Study may impose additional components or additional testing.

b. Non-Certified Equipment

Non-certified equipment shall be subjected to the appropriate tests described in Type Testing (Section J.3.) as well as those described in Certified Equipment Commissioning Test (Section J.5.a.). With Liberty approval, these tests may be performed in the factory, in the field as part of commissioning, or a combination of both. Liberty, at its discretion, may also approve a reduced set of tests for a particular application or, for example, if they have sufficient experience with the equipment.

c. Verifying final protective settings

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

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**GENERATING FACILITY INTERCONNECTIONS**

J. TESTING AND CERTIFICATION CRITERIA (Continued)

5. Commissioning Testing (Continued)

d. Trip Test (Continued)

Interconnection protective devices (e.g. reverse power relay) that have not previously been tested as part of the interconnection system 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 devices or between interrupting devices shall be similarly tested unless they are part of a system that has been tested and approved during manufacture.

e. In-service test

Interconnection protective devices that have not previously been tested as part of the interconnection system 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 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.

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**GENERATING FACILITY INTERCONNECTIONS**

J. TESTING AND CERTIFICATION CRITERIA (Continued)

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 EP shall maintain periodic test reports or a log for inspection by Liberty. Periodic Testing conforming to Liberty test intervals for the particular line section may be specified by Liberty under special circumstances, such as high fire hazard areas. A system that depends upon a battery for trip power 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.

K. TESTING PROCEDURES

1. Type Test and Requirements

This section describes the Type Tests necessary to qualify a device as Certified, which are not contained in Underwriters Laboratories UL 1741 Standard *Inverters, Converters and Controllers for Use in Independent Power Systems*, or other referenced standards.

a) Non-Export test Procedures

The non-export 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 Step 2, Options 1 and 2, of the Initial Review Process. Tests are provided for discrete relay packages and for controllers and inverters that include the intended function.

1) Reverse Power Relay Test

This version of the Non-Export test procedure is intended for stand-alone reverse power and under power relay packages provided to meet the requirements of Options 1 and 2 of the Export Screen. It should be understood that in the reverse power application, the relay will provide a trip output with power in the export (toward Liberty's system) direction.

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**GENERATING FACILITY INTERCONNECTIONS**

K. TESTING PROCEDURES (Continued)

1. Type Test and Requirements (Continued)

a. Non-Export test Procedures (Continued)

1) Reverse Power Relay Test (Continued)

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

Determine the appropriate secondary pickup current for the desired export power flow of 0.5 secondary watts (the agreed-upon minimum pickup setting, assumes 5Amp and 120V CT/PT secondary). Apply nominal voltage with minimum current setting at 0 degrees 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 percent 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).

*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 relay's 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 angles 90, 180 and 270 degrees and verify that the relay does NOT operate.

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K. **TESTING PROCEDURES** (Continued)

1. Type Test and Requirements (Continued)

a. Non-Export test Procedures (Continued)

1) Reverse Power Relay Test (Continued)

*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 3-phase relays, use Ia at 180, Ib at 60 and Ic and 300 degrees). Remove Phase-1 voltage and observe that the relay does not operate. Repeat for phase-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 Ia at 180, Ib at 300 and Ic at 60 degrees). Observe that the relay does NOT operate.

*Step 6: Unbalanced Fault Test*

Using the pickup settings determined in Step 1, apply rated voltage and 2 times rated current, to simulate an unbalanced fault in the non-trip direction (use Va at 0 degrees, Vb and Vc at 180 degrees, Ia at 180 degrees, Ib at 0 degrees, and Ic at 180 degrees). Observe that the relay, especially single phase, does not misoperate.

*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

(Continued)

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Issued by

Michael R Smart

Date Filed July 15, 2013

Name

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President

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**RULE 21**  
**GENERATING FACILITY INTERCONNECTIONS**

K. **TESTING PROCEDURES** (Continued)

1. Type Test and Requirements (Continued)

a. Non-Export test Procedures (Continued)

1) Reverse Power Relay Test (Continued)

*Step 8: Dielectric Test*

Perform the test described in IEC 414 using 2 kV RMS for 1 minute.

*Step 9: Surge withstand*

Perform the surge withstand test described in IEEE C37.90.1.1989 or the surge withstand test described in B.3.7.

2) Under Power Relay Test

In the underpower application, the relay will provide a trip output when import power (toward the EP) drops below the specified power level.

Note: For an underpower relay, pickup is defined as the highest power level at which the relay indicates that the power is *less* than the set setting.

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

Determine the appropriate secondary pickup current for the desired power flow pickup level of 5% of peak load (the agreed-upon minimum pickup setting). Apply rated voltage and current setting at 0 degrees 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 percent 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).

(Continued)

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**RULE 21**  
**GENERATING FACILITY INTERCONNECTIONS**

K. **TESTING PROCEDURES** (Continued)

1. Type Test and Requirements (Continued)

a. Non-Export test Procedures (Continued)

2) Under Power Relay Test (Continued)

*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% 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% of the value at 0 degrees) and verify that the relay operates. Repeat for angles 90, 180 and 270 degrees and verify that the relay operates for any current less than rated current.

*Step 4: Negative Sequence Voltage Test*

Using the pickup settings determined in Step 1, apply rated relay voltage and 25% 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 phase-2 and 3.

*Step 5: Unbalanced Fault Test*

Using the pickup settings determined in Step 1, apply rated voltage and 2 times rated current, to simulate an unbalanced fault in the normal load direction (use Va at 0 degrees, Vb and Vc at 180 degrees, Ia at 0 degrees, Ib at 180 degrees, and Ic at 0 degrees). Observe that the relay, especially single phase, operates properly.

(Continued)

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**RULE 21**  
**GENERATING FACILITY INTERCONNECTIONS**

K. TESTING PROCEDURES (Continued)

1. Type Test and Requirements (Continued)

a. Non-Export test Procedures (Continued)

2) Under Power Relay Test (Continued)

*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 1 minute.

*Step 8: Surge withstand*

Perform the surge withstand test described in IEEE C37.90.1.1989 or the surge withstand test described in J.3.g

3) Functional Test for Inverters and Controllers

Inverters and controllers designed to provide reverse or under power functions shall be tested to certify the intended operation of this function. Two methods are provided.

Method 1: If the controller utilizes external current/voltage measurement to determine the reverse or underpower condition, then the controller shall be functionally tested by application of appropriate secondary currents and potentials as described in the Relay Test K.1.a.1.

Method 2: If external secondary current or potential 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 two seconds. These tests may be factory tests, if the measurement and control points are part of a single unit, or may be provided for in the field.

(Continued)

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**GENERATING FACILITY INTERCONNECTIONS**K. TESTING PROCEDURES (Continued)

## 1. Type Test and Requirements (Continued)

## b. In-rush Current Test

This test will determine the maximum in-rush current drawn by the unit.

## 1) Locked-Rotor Method

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

## 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 to Liberty. 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 Liberty 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 +/- five percent 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 will be included in the test report and will be made available to Liberty.

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PROPOSED  
GENERATING FACILITY  
INTERCONNECTION AGREEMENT

This Generating Facility Interconnection Agreement ("Agreement") is entered into by and between Electrical Producer's Name ("Electricity Producer" or "EP"), and Liberty Utilities (CalPeco Electric) LLC ("Liberty"). EP and Liberty are sometimes also referred to in this Agreement jointly as "Parties" or individually as "Party."

In consideration of the mutual promises and obligations stated in this Agreement and its attachments, the Parties agree as follows:

**1. SCOPE AND PURPOSE**

This Agreement provides for EP to interconnect and operate a Generating Facility in parallel with Liberty's Distribution System to serve the electrical loads connected to the electric service account that Liberty uses to interconnect EP's Generating Facility (or, where permitted under Section 218 of the California Public Utilities Code, the electric loads of an on-site or neighboring party lawfully connected to EP's Generating Facility through EP's circuits).

**2. SUMMARY AND DESCRIPTION OF EP's GENERATING FACILITY**

2.1 A description of the Generating Facility, including a summary of its significant components and a single-line diagram showing the general arrangement of how EP's Generating Facility and loads are interconnected with Liberty's Distribution System, is attached to and made a part of this Agreement as Appendix A.

2.2 Generating Facility identification number: \_\_\_\_\_ (Assigned by Liberty)

2.3 Liberty's customer electric service account number: \_\_\_\_\_ (Assigned by Liberty)

2.4 Name and address used by Liberty to locate the electric service account used to interconnect the Generating Facility with Liberty's Distribution System:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2.5 The Gross Nameplate Rating of the Generating Facility is: \_\_\_\_\_ kW.

2.6 The Net Nameplate Rating of the Generating Facility is \_\_\_\_\_ kW.

2.7 The expected annual energy production of the Generating Facility is \_\_\_\_\_ kWh.

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**2. SUMMARY AND DESCRIPTION OF EP's GENERATING FACILITY (Continued)**

- 2.8 For the purpose of securing the Competition Transition Charge exemption available under Section 372 of the California Public Utilities Code ("PUC"), EP hereby declares that the Generating Facility o does / o does not meet the requirements for "Cogeneration" as such term is used in Section 218.5 of the California Public Utilities Code.
- 2.9 The Generating Facility's expected date of Initial Operation is \_\_\_\_\_. The expected date of Initial Operation shall be within two years of the date of this Agreement.

**3. DOCUMENTS INCLUDED; DEFINED TERMS**

- 3.1 This Agreement includes the following exhibits which are specifically incorporated herein and made a part of this Agreement by this reference:
- Appendix A- Description of Generating Facility and Single-Line Diagram
- Appendix B- Copies of Rules 2 and 21 and other selected rules and tariffs of Liberty
- Appendix C (When applicable) Copy of Interconnection Facility Financing and Ownership Agreement
- 3.2 When initially capitalized, whether in the singular or in the plural, the terms used herein shall have the meanings assigned to them either in this Agreement or in Rule 21 of Liberty's tariffs.

**4. TERM AND TERMINATION**

- 4.1 This Agreement shall become effective as of the last date entered in Section 16, below. The Agreement shall continue in full force and effect until the earliest date that one of the following events occurs:
- (a) The Parties agree in writing to terminate the Agreement; or
- (b) At 12:01 A.M. on the 61<sup>st</sup> day after EP or Liberty provides written Notice (pursuant to Section 9, below) to the other Party of EP's or Liberty's intent to terminate this Agreement.
- 4.2 EP may elect to terminate this Agreement pursuant to the terms of Section 4.1(b) for any reason. Liberty may elect to terminate this Agreement pursuant to the terms of Section 4.1(b) for one or more of the following reasons:
- (a) A change in applicable rules, tariffs, and regulations, as approved or directed by the CPUC, or a change in any local, state or federal law, statute or regulation, either of which materially alters or otherwise affects Liberty's ability or obligation to perform Liberty's duties under this Agreement; or,

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**4. TERM AND TERMINATION (Continued)**

- (b) EP fails to take all corrective actions specified in Liberty's Notice that EP's Generating Facility is out of compliance with the terms of this Agreement within the time frame set forth in such Notice; or,
  - (c) EP fails to interconnect and operate the Generating Facility per the terms of this Agreement prior to 120 days after the date set forth in Section 2.9, above, as the Generating Facility's expected date of Initial Operation; or,
  - (d) EP abandons the Generating Facility. Liberty shall deem the Generating Facility to be abandoned if Liberty determines, in its sole opinion, the Generating Facility is non-operational and EP does not provide a substantive response to Liberty's Notice of intent to terminate this Agreement as a result of EP's apparent abandonment of the Generating Facility affirming EP's intent and ability to continue to operate the Generating Facility.
- 4.3 Notwithstanding any other provisions of this Agreement, Liberty shall have the right to unilaterally file with the CPUC, pursuant to the CPUC's rules and regulations, an application to terminate this Agreement.
- 4.4 Any agreement attached to and incorporated into this Agreement shall terminate concurrently with this Agreement unless the Parties have agreed otherwise in writing.

**5. GENERATING FACILITY OPERATION AND CERTIFICATION REQUIREMENTS**

- 5.1 The electric power produced by EP's Generating Facility shall be used solely to serve electrical loads connected to the electric service account that Liberty uses to interconnect EP's Generating Facility (or, where permitted under Section 218 of the PUC, the electric loads of an on-site or neighboring party lawfully connected to EP's Generating Facility through EP's circuits). EP shall attempt in good faith to regulate the electric power output of EP's Generating Facility so as to prevent the flow of electric energy from the Generating Facility to Liberty's electric system. Unless otherwise agreed upon in writing by the Parties, this Agreement does not provide for, nor otherwise require Liberty to receive, purchase, transmit, distribute, or store the electrical power produced by EP's Generating Facility.
- 5.2 If EP declares that its Generating Facility meets the requirements for "Cogeneration" as such term is used in Section 218.5 of the PUC (or any successor definition of "Cogeneration") ("Cogeneration Requirements"), EP warrants that, beginning on the date of Initial Operation and continuing throughout the term of this Agreement, its Generating Facility shall continue to meet such Cogeneration Requirements. If EP becomes aware that its Generating Facility has ceased to meet the Cogeneration Requirements, EP shall promptly provide Liberty with Notice of such change pursuant to Section 9.1 below.

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**5. GENERATING FACILITY OPERATION AND CERTIFICATION REQUIREMENTS  
(Continued)****5.2 (Continued)**

If at any time during the term of this Agreement Liberty determines in its sole discretion that EP's Generating Facility may no longer meet the Cogeneration Requirements, Liberty may require EP to provide evidence that its Generating Facility continues to meet the Cogeneration Requirements within 15 business days of Liberty's request for such evidence. Additionally, Liberty may periodically (typically, once per year) inspect EP's Generating Facility and/or require documentation from EP to monitor the Generating Facility's compliance with Section 218.5 of the PUC. If Liberty determines in its sole judgment that EP either failed to provide evidence in a timely manner or that it provided insufficient evidence that its Generating Facility continues to meet the Cogeneration Requirements, then the Cogeneration status of the Generating Facility shall be deemed ineffective until such time as EP again demonstrates to Liberty's reasonable satisfaction that the Generating Facility meets the requirements for a Cogeneration facility (the "Status Change").

5.2.1 Liberty shall revise its records and the administration of this Agreement to reflect the Status Change and provide Notice to EP of the Status Change pursuant to Section 9.1 below. This Notice shall specify the effective date of the Status Change. This date shall be the first day of the calendar year for which Liberty determines in its sole discretion that the Generating Facility first ceased to meet the Cogeneration Requirements. Liberty's Notice shall include an invoice for Competition Transition Charges ("CTCs") that were not previously billed during the period between the effective date of the Status Change and the date of the Notice in reliance upon EP's representations that the Generating Facility complied with the Cogeneration Requirements and therefore was eligible for the exemption from CTCs available under Section 372 of the PUC.

5.2.2 Any amounts to be paid or refunded by EP, as may be invoiced by Liberty pursuant to the terms of Section 5.2, shall be paid to Liberty within 30 days of EP's receipt of such invoice.

**6. INTERCONNECTION FACILITIES**

6.1 EP and/or Liberty, as appropriate, shall provide Interconnection Facilities that adequately protect Liberty's Distribution System, personnel, and other persons from damage or injury, which may be caused by the operation of EP's Generating Facility.

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**6. INTERCONNECTION FACILITIES (Continued)**

6.2 EP shall be solely responsible for the costs, design, purchase, construction, operation, and maintenance of the Interconnection Facilities that EP owns.

6.3 If the provisions of Liberty's Rule 21, or any other tariff or rule approved by the CPUC, requires Liberty to own and operate a portion of the Interconnection Facilities, EP and Liberty shall promptly execute an *Interconnection Facilities Financing and Operation Agreement* that establishes and allocates responsibility for the design, installation, operation, maintenance, and ownership of the Interconnection Facilities. This *Interconnection Facilities Financing and Operation Agreement* shall be attached to and made a part of this Agreement as Appendix C.

**7. LIMITATION OF LIABILITY**

Each Party's liability to the other Party for any loss, cost, claim, injury, liability, or expense, including reasonable attorney's fees, relating to or arising from any act or omission in its performance of this agreement, shall be limited to the amount of direct damage actually incurred. In no event shall either Party be liable to the other Party for any indirect, special, consequential, or punitive damages of any kind whatsoever.

**8. INSURANCE**

8.1 In connection with EP's performance of its duties and obligations under this Agreement, EP shall maintain, during the term of the Agreement, general liability insurance with a combined single limit of not less than:

- (a) Two million dollars (\$2,000,000) for each occurrence if the Gross Nameplate Rating of EP's Generating Facility is greater than one hundred (100) kW;
- (b) One million dollars (\$1,000,000) for each occurrence if the Gross Nameplate Rating of EP's Generating Facility is greater than twenty (20) kW and less than or equal to one hundred (100) kW; and
- (c) Five hundred thousand dollars (\$500,000) for each occurrence if the Gross Nameplate Rating of EP's Generating Facility is twenty (20) kW or less.
- (d) Two hundred thousand dollars (\$200,000) for each occurrence if the Gross Nameplate Rating of EP's Generating Facility is ten (10) kW or less and EP's Generating Facility is connected to an account receiving residential service from Liberty.

Such general liability insurance shall include coverage for "Premises-Operations, Owners and Contractors Protective, Products/Completed Operations Hazard, Explosion, Collapse, Underground, Contractual Liability, and Broad Form Property Damage including Completed Operations."

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**8. INSURANCE (Continued)**

- 8.2 The general liability insurance required in Section 8.1 shall, by endorsement to the policy or policies, (a) include Liberty as an additional insured; (b) contain a severability of interest clause or cross-liability clause; (c) provide that Liberty shall not by reason of its inclusion as an additional insured incur liability to the insurance carrier for payment of premium for such insurance; and (d) provide for thirty (30) calendar days' written notice to Liberty prior to cancellation, termination, alteration, or material change of such insurance.
- 8.3 If EP's Generating Facility is connected to an account receiving residential service from Liberty and the requirement of Section 8.2(a) prevents EP from obtaining the insurance required in Section 8.1, then upon EP's written Notice to Liberty in accordance with Section 9.1, the requirements of Section 8.2(a) shall be waived.
- 8.4 Evidence of the insurance required in Section 8.2 shall state that coverage provided is primary and is not in excess to or contributing with any insurance or self-insurance maintained by Liberty.
- 8.5 EP shall furnish the required insurance certificates and endorsements to Liberty prior to Initial Operation of the Generating Facility. Thereafter, Liberty shall have the right to periodically inspect or obtain a copy of the original policy or policies of insurance.
- 8.6 If EP is self-insured with an established record of self-insurance, EP may comply with the following in lieu of Sections 8.1 through 8.4:
- (a) EP shall provide to Liberty, at least thirty (30) calendar days prior to the date of Initial Operation, evidence of an acceptable plan to self-insure to a level of coverage equivalent to that required under Section 8.1.
  - (b) If EP ceases to self-insure to the level required hereunder, or if EP are unable to provide continuing evidence of EP's ability to self-insure, EP agrees to immediately obtain the coverage required under Section 8.1.
- 8.7 All insurance certificates, statements of self insurance, endorsements, cancellations, terminations, alterations, and material changes of such insurance shall be issued and submitted to the following:

Liberty Utilities (CalPeco Electric) LLC

Attention: \_\_\_\_\_

\_\_\_\_\_

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(Continued)

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**9. NOTICES**

- 9.1 Any written notice, demand, or request required or authorized in connection with this Agreement ("Notice") shall be deemed properly given if delivered in person or sent by first class mail, postage prepaid, to the person specified below:

If to Liberty: Liberty Utilities (CalPeco Electric) LLC  
Attention: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

Phone: ( ) \_\_\_\_\_  
FAX: ( ) \_\_\_\_\_

If to EP : EP Name  
Address: \_\_\_\_\_  
City: \_\_\_\_\_  
Phone: ( ) \_\_\_\_\_  
FAX: ( ) \_\_\_\_\_

- 9.2 A Party may change its address for Notices at any time by providing the other Party Notice of the change in accordance with Section 9.1.
- 9.3 The Parties may also designate operating representatives to conduct the daily communications, which may be necessary or convenient for the administration of this Agreement. Such designations, including names, addresses, and phone numbers may be communicated or revised by one Party's Notice to the other.

**10. REVIEW OF RECORDS AND DATA**

Liberty shall have the right to review and obtain copies of EP's operations and maintenance records, logs, or other information such as, unit availability, maintenance outages, circuit breaker operation requiring manual reset, relay targets and unusual events pertaining to EP's Generating Facility or its interconnection with Liberty's Distribution System.

**11. ASSIGNMENT**

EP shall not voluntarily assign its rights nor delegate its duties under this Agreement without Liberty's written consent. Any assignment or delegation EP makes without Liberty's written consent shall not be valid. Liberty shall not unreasonably withhold its consent to EP's assignment of this Agreement.

**12. NON-WAIVER**

None of the provisions of this Agreement shall be considered waived by a Party unless such waiver is given in writing. The failure of a Party to insist in any one or more instances upon strict performance of any of the provisions of this Agreement or to take advantage of any of its rights hereunder shall not be construed as a waiver of any such provisions or the relinquishment of any such rights for the future, but the same shall continue and remain in full force and effect.

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**13. GOVERNING LAW, JURISDICTION OF CPUC, INCLUSION OF LIBERTY'S TARIFFS AND RULES**

- 13.1 This Agreement shall be interpreted, governed, and construed under the laws of the State of California as if executed and to be performed wholly within the State of California without giving effect to choice of law provisions that might apply to the law of a different jurisdiction.
- 13.2 This Agreement shall, at all times, be subject to such changes or modifications by the CPUC as it may from time to time direct in the exercise of its jurisdiction.
- 13.3 The interconnection and services provided under this Agreement shall at all times be subject to the terms and conditions set forth in the tariff schedules and rules applicable to the electric service provided by Liberty, which tariff schedules and rules are hereby incorporated into this Agreement by this reference.
- 13.4 Notwithstanding any other provisions of this Agreement, Liberty shall have the right to unilaterally file with the CPUC, pursuant to the CPUC's rules and regulations, an application for change in rates, charges, classification, service, tariff or rule or any agreement relating thereto.

**14. AMENDMENT AND MODIFICATION**

This Agreement can only be amended or modified by a writing signed by both Parties.

**15. ENTIRE AGREEMENT**

This Agreement, including any incorporated tariff schedules and rules, contains the entire agreement and understanding between the Parties, their agents, and employees as to the subject matter of this Agreement. Each party also represents that in entering into this Agreement, it has not relied on any promise, inducement, representation, warranty, agreement or other statement not set forth in this Agreement or in the incorporated tariff schedules and rules.

**16. SIGNATURES**

IN WITNESS WHEREOF, the Parties hereto have caused two originals of this Agreement to be executed by their duly authorized representatives. This Agreement is effective as of the last date set forth below.

**EP NAME****LIBERTY UTILITIES (CALPECO ELECTRIC) LLC**

By: SAMPLE  
 Name: \_\_\_\_\_  
 Title: \_\_\_\_\_  
 Date: \_\_\_\_\_

By: SAMPLE  
 Name: \_\_\_\_\_  
 Title: \_\_\_\_\_  
 Date: \_\_\_\_\_

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Michael R. Smart  
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LIBERTY UTILITIES (CALPECO ELECTRIC) LLC  
SOUTH LAKE TAHOE, CALIFORNIA

Canceling 2<sup>nd</sup> Revised  
1st Revised

CPUC Sheet No. 331  
CPUC Sheet No. 331

**APPENDIX A**

**DESCRIPTION OF GENERATING FACILITY  
AND SINGLE-LINE DIAGRAM,  
(Provided by EP)**

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**APPENDIX B**

**RULES: "2" and "21"**

**TARIFF SCHEDULE: "S"- Standby**

**TARIFF SCHEDULES:**

(Note: Liberty's tariffs are included for reference only and shall at all times be subject to such changes or modifications by the CPUC as the CPUC may, from time to time, direct in the exercise of its jurisdiction.)

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LIBERTY UTILITIES (CALPECO ELECTRIC) LLC

SOUTH LAKE TAHOE, CALIFORNIA

Canceling 2nd Revised

1st Revised

CPUC Sheet No. 333

CPUC Sheet No. 333

**APPENDIX C**  
**(When Applicable)**

**INTERCONNECTION FACILITIES**  
**FINANCING AND OWNERSHIP**  
**AGREEMENT**

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LIBERTY UTILITIES (CALPECO ELECTRIC) LLC  
SOUTH LAKE TAHOE, CALIFORNIA

Canceling 2nd Revised  
1st Revised

CPUC Sheet No. 334  
CPUC Sheet No. 334

ATTACHMENT C  
INTERCONNECTION APPLICATION FORM

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PART 1 To be filled out by all Applicants

Note: This Application must be filled out in accordance with Liberty's Rule 21, "Generating Facility Interconnections," Sections C, I, and J

**Facility Information** (Where will the Generating Facility be installed?)

|                                           |       |                 |               |
|-------------------------------------------|-------|-----------------|---------------|
| Contact Person                            | Phone | Fax             | Email Address |
| Company Name                              |       | EC Meter Number |               |
| Street Address                            | City  | State           | Zip Code      |
| Mailing Address (if different from above) | City  | State           | Zip Code      |

**Applicant Information** (Who will be contractually obligated for this Generating Facility?)

|                                           |       |       |               |
|-------------------------------------------|-------|-------|---------------|
| Contact Person                            | Phone | Fax   | Email Address |
| Company Name                              |       |       |               |
| Street Address                            | City  | State | Zip Code      |
| Mailing Address (if different from above) | City  | State | Zip Code      |

**Contractor / Installer Information** (If different from above)

|                                           |       |       |               |
|-------------------------------------------|-------|-------|---------------|
| Contact Person                            | Phone | Fax   | Email Address |
| Company Name                              |       |       |               |
| Street Address                            | City  | State | Zip Code      |
| Mailing Address (if different from above) | City  | State | Zip Code      |

**Installation Questions**

1. How many Generators do you intend to install behind the single meter covered by this Application for this Generating Facility?

Number of Generators

Note:

Multiple Generators connected through a single interface and controlled as one generating set count as one Generating Facility.

Example: photovoltaic panels connected through a single inverter or multiple micro-turbines connected through a single interface and controlled as one generating set count as one Generating Facility. If you plan to use more than one type of Generator, please provide the information for each type and specify how many of each type you plan to use.

2. Is any piece of generation equipment you are using Certified for use in California? ☐ ☐
- (Section J, Rule 21)

Yes No

If **Yes**, please attach your generation equipment certificate for each certified generation package. If every piece of equipment you are using is certified, go to question 3.

Note: If you want to check for certification, please contact the manufacturer of your Product.

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**2.1** Has any non-certified piece of generation equipment you are installing been previously approved by Liberty for interconnection with Liberty's Distribution System? ☐ ☐

Yes No

If **Yes**, attach your generation equipment certificate for each certified generating unit. If every generating unit you are installing is certified, skip to question 3. If you are uncertain about the certification status of your generation unit, contact the manufacturer of your generating unit.

Approval Date Equipment Type

Approval Date Equipment Type

Approval Date Equipment Type

Approval Date Equipment Type

*Note: Add additional sheets if necessary.*

**2.2** Is any piece of generation equipment you are using not certified? ☐ ☐

Yes No

If **Yes**, complete Part 2 for each non-certified or non-Liberty approved piece of generation equipment.

*Note: You will need to fill out one Part 2 form for each non-certified piece.*

**3.** Do you plan to export to the Distribution System? ☐ ☐

Yes No

If **Yes**, continue to question 3.1.

If **No**, continue to question 3.2.

**3.1** Is the Generating Facility a Qualifying Facility (QF)? ☐ ☐

Yes No

If **Yes**, continue to question 3.1.1.

If **No**, STOP! You cannot apply with this form.

**3.1.1** Is the Generating Facility system <100 kW? ☐ ☐

Yes No

If **Yes**, continue to question 3.1.1.1.

If **No**, STOP! You cannot apply with this form.

**3.1.1.1** What is the estimated net annual export in kWh?

Net Export kWh

**3.2** Which of the four options do you choose as your non-export condition?

*Note: See Appendix A of Rule 21*

Option 1: Reverse power protection Yes ☐

Option 2: Underpower (always import) Yes ☐

Option 3: Limit incidental export of power\* Yes ☐

\*If you select this option, you must meet all of the following conditions:

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a. The aggregate nameplate capacity of the Generating Facility must be less than or equal to 25% of the nominal ampere rating of the service entrance equipment serving your facility.

b. Total aggregate nameplate capacity of the Generating Facility must be less than or equal to the rating of Liberty's transformer serving your facility.

Note: Does not apply to customers taking primary service.

c. Your Generating Facility must be certified as Non-Islanding.

Option 4: The nameplate rating of the Generating Facility will not exceed 50% of the host facility's minimum electrical load. Yes ☐

If option 4 is selected, what is the minimum load of the host facility?

Minimum Load kW

4. Operational Information

4.1 What mode of operation do you plan?

As available ☐

Prime power (base load) ☐

Demand Management ☐

Peak shaving ☐

Combined Heat and Power ☐

Load Following ☐

Other (Describe):

4.2 What is your total estimated annual kilowatt-hr production?

Annual kWh Production

5. Do any of your generating units start by using grid power (motoring)?

☐

Yes No

If **Yes**, continue to question 5.1.

If **No**, skip to question 6.

5.1 What is your Inrush Current?

Note: If you don't know, contact your generator manufacturer.

Inrush Current

5.2 What is the continuous ampere rating of your service entrance equipment?

Ampere Rating

6. Is the Gross Nameplate Rating of your Generating Facility system 11 kVA or less?

☐

Yes No

If **Yes**, skip to question 8.

7. (a) What is the short circuit contribution of the proposed Generating Facility system at the Generator terminals?

Amps

Note: If your Generating Facility system is not Certified, or if this information is not in the Certificate, you must also answer Part 2, Question 6

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7. (b) What is the short circuit contribution of the proposed Generating Facility at the Point of Common Coupling with Liberty's Distribution System?

Amps

*Note: This value should be based on your answer to question 7(a), adjusted for site/facility impedance to the Point of Common Coupling.*

- 7.1 Is your proposed Generating Facility system connected to Liberty's Distribution System through a transformer shared by other Customers? ☐ ☐

Yes No

*Note: It may be necessary to contact Liberty to obtain this information*

If **Yes**, answer question 7.2.

If **No**, skip to question 8.

- 7.2 What are the interrupting ratings of the other Customers service panels?

Amps

8. Will you install a Dedicated Transformer in connection with the installation of your proposed Generating Facility? ☐ ☐

Yes No

If **Yes**, answer question 8.1.

If **No**, skip to question 9.

- 8.1 If you are adding a transformer, please provide the following:

  
Rating KVAPrimary volts

  
Secondary volts

  
Impedance

9. What is your estimated date of initial operation?

Date of Operation

10. The following attachments must accompany Part 1 of the application when you submit it:  
Single-line Drawing ☐

*Note: A sample Single-line drawing is included with this application*

Included

Site plan showing the location and arrangement of the major equipment (facility layout)

*Note: This plan should include any customer-owned transformers.*

☐

Included

11. Please check this box if you wish Liberty to bypass Initial Review and to provide you with a cost-estimate for the Interconnection Study. ☐

Provide Cost Estimate

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LIBERTY UTILITIES (CALPECO ELECTRIC) LLC

SOUTH LAKE TAHOE, CALIFORNIA

Canceling 2nd Revised

1st Revised

CPUC Sheet No. 339

CPUC Sheet No. 339

When you have completed this application, mail, express mail, fax, or email it to:

Liberty Utilities (CalPeco Electric) LLC

Attn: Customer Generation

933 Eloise Avenue

South Lake Tahoe, CA 96150

Phone: (530) 543-5277

Fax: (530) 544-4811

Email: mike.long@libertyutilities.com

**All completed applications must be accompanied by the Application Fee:**

**A check in the amount of \$800.00 payable to Liberty Utilities (CalPeco Electric) LLC must accompany all completed Applications prior to Liberty commencing the Initial Review.**

*Note: If you choose to fax, please contact Liberty for notification of the date and time that your successful fax transmission occurred. It is the Generating Facility's responsibility to ensure that the Application and the Application Fee have been received by Liberty.*

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PART 2 To be filled out for all non-certified DG units or component types

Note: Fill out one Part 2 form for each non-certified generating unit. Multiple Generators connected through a single interface and controlled as one generating set count as one Generating Facility. Example: photovoltaic panels connected through a single inverter or multiple micro-turbines connected through a single interface and controlled as one generating set count as one Generating Facility.

1. Is the unit a Pre-packaged prime mover/generator/inverter/controller system? ☐ Yes ☐ No

If Yes, answer question 1.1.

If No, skip to question 2.

- 1.1 Who is the manufacturer?   
Manufacturer Name

- 1.2 What is the model number?   
Model

2. What is the Gross and Net Nameplate Rating in kVA?  Gross kVA  Net kVA

3. Prime Mover Information

What is the prime mover technology? (Please check all appropriate boxes.)

☐ IC Engine ☐ Microturbine ☐ PV ☐ Fuel Cell ☐ Hydro ☐ Wind ☐ Comb. Turbine ☐ Steam Turbine

Other (please describe)

Who is the prime mover manufacturer?   
Manufacturer Name

Who is the prime mover model number?   
Model

4. Generator/Inverter Information

What is the generator/inverter technology? (mark all appropriate boxes)

☐ Inverter ☐ Induction ☐ Synchronous ☐ Single phase ☐ Three phase

Who is the generator/inverter manufacturer?   
Manufacturer Name

What is the generator/inverter model #?   
Model

5. What is the power factor range of the generator/inverter?  Min  Max

Is the range adjustable? ☐ Yes ☐ No

Note: When paralleled with Liberty's Distribution System, the unit is required to operate in power factor regulation mode (not in voltage regulation mode.)

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6. Short Circuit Current Capability

6.1 What is the short circuit current capability of the Generating Facility at the Generating Facility's terminals?

Amps

Nominal Voltage

6.2 If you intend to have only one generating set behind the single meter covered by this application, skip to question 6.3.

If you intend to have more than one generating unit behind the meter, what is the maximum number of units operating simultaneously?

Number of Units

6.3 During a distribution system fault, what is your short circuit contribution, in amps?

Amps

*Note: To answer this question, you may need to gather the following from the Generator manufacturer:*

1. Fault duration curve and fault current interrupt time of the interrupting device

Or:

2. Synchronous machines only, the greater of:

(a) Fault current interrupt time of the interrupting device; including the:

Direct axis synchronous reactance ( $X_d$ ),

Direct axis transient reactance ( $X'_d$ ), and

Direct axis subtransient reactance ( $X''_d$ )

Or:

(b) The inertia constant of prime mover or Generator, including the:

Direct axis synchronous reactance ( $X_d$ ),

Direct axis transient reactance ( $X'_d$ ), and

Direct axis subtransient reactance ( $X''_d$ )

7. The following attachments must accompany Part 2 of the application when you submit it:

7.1 Complete and accurate protection diagrams including single-line meter relay and logic diagrams. ☐

Included

7.2 A description of the proposed protection schemes and description of operations ☐

Included

7.3 Maintenance plans for the interconnection protective devices and interconnection interrupting devices. ☐

Included

7.4 Any other documentation and certifications that may assist Liberty in approving your generating unit for interconnection with Liberty's Distribution System. ☐

Included

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