



INTERCONNECTION AND PARALLEL OPERATION OF DISTRIBUTED GENERATION

Customer Information Package

Updated 5/18/2016

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** The information provided herein is for your convenience and we have provided documents that were current on the date this communication was prepared; however, the documents are subject to change.*

This document is intended to provide documents for commonly installed photovoltaic and wind turbine systems. If you have any questions concerning interconnection of distributed renewable generation please contact Blake Burchard (rbburchard@aep.com) at 325-657-2733.

AEP Texas approval of connecting a generator to its distribution system is required.

SUMMARY OF THE PROCESS:

1. A completed interconnection application form is submitted to AEP Texas.
2. AEP Texas considers UL1741 compliant inverters as pre-certified.
3. Documentation must be provided, with application, that equipment has at least a 5 year warranty.
4. Company will install a dual register meter. Both inflow and out flow readings will be sent to Customer's Retail Energy Provider each month.
5. Company will make on-site visits to verify the proper installation and continuing safe operations of the generating facilities. This includes the required installation of an external AC disconnect switch (**blade type, not a breaker**) which is within three (3) feet of the meter, readily accessible to the Company, and lockable. ***If more than one inverter is used, feed all inverters through a single, common external AC disconnect.***
6. The point of common coupling of the renewable generating facilities is preferred to be **behind the main disconnect** for the service for which the renewable generation is interconnected.
7. Company will notify customer of approval or disapproval of interconnection and provide any applicable conditions.
8. Company will prepare and send Customer an Interconnection Agreement to be executed by the Customer.
9. Customer signs Interconnection Agreement and returns it to Company. Company will send customer a copy of the fully executed agreement after the Company has signed it.
10. Company schedules and completes a commissioning test and meter change by an AEP Meter Electrician.
11. Following completion of all steps above, the customer may operate the generator connected to the AEP Texas system.
12. **Please do not close, or allow your electrician/installer to close, (place in the "ON" position) the lockable disconnect switch until AEP has conducted its safety inspection of the installation. Closing the switch prior to being authorized to do so by AEP could create a severe safety hazard for the public, AEP employees, and your family. In addition, it is a violation of the law and could result in AEP disconnecting your electric service until proper authorization has been granted.**
13. **Per Texas Public Utility Commission Substantive Rule 25.211**
The owner of a distributed generation facility that is interconnected under this section shall report to the utility any change in ownership of the facility and the cessation of operations of a facility within 14 days of such change.

**To assist you in making an informed decision, you may
want to visit these websites:**

Wind turbine Generating Systems

Texas State Energy Conservation Office - www.seco.cpa.state.tx.us

U.S. Dept. of Energy - www.eere.energy.gov

Federal Tax Incentive Information

Energy Star - www.energystar.gov

*AEP Texas does not maintain these sites.

6.1.2.4 INTERCONNECTION AND PARALLEL OPERATION OF DISTRIBUTED GENERATION

Company shall interconnect distributed generation pursuant to Public Utility Commission of Texas Substantive Rules 25.211 and 25.212.

A customer seeking interconnection and parallel operation of distributed generation with Company must complete and submit the Application for Interconnection and Parallel Operation of Distributed Generation with the Utility System.

PRE-INTERCONNECTION STUDY FEE SCHEDULE

Pre-certified distributed generation units that are up to 500 kW that export not more than 15% of the total load on a single radial feeder and also contribute not more than 25% of the maximum potential short circuit current on a radial feeder are exempt from any pre-interconnection study fees. For all other DG applications, the study fees in the following table will apply.

	0-10 kW	10+ to 500 kW	500+ to 2000 kW	2000+kW
Non Exporting				
1. Pre-certified, not on network	\$0	\$200	\$400	\$600
2. Not pre-certified, not on network	\$ 100	\$300	\$540	\$704
3. Pre-certified, on network	\$100	\$400	\$1,000	\$2,000
4. Not pre-certified, on network	\$380	\$865	\$1,535	\$2,432
Exporting				
1. Pre-certified, not on network	\$75	\$300	\$1,000	\$2,000
2. Not pre-certified, not on network	\$150	\$635	\$1,205	\$2,182
3. Pre-certified, on network	\$160	\$767	\$2,377	\$2,878
4. Not pre-certified, on network	\$495	\$1,246	\$2,856	\$3,357

**6.3.2 APPLICATION FOR INTERCONNECTION AND
PARALLEL OPERATION OF DISTRIBUTED
GENERATION**

**Proxy of Prescribed Form for the Application for Interconnection and Parallel Operation of
Distributed Generation**

Customers seeking to interconnect distributed generation with the utility system will complete and file with the company the following Application for Parallel Operation:

**APPLICATION FOR INTERCONNECTION AND
PARALLEL OPERATION OF DISTRIBUTED GENERATION**

Return Completed Application to:

AEP Texas
Attention: Customer Service Dept.
P.O. Box 2121
Corpus Christi, Texas 78403-2121

Customer's Name: _____

Address: _____

Contact Person: _____

Email Address: _____

Telephone Number: _____

Service Point Address: _____

ESI ID: _____

Information Prepared and Submitted By: _____

(Name and Address) _____

Signature _____

**APPLICATION FOR INTERCONNECTION AND PARALLEL OPERATION
OF DISTRIBUTED GENERATION (CONTINUED)**

The following information shall be supplied by the Customer or Customer's designated representative. All applicable items must be accurately completed in order that the Customer's generating facilities may be effectively evaluated by AEP Texas for interconnection with the utility system.

GENERATOR

Number of Units: _____

Manufacturer: _____

**Note: The manufacturer's initial warranty must be for no less than 5 years.
Please attach a copy of Manufacturer's Warranty to Application.**

Type (Synchronous, Induction, or Inverter): _____

Fuel Source Type (Solar, Natural Gas, Wind, etc.): _____

Kilowatt Rating (95° F at location): _____

Kilovolt-Ampere Rating (95° F at location): _____

Power Factor: _____

Voltage Rating: _____

Number of Phases: _____

Frequency: _____

Do you plan to export power: _____ Yes / _____ No

(Note: Exporting power requires special metering and the utility can assess a fee for providing that metering)

If Yes, maximum amount expected: _____

Do you wish AEP Texas to report excess generation to your REP?

_____ Yes / _____ No

Pre-Certification Label or Type Number (e.g., UL-1741 Utility Interactive or IEEE 1547.1): _____

Expected Energization and Start-up Date: _____

Normal operation of interconnection: (examples: provide power to meet base load, demand management, standby, back-up, other (please describe)) _____

**APPLICATION FOR INTERCONNECTION AND PARALLEL OPERATION
OF DISTRIBUTED GENERATION (CONTINUED)**

One-line diagram attached: _____ Yes

For systems not using pre-certified inverters (e.g., inverters certified to UL-1741 or IEEE 1547.1), does AEP Texas have the dynamic modeling values from the generator manufacturer? ____ Yes ____ No

If not, please explain: _____

[Note: For pre-certified equipment the answer is Yes. Otherwise, applicant must provide the dynamic modeling values if they are available)

Layout sketch showing lockable, "visible" disconnect device is attached: _____ Yes

Authorized Release of Information List

By signing this Application in the space provided below, Customer authorizes AEP Texas to release Customer's proprietary information to the extent necessary to process this Application to the following persons:

	Name	Phone Number	Email Address
Project Manager			
Electrical Contractor			
Consultant			
Other			

AEP Texas

[CUSTOMER NAME]

BY: _____

BY: _____

PRINTED NAME:

PRINTED NAME:

TITLE: _____

TITLE: _____

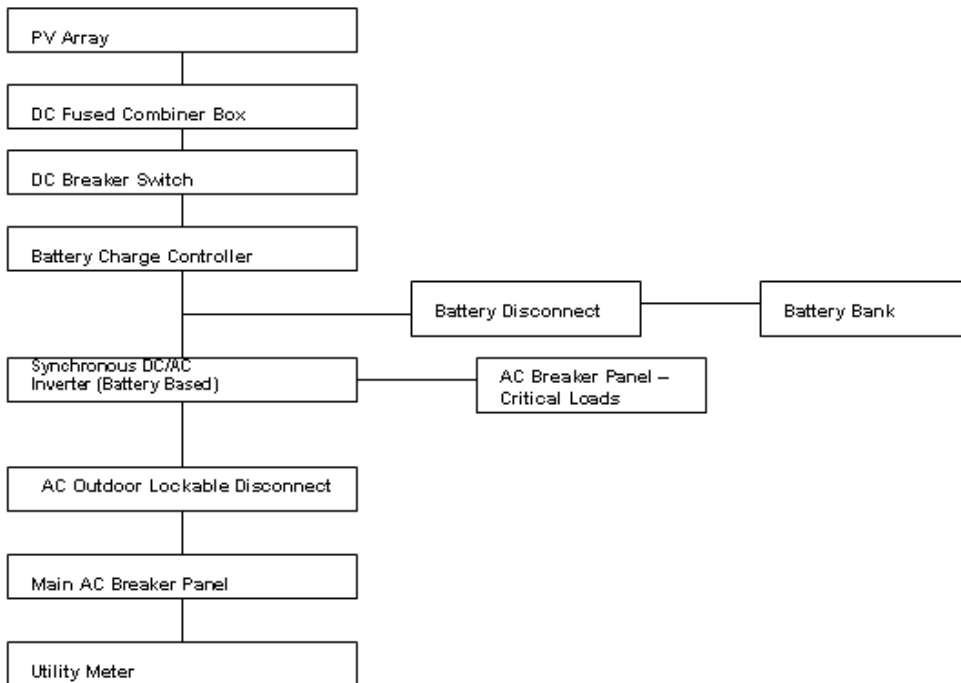
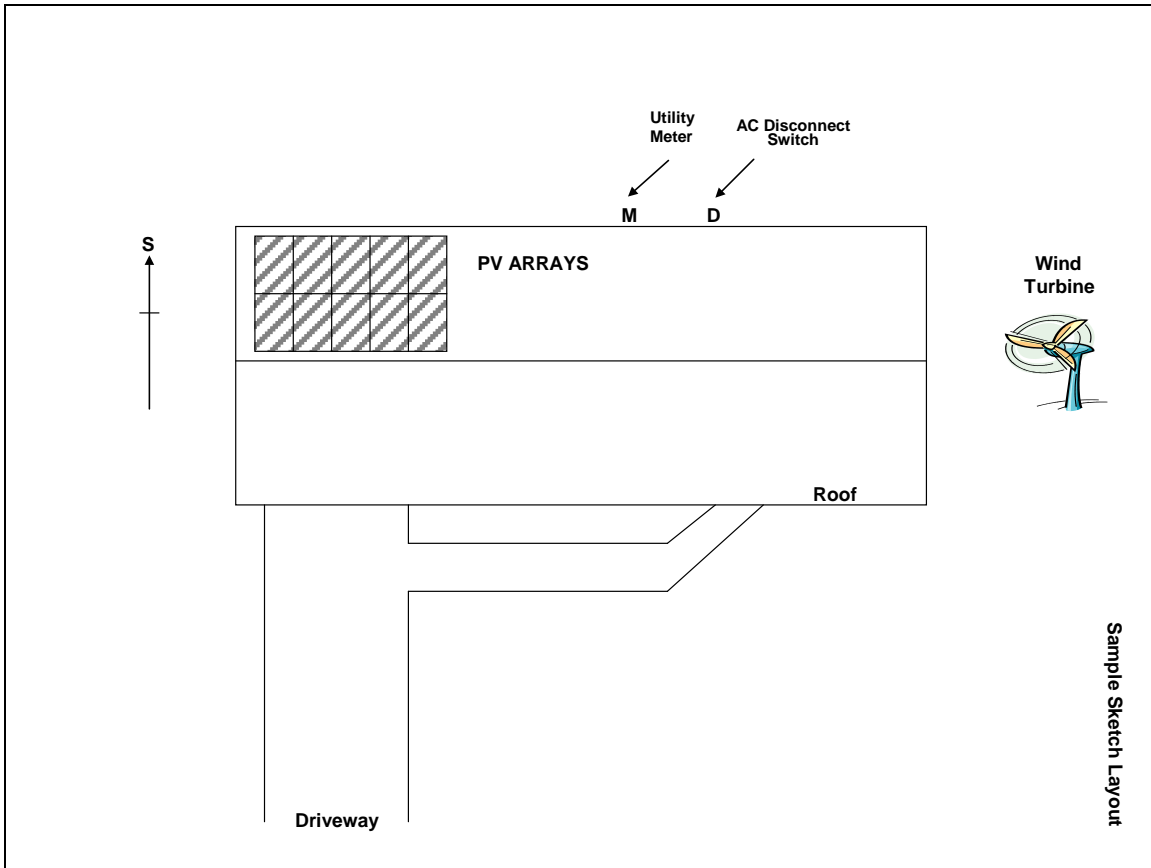
DATE: _____

DATE: _____

Items needed to accompany the Application for Interconnection:

- One line wiring diagram
- Spec sheet for the inverter
- Spec sheet for the turbine or modules
- Site drawing or sketch that includes the location of the existing AEP meter, where the Required AC disconnect (Blade Type, not a breaker) will be located and where the modules or turbine(s) are located
- Proof of 5-year warranty on the modules, turbine and inverter

Example of One-line Diagram and Layout Sketch (attach to Application)



6.3.3 AGREEMENT FOR INTERCONNECTION AND PARALLEL OPERATION OF DISTRIBUTED GENERATION

This Interconnection Agreement (“Agreement”) is made and entered into this _____ day of _____, _____, by AEP Texas (Company”), and _____ (“Customer”), a _____ [specify whether corporation, and if so name state, municipal corporation, cooperative corporation, or other], each hereinafter sometimes referred to individually as “Party” or both referred to collectively as the “Parties.” In consideration of the mutual covenants set forth herein, the Parties agree as follows:

1. **Scope of Agreement** -- This Agreement is applicable to conditions under which Company and Customer agree that one or more generating facility or facilities of ten megawatts or less and related interconnecting facilities to be interconnected at less than 60 kilovolts (“Facilities”) may be interconnected to Company’s facilities, as described in Exhibit A.

2. **Establishment of Point(s) of Interconnection** -- Company and Customer agree to interconnect Facilities at the locations specified in this Agreement, in accordance with Public Utility Commission of Texas (Commission”) Substantive Rules 25.211, relating to Interconnection of Distributed Generation, and 25.212, relating to Technical requirements for Interconnection and Parallel Operation of On-Site Distributed Generation, (16 Texas Administrative Code §25.211 and §25.212) (the “Rules”) or any successor rule addressing distributed generation and as described in the attached Exhibit A (the “Point(s) of Interconnection”).

3. **Responsibilities of Company and Customer** -- Customer shall, at its own cost and expense, operate, maintain, repair, and inspect, and shall be fully responsible for, Facilities specified on Exhibit A. Customer shall conduct operations of its Facilities in compliance with all aspects of the Rules, and Company shall conduct operations on its facilities in compliance with all aspects of the Rules, and as further described and mutually agreed to in the applicable Facility Schedule. Maintenance of Facilities shall be performed in accordance with the applicable manufacturer’s recommended maintenance schedule. Customer agrees to cause Facilities to be constructed in accordance with specifications equal to or greater than those provided by the National Electrical Safety Code, approved by the American National Standards Institute, in effect at the time of construction.

Each Party covenants and agrees to design, install, maintain, and operate, or cause the design, installation, maintenance, and operation of, its facilities so as to reasonably minimize the likelihood of a disturbance, originating in facilities of one Party, affecting or impairing the facilities of the other Party, or other facilities with which Company is interconnected.

Company shall notify Customer if there is evidence that operation of Facilities causes disruption or deterioration of service to other utility customers or if the operation of Facilities causes damage to Company's facilities or other facilities with which Company is interconnected. Company and Customer shall work cooperatively and promptly to resolve the problem.

Customer shall notify Company of any emergency or hazardous condition or occurrence with Facilities which could affect safe operation of Company's facilities or other facilities with which Company is interconnected.

Customer shall provide Company at least 14 days' written notice of a change in ownership or cessation of operations of one of more Facilities.

4. **Limitation of Liability and Indemnification**

- a. *Notwithstanding any other provision in this Agreement, with respect to Company's provision of electric service to Customer other than the interconnections service addressed by this Agreement, Company's liability to Customer shall be limited as set forth in Section 5.2 of Company's Commission-approved tariffs, which are incorporated herein by reference.*
- b. *Neither Company nor Customer shall be liable to the other for damages for anything that is beyond such Party's control, including an act of God, labor disturbance, act of a public enemy, war, insurrection, riot, fire, storm or flood, explosion, breakage or accident to machinery or equipment, a curtailment, order, or regulation or restriction imposed by governmental, military, or lawfully established civilian authorities, or the making of necessary repairs upon the property or equipment of either party.*
- c. *Notwithstanding Paragraph 4.b of this Agreement, Company shall assume all liability for and shall indemnify Customer for any claims, losses, costs, and expenses of any kind or character to the extent that they result from Company's negligence in connection with the design, construction, or operation of its Facilities as described on Exhibit A; provided, however, that Company shall have no obligation to indemnify Customer for claims brought by claimants who cannot recover directly from Company. Such indemnity shall include, but is not limited to, financial responsibility for: (a) Customer's monetary losses; (b) reasonable costs and expenses of defending an action or claim made by a third person; (c) damages related to the death or injury of a third person; (d) damages to the property of Customer; (e) damages to the property of a third person; (f) damages for the disruption of the business of a third person. In no event shall Company be liable for consequential, special, incidental, or punitive damages, including, without limitation, loss of profits, loss of revenue, or loss of production. The Company does not assume liability for any costs for damages arising from the disruption of the business of Customer or for Customer's costs and expenses of prosecuting or defending an action or claim against Company. This paragraph does not create a*

liability on the part of Company to Customer or a third person, but requires indemnification where such liability exists. The limitations of liability provided in this paragraph do not apply in cases of gross negligence or intentional wrongdoing.

d. *Please check the appropriate box.*

Private Entity

Notwithstanding Paragraph 4.b of this Agreement, Customer shall assume all liability for and shall indemnify Company for any claims, losses, costs, and expenses of any kind or character to the extent that they result from Customer's negligence in connection with the design, construction, or operation of Facilities as described on Exhibit A; provided, however, that Customer shall have no obligation to indemnify Company for claims brought by claimants who cannot recover directly from Customer. Such indemnity shall include, but is not limited to, financial responsibility for: (a) Company's monetary losses; (b) reasonable costs and expenses of defending an action or claim made by a third person; (c) damages related to the death or injury of a third person; (d) damages to the property of Company; (e) damages to the property of a third person; (f) damages for the disruption of the business of a third person. In no event shall Customer be liable for consequential, special, incidental, or punitive damages, including, without limitation, loss of profits, loss of revenue, or loss of production. The Customer does not assume liability for any costs for damages arising from the disruption of the business of Company or for Company's costs and expenses of prosecuting or defending an action or claim against Customer. This paragraph does not create a liability on the part of Customer to Company or a third person, but requires indemnification where such liability exists. The limitations of liability provided in this paragraph do not apply in cases of gross negligence or intentional wrongdoing.

Federal Agency

Notwithstanding Paragraph 4.b of this Agreement, the liability, if any, of Customer relating to this Agreement, for injury or loss of property, or personal injury or death shall be governed exclusively by the provisions of the Federal Tort Claims Act (28 U.S.C. §§ 1346, and 2671-2680). Subject to applicable federal, state, and local laws, each Party's liability to the other 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 damages actually incurred, and in no event shall either Party be liable to the other for any indirect, special, consequential, or punitive damages.

e. *Company and Customer shall each be responsible for the safe installation, maintenance, repair, and condition of their respective facilities on their respective sides of the Points of Interconnection. Company does not assume any duty of inspecting Customer's Facilities.*

f. For the mutual protection of Customer and Company, only with Company prior authorization are the connections between Company's service wires and Customer's service entrance conductors to be energized.

5. **Right of Access, Equipment Installation, Removal & Inspection** -- Upon reasonable notice, Company may send a qualified person to the premises of Customer at or immediately before the time Facilities first produce energy to inspect the interconnection, and observe Facilities' commissioning (including any testing), startup, and operation for a period of up to three days after initial startup of Facilities.

Following the initial inspection process described above, at reasonable hours, and upon reasonable notice, or at any time without notice in the event of an emergency or hazardous condition, Company shall have access to Customer's premises for any reasonable purpose in connection with the performance of the obligations imposed on it by this Agreement or if necessary to meet its legal obligation to provide service to its customers.

6. **Disconnection of Facilities** -- Customer retains the option to disconnect from Company's facilities. Customer shall notify Company of its intent to disconnect by giving Company at least thirty days' written notice. Such disconnection shall not be a termination of this Agreement unless Customer exercises rights under Section 7.

Customer shall disconnect Facilities from Company's facilities upon the effective date of any termination under Section 7.

Subject to Commission Rule, for routine maintenance and repairs of Company's facilities, Company shall provide Customer with seven business days' notice of service interruption.

Company shall have the right to suspend service in cases where continuance of service to Customer will endanger persons or property. During the forced outage of Company's facilities serving Customer, Company shall have the right to suspend service to effect immediate repairs of Company's facilities, but Company shall use its best efforts to provide the Customer with reasonable prior notice.

7. **Effective Term and Termination Rights** -- This Agreement becomes effective when executed by both Parties and shall continue in effect until terminated. The Agreement may be terminated for the following reasons: (a) Customer may terminate this Agreement at any time, by giving Company sixty days' written notice; (b) Company may terminate upon failure by Customer to generate energy from Facilities in parallel with Company's facilities within twelve months after completion of the interconnection; (c) either Party may terminate by giving the other Party at least sixty days' written notice that the other Party is in default of any of the material terms and conditions of the Agreement, so long as the notice specifies the basis for termination and there is reasonable opportunity to cure the default; or (d) Company may terminate by giving

Customer at least sixty days' written notice if possible in the event that there is a material change in an applicable rule or statute that necessitates termination of this Agreement.

8. **Governing Law and Regulatory Authority** -- *Please check the appropriate box.*

Private Entity: This Agreement was executed in the State of Texas and must in all respects be governed by, interpreted, construed, and enforced in accordance with the laws thereof. This Agreement is subject to, and the Parties' obligations hereunder include, operating in full compliance with all valid, applicable federal, state, and local laws or ordinances, and all applicable rules, regulations, orders of, and tariffs approved by, duly constituted regulatory authorities having jurisdiction.

Federal Agency: This Agreement was executed in the State of Texas and, to the extent not inconsistent with all applicable federal law (including, but not limited to: (a) the Anti-Deficiency Acts, 31 USC §§1341, 1342 and 1501-1519; (b) the Tort Claims Act, 28 USC Chapter 171, §§2671-2680, and 28 CFR Part 14; and (c) the Contract Disputes Act of 1978, as amended, 41 USC §§601-613), must in all respects be governed by, interpreted, construed, and enforced in accordance with the laws thereof. This Agreement is subject to, and the Parties' obligations hereunder include, operating in full compliance with all valid, applicable federal, state, and local laws or ordinances, and all applicable rules, regulations, orders of, and tariffs approved by, duly constituted regulatory authorities having jurisdiction.

9. **Amendment** -- This Agreement may be amended only upon mutual agreement of the Parties, which amendment will not be effective until reduced to writing and executed by the Parties.

10. **Entirety of Agreement and Prior Agreements Superseded** -- This Agreement, including the attached Exhibit A and Facility Schedules, which are expressly made a part hereof for all purposes, constitutes the entire agreement and understanding between the Parties with regard to the interconnection of the facilities of the Parties at the Points of Interconnection expressly provided for in this Agreement. The Parties are not bound by or liable for any statement, representation, promise, inducement, understanding, or undertaking of any kind or nature (whether written or oral) with regard to the subject matter hereof not set forth or provided for herein. This Agreement replaces all prior agreements and undertakings, oral or written, between the Parties with regard to the subject matter hereof, including without limitation _____ [specify any prior agreements being superseded], and all such agreements and undertakings are agreed by the Parties to no longer be of any force or effect. It is expressly acknowledged that the Parties may have other agreements covering other services not expressly provided for herein, which agreements are unaffected by this Agreement.

11. **Written Notices** -- Written notices given under this Agreement are deemed to have been duly delivered if hand delivered or sent by United States certified mail, return receipt requested, postage prepaid, to:

(a) If to Company:

(b) If to Customer:

The above-listed names, titles, and addresses of either Party may be changed by written notification to the other, notwithstanding Section 10.

12. **Invoicing and Payment** -- Invoicing and payment terms for services associated with this agreement shall be consistent with applicable Substantive Rules of the Commission.

13. **No Third-Party Beneficiaries** -- This Agreement is not intended to and does not create rights, remedies, or benefits of any character whatsoever in favor of any persons, corporations, associations, or entities other than the Parties, and the obligations herein assumed are solely for the use and benefit of the Parties, their successors in interest and, where permitted, their assigns.

14. **No Waiver** -- The failure of a Party to this Agreement to insist, on any occasion, upon strict performance of any provision of this Agreement will not be considered to waive the obligations, rights, or duties imposed upon the Parties.

15. **Headings** -- The descriptive headings of the various parts of this Agreement have been inserted for convenience of reference only and are to be afforded no significance in the interpretation or construction of this Agreement.

16. **Multiple Counterparts** -- This Agreement may be executed in two or more counterparts, each of which is deemed an original but all constitute one and the same instrument.

IN WITNESS WHEREOF, the Parties have caused this Agreement to be signed by their respective duly authorized representatives.

AEP Texas

[CUSTOMER NAME]

By: _____

By: _____

Printed Name

Printed Name

Title: _____

Title: _____

Date: _____

Date: _____

SAMPLE

**AGREEMENT FOR INTERCONNECTION AND PARALLEL OPERATION OF
DISTRIBUTED GENERATION**

EXHIBIT A

LIST OF FACILITY SCHEDULES AND POINTS OF INTERCONNECTION

Facility Schedule No.

Name of Point of Interconnection

SAMPLE

[Insert Facility Schedule number and name for each Point of Interconnection]

FACILITY SCHEDULE NO. _____

[The following information is to be specified for each Point of Interconnection, if applicable.]

1. Customer Name:

2. Premises Owner Name:

3. Facility location:

4. Delivery voltage:

5. Metering (voltage, location, losses adjustment due to metering location, and other):
A dual-register meter will be required if Customer wants to export surplus power into the market. Dual-Register Meter is desired: _____ Yes / _____ No

6. Normal Operation of Interconnection: **Used for internal load requirements**

7. One line diagram attached (check one): _____ Yes / _____ No

If Yes, then the one-line drawing should show the most current drawing(s) available as of the signing of this Schedule. Company and Customer agree drawings(s) may be updated to meet as-built or design changes that occur during construction. Customer understands and agrees that any changes that substantially affect the protective or functional requirements required by the Company will need to be reviewed and accepted by Company.

8. Equipment to be furnished by Company: **Company will provide the requested metering.**
(This section is intended to generally describe equipment to be furnished by Company to effectuate the interconnection and may not be a complete list of necessary equipment.)

9. Equipment to be furnished by Customer: **It is the Customer's responsibility to pay appropriate fee for the metering to record power delivered to the AEP system.**

(This section is intended to describe equipment to be furnished by Customer to effectuate the interconnection and may not be a complete list of necessary equipment.)

10. Cost Responsibility and Ownership and Control of Company Facilities:

Unless otherwise agreed or prescribed by applicable regulatory requirements or other law, any payments received by Company from Customer will remain the property of Company. Company shall at all times have title and complete ownership and control over facilities installed by Company. **Customer needs to pay \$_____**

11. Modifications to Customer Facilities:

Customer understands and agrees that, before making any modifications to its Facilities that substantially affect the protective or interconnection parameters or requirements used in the interconnection process (including in an Pre-interconnection Study performed by Company), Customer will both notify Company of, and receive approval by Company for, such modifications. Customer further understands and agrees that, if required pursuant to Commission Substantive Rule 25.211(m)(5), it will submit a new Application for Interconnection and Parallel Operation request for the desired modifications.

12. Supplemental terms and conditions attached (check one): _____ Yes / _____ No

AEP Texas

_____ **[CUSTOMER NAME]**

By: _____

By: _____

Title: _____

Title: _____

Date: _____

Date: _____

Public Utility Commission of Texas
Rules for Interconnection of Distributed Generation

§25.211. Interconnection of On-Site Distributed Generation (DG). (effective 3/26/14 (P 41325))

- (a) **Application.** Unless the context indicates otherwise, this section and §25.212 of this title (relating to Technical Requirements for Interconnection and Parallel Operation of On-Site Distributed Generation) apply to an electric utility for all purposes except to the extent preempted by federal law. The only part of this section that applies to electric cooperatives is subsection (o) of this section.
- (b) **Purpose.** The purpose of this section includes stating the terms and conditions that govern the interconnection and parallel operation of both on-site distributed generation in order to implement Public Utility Regulatory Act (PURA) §39.101(b)(3) and a natural gas distributed generation facility in order to implement PURA §35.036. Sales of power by on-site distributed generation and natural gas distributed generation in the intrastate wholesale market are subject to §§25.191-25.203 of this title (relating to Open-Access Comparable Transmission Service for Electrical Utilities in the Electric Reliability Council of Texas).
- (c) **Definitions.** The following words and terms when used in this section and §25.212 of this title shall have the following meanings, unless the context indicates otherwise:
- (1) **Application for interconnection and parallel operation or application** -- The form of application prescribed in subsection (q) of this section.
 - (2) **Company** -- An electric utility operating a distribution system.
 - (3) **Customer** -- Any entity interconnected to the company's utility system for the purpose of receiving or exporting electric power from or to the company's utility system.
 - (4) **Distributed natural gas generation facility** -- A facility installed on the customer's side of the meter that uses natural gas to generate not more than 2,000 kilowatts of electricity.
 - (5) **Facility** -- An electrical generating installation consisting of one or more on-site distributed generation units, including a distributed natural gas generation facility. The total capacity of the installation's on-site distributed generation units may exceed ten megawatts (MW); however, no more than ten MW of the installation's capacity will be interconnected at any point in time at the point of common coupling under this section.
 - (6) **Interconnection** -- The physical connection of distributed generation to the utility system in accordance with the requirements of this section so that parallel operation can occur.
 - (7) **Interconnection agreement** -- The form of agreement prescribed in subsection (p) of this section. The interconnection agreement sets forth the contractual conditions under which a company and a customer agree that one or more facilities may be interconnected with the company's utility system.
 - (8) **Inverter-based protective function** -- A function of an inverter system, carried out using hardware and software, that is designed to prevent unsafe operating conditions from occurring before, during, and after the interconnection of an inverter-based static power converter unit with a utility system. For purposes of this definition, unsafe operating conditions are conditions that, if left uncorrected, would result in harm to personnel, damage to equipment, unacceptable system instability or operation outside legally established parameters affecting the quality of service to other customers connected to the utility system.
 - (9) **Network service** -- Network service consists of two or more utility primary distribution feeder sources electrically tied together on the secondary (or low voltage) side to form one power source for one or more customers. The service is designed to maintain service to the customers even after the loss of one of these primary distribution feeder sources.
 - (10) **On-site distributed generation (or distributed generation)** -- An electrical generating facility located at a customer's point of delivery (point of common coupling) of ten megawatts (MW) or less and connected at a voltage less than 60 kilovolts (kV) which may be connected in parallel operation to the utility system.
 - (11) **Parallel operation** -- The operation of on-site distributed generation while the customer is connected to the company's utility system.
 - (12) **Point of common coupling** -- The point where the electrical conductors of the company utility system are connected to the customer's conductors and where any transfer of electric

power between the customer and the utility system takes place, such as switchgear near the meter.

- (13) **Pre-certified equipment** -- A specific generating and protective equipment system or systems that have been certified as meeting the applicable parts of this section relating to safety and reliability by an entity approved by the commission.
 - (14) **Pre-interconnection study** -- A study or studies that may be undertaken by a company in response to its receipt of a completed application for interconnection and parallel operation with the utility system. Pre-interconnection studies may include, but are not limited to, service studies, coordination studies and utility system impact studies.
 - (15) **Stabilized** -- A company utility system is considered stabilized when, following a disturbance, the system returns to the normal range of voltage and frequency for a duration of two minutes or a shorter time as mutually agreed to by the company and customer.
 - (16) **Tariff for interconnection and parallel operation of distributed generation** -- The tariff for interconnection and parallel operation of distributed generation prescribed in subsection (q) of this section.
 - (17) **Unit** -- A power generator.
 - (18) **Utility system** -- A company's distribution system below 60 kV to which the generation equipment is interconnected.
- (d) **Terms of Service.**
- (1) **Distribution line charge.** No distribution line charge shall be assessed to a customer for exporting energy to the utility system.
 - (2) **Interconnection operations and maintenance costs.** No charge for operation and maintenance of a utility system's facilities shall be assessed against a customer for exporting energy to the utility system.
 - (3) **Transmission charges.** No transmission charges shall be assessed to a customer for exporting energy. For purposes of this paragraph, the term transmission charges means transmission access and line charges, transformation charges, and transmission line loss charges.
 - (4) **New or amended interconnection agreements.** A new or amended interconnection agreement entered into 30 or more days after the commission's approval of an electric utility's compliance tariff filed pursuant to paragraph (5) of this subsection shall meet the requirements of this section.
 - (5) **Tariffs.** Not later than 30 days after the effective date of this amended section, an electric utility shall file with the commission for approval tariff amendments to comply with this amended section, including subsections (p) and (q) of this section. An electric utility shall include in its tariff the fees for interconnection studies. An electric utility that sells electricity shall also include back-up, supplemental, and maintenance power services for distributed generation in its tariff.
- (e) **Disconnection and reconnection.** A utility may disconnect a distributed generation unit from the utility system under the following conditions:
- (1) **Expiration or termination of interconnection agreement.** The interconnection agreement specifies the effective term and termination rights of company and customer. Upon expiration or termination of the interconnection agreement with a customer, in accordance with the terms of the agreement, the utility may disconnect customer's facilities.
 - (2) **Non-compliance with the technical requirements specified in §25.212 of this title.** A utility may disconnect a distributed generation facility if the facility is not in compliance with the technical requirements specified in §25.212 of this title. Within two business days from the time the customer notifies the utility that the facility has been restored to compliance with the technical requirements of §25.212 of this title, the utility shall have an inspector verify such compliance. Upon such verification, the customer in coordination with the utility may reconnect the facility.
 - (3) **System emergency.** A utility may temporarily disconnect a customer's facility without prior written notice in cases where continued interconnection will endanger persons or property.

During the forced outage of a utility system, the utility shall have the right to temporarily disconnect a customer's facility to make immediate repairs on the utility's system. When possible, the utility shall provide the customer with reasonable notice and reconnect the customer as quickly as reasonably practical.

- (4) **Routine maintenance, repairs, and modifications.** A utility may disconnect a customer or a customer's facility with seven business days prior written notice of a service interruption for routine maintenance, repairs, and utility system modifications. The utility shall reconnect the customer as quickly as reasonably possible following any such service interruption.
 - (5) **Lack of approved application and interconnection agreement.** In order to interconnect distributed generation to a utility system, a customer must first submit to the utility an application for interconnection and parallel operation with the utility system and execute an interconnection agreement on the forms prescribed by the commission. The utility may refuse to connect or may disconnect the customer's facility if such application has not been received and approved.
- (f) **Incremental demand charges.** During the term of an interconnection agreement a utility may require that a customer disconnect its distributed generation unit and/or take it off-line as a result of utility system conditions described in subsection (e)(3) and (4) of this section. Incremental demand charges arising from disconnecting the distributed generator as directed by company during such periods shall not be assessed by company to the customer.
- (g) **Pre-interconnection studies for non-network interconnection of distributed generation.** A utility may conduct a service study, coordination study or utility system impact study prior to interconnection of a distributed generation facility. In instances where such studies are deemed necessary, the scope of such studies shall be based on the characteristics of the particular distributed generation facility to be interconnected and the utility's system at the specific proposed location. By agreement between the utility and its customer, studies related to interconnection of on-site distributed generation on the customer's premises may be conducted by a qualified third party.
- (1) **Distributed generation facilities for which no pre-interconnection study fees may be charged.** A utility may not charge a customer a fee to conduct a pre-interconnection study for pre-certified distributed generation units up to 500 kW that export not more than 15% of the total load on a single radial feeder and contribute not more than 25% of the maximum potential short circuit current on a single radial feeder.
 - (2) **Distributed generation facilities for which pre-interconnection study fees may be charged.** Prior to the interconnection of a distributed generation facility not described in paragraph (1) of this subsection, a utility may charge a customer a fee to offset its costs incurred in the conduct of a pre-interconnection study. In those instances where a utility conducts an interconnection study the following shall apply:
 - (A) The conduct of such pre-interconnection study shall take no more than four weeks;
 - (B) A utility shall prepare written reports of the study findings and make them available to the customer;
 - (C) The study shall consider both the costs incurred and the benefits realized as a result of the interconnection of distributed generation to the company's utility system; and
 - (D) The customer shall receive an estimate of the study cost before the utility initiates the study.
- (h) **Network interconnection of distributed generation.** Certain aspects of secondary network systems create technical difficulties that may make interconnection more costly to implement. In instances where customers request interconnection to a secondary network system, the utility and the customer shall use best reasonable efforts to complete the interconnection and the utility shall utilize the following guidelines:
- (1) A utility shall approve applications for distributed generation facilities that use inverter-based protective functions unless total distributed generation (including the new facility) on

affected feeders represents more than 25% of the total load of the secondary network under consideration.

- (2) A utility shall approve applications for other on-site generation facilities whose total generation is less than the local customer's load unless total distributed generation (including the new facility) on affected feeders represents more than 25% of the total load of the secondary network under consideration.
 - (3) A utility may postpone processing an application for an individual distributed generation facility under this section if the total existing distributed generation on the targeted feeder represents more than 25% of the total load of the secondary network under consideration. If that is the case, the utility should conduct interconnection and network studies to determine whether, and in what amount, additional distributed generation facilities can be safely added to the feeder or accommodated in some other fashion. These studies should be completed within six weeks, and application processing should then resume.
 - (4) A utility may reject applications for a distributed generation facility under this section if the utility can demonstrate specific reliability or safety reasons why the distributed generation should not be interconnected at the requested site. However, in such cases the utility shall work with the customer to attempt to resolve such problems to their mutual satisfaction.
 - (5) A utility shall make all reasonable efforts to seek methods to safely and reliably interconnect distributed generation facilities that will export power. This may include switching service to a radial feed if practical and if acceptable to the customer.
- (i) **Pre-Interconnection studies for network interconnection of distributed generation.** Prior to charging a pre-interconnection study fee for a network interconnection of distributed generation, a utility shall first advise the customer of the potential problems associated with interconnection of distributed generation with its network system. For potential interconnections to network systems there shall be no pre-interconnection study fee assessed for a facility with inverter systems under 20 kW. For all other facilities the utility may charge the customer a fee to offset its costs incurred in the conduct of the pre-interconnection study. In those instances where a utility conducts an interconnection study, the following shall apply:
- (1) The conduct of such pre-interconnection studies shall take no more than four weeks;
 - (2) A utility shall prepare written reports of the study findings and make them available to the customer;
 - (3) The studies shall consider both the costs incurred and the benefits realized as a result of the interconnection of distributed generation to the utility's system; and
 - (4) The customer shall receive an estimate of the study cost before the utility initiates the study.
- (j) **Communications concerning proposed distributed generation projects.** In the course of processing applications for interconnection and parallel operation and in the conduct of pre-interconnection studies, customers shall provide the utility detailed information concerning proposed distributed generation facilities. Such communications concerning the nature of proposed distributed generation facilities shall be made subject to the terms of §25.84 of this title (relating to Annual Reporting of Affiliate Transactions for Electric Utilities), §25.272 of this title (relating to Code of Conduct for Electric Utilities and their Affiliates), and §25.273 of this title (relating to Contracts between Electric Utilities and their Competitive Affiliates). A utility and its affiliates shall not use such knowledge of proposed distributed generation projects submitted to it for interconnection or study to prepare competing proposals to the customer that offer either discounted rates in return for not installing the distributed generation, or offer competing distributed generation projects.
- (k) **Equipment pre-certification.**
- (1) **Entities performing pre-certification.** The commission may approve one or more entities that shall pre-certify equipment as defined pursuant to this section.
 - (2) **Standards for entities performing pre-certification.** Testing organizations and/or facilities capable of analyzing the function, control, and protective systems of distributed generation units may request to be certified as testing organizations.
 - (3) **Effect of pre-certification.** Distributed generation units which are certified to be in compliance by an approved testing facility or organization as described in this subsection

shall be installed on a company utility system in accordance with an approved interconnection control and protection scheme without further review of their design by the utility.

- (l) **Designation of utility contact persons for matters relating to distributed generation interconnection.**
 - (1) Each electric utility shall designate a person or persons who will serve as the utility's contact for all matters related to distributed generation interconnection.
 - (2) Each electric utility shall identify to the commission its distributed generation contact person.
 - (3) Each electric utility shall provide convenient access through its internet web site to the names, telephone numbers, mailing addresses and electronic mail addresses for its distributed generation contact person.

- (m) **Time periods for processing applications for interconnection and parallel operation.** In order to apply for interconnection the customer shall provide the utility a completed application for interconnection and parallel operation. The interconnection of distributed generation shall take place within the following schedule:
 - (1) For a facility with pre-certified equipment, interconnection shall take place within four weeks of the utility's receipt of a completed application.
 - (2) For other facilities, interconnection shall take place within six weeks of the utility's receipt of a completed application.
 - (3) If interconnection of a particular facility will require substantial capital upgrades to the utility system, the company shall provide the customer an estimate of the schedule and customer's cost for the upgrade. If the customer desires to proceed with the upgrade, the customer and the company will enter into a contract for the completion of the upgrade. The interconnection shall take place no later than two weeks following the completion of such upgrades, except in situations in which a customer is not able to connect within two weeks following the completion of such upgrades, this time may be extended by agreement of the electric utility and the customer. The utility shall employ best reasonable efforts to complete such system upgrades in the shortest time reasonably practical.
 - (4) A utility shall use best reasonable efforts to interconnect facilities within the time frames described in this subsection. If in a particular instance, a utility determines that it cannot interconnect a facility within the time frames stated in this subsection, it will notify the applicant in writing of that fact. The notification will identify the reason or reasons interconnection could not be performed in accordance with the schedule and provide an estimated date for interconnection.
 - (5) All applications for interconnection and parallel operation shall be processed by the utility in a non-discriminatory manner. Applications shall be processed in the order that they are received. It is recognized that certain applications may require minor modifications while they are being reviewed by the utility. Such minor modifications to a pending application shall not require that it be considered incomplete and treated as a new or separate application.

- (n) **Reporting requirements.** Each electric utility shall maintain records concerning applications received for interconnection and parallel operation of distributed generation. Such records will include the name of the applicant, the business address of the applicant, and the location of the proposed facility by county, the capacity rating of the facility in kilowatts, whether the facility is a renewable energy resource as defined in §25.173 of this title (relating to Goal for Renewable Energy), the date each application is received, documents generated in the course of processing each application, correspondence regarding each application, and the final disposition of each application. The owner of a distributed generation facility that is interconnected under this section shall report to the utility any change in ownership of the facility and the cessation of operations of a facility within 14 days of such change. By March 30 of each year, every electric utility shall file with the commission a distributed generation interconnection report for the preceding calendar year that

identifies each distributed generation facility interconnected with the utility's distribution system. The report shall list the new distributed generation facilities interconnected with the system since the previous year's report, any change in ownership or the cessation of operations of any distributed generation that has been reported to the electric utility and not included in the previous report, the capacity of each facility and whether it is a renewable energy resource, and the feeder or other point on the company's utility system where the facility is connected. The annual report shall also identify all applications for interconnection received during the previous one-year period, and the disposition of such applications.

- (o) **Distributed natural gas generation facility.** This subsection, as well as the other subsections of this section, apply to a distributed natural gas generation facility. This subsection does not require an electric cooperative to transmit electricity to a retail point of delivery in the certificated area of the electric cooperative if the electric cooperative has not adopted customer choice. If there is a conflict between this subsection and another subsection of this section, this subsection controls.
 - (1) **Transmission.**
 - (A) **Electric utilities.** At the request of the owner or operator of a distributed natural gas generation facility, an electric utility shall allow the owner or operator of the facility to interconnect with and use transmission and distribution facilities to transmit electricity to another entity that is acceptable to the owner or operator in accordance with this section and the commission's rules for open-access comparable transmission service for electric utilities in ERCOT, §§25.191 - 25.203 of this title, or a tariff approved by the Federal Energy Regulatory Commission (FERC).
 - (B) **Electric cooperatives.** At the request of the owner or operator of a distributed natural gas generation facility, an electric cooperative shall allow the owner or operator of the facility to use transmission and distribution facilities to transmit the electric power to another entity that is acceptable to the owner or operator in accordance with the commission's rules for open-access comparable transmission service for electric utilities in ERCOT, §§25.191 - 25.203 of this title, or a tariff approved by FERC.
 - (2) **Interconnection Disputes.** If an electric utility or electric cooperative seeks to recover from the owner or operator of a distributed natural gas generation facility an amount that exceeds the amount in the estimate provided under PURA §35.036(e) by more than 5%, the commission shall resolve the dispute at the request of the owner or operator of the facility.
- (p) **Agreement for Interconnection and Parallel Operation of Distributed Generation.**
Figure: 16 TAC §25.211(p)
- (q) **Tariff for Interconnection and Parallel Operation of Distributed Generation.**
Figure: 16 TAC §25.211(q)

§25.212. Technical Requirements for Interconnection and Parallel Operation of On-Site Distributed Generation. (12/21/99)

- (a) **Purpose.** The purpose of this section is to describe the requirements and procedures for safe and effective connection and operation of distributed generation.
- (1) A customer may operate 60 Hertz (Hz), three-phase or single-phase generating equipment, whether qualifying facility (QF) or non-QF, in parallel with the utility system pursuant to an interconnection agreement, provided that the equipment meets or exceeds the requirements of this section.
 - (2) This section describes typical interconnection requirements. Certain specific interconnection locations and conditions may require the installation and use of more sophisticated protective devices and operating schemes, especially when the facility is exporting power to the utility system.
 - (3) If the utility concludes that an application for parallel operation describes facilities that may require additional devices and operating schemes, the utility shall make those additional requirements known to the customer at the time the interconnection studies are completed.
 - (4) Where the application of the technical requirements set forth in this section appears inappropriate for a specific facility, the customer and utility may agree to different requirements, or a party may petition the commission for a good cause exception, after making every reasonable effort to resolve all issues between the parties.
- (b) **General interconnection and protection requirements.**
- (1) The customer's generation and interconnection installation must meet all applicable national, state, and local construction and safety codes.
 - (2) The customer's generator shall be equipped with protective hardware and software designed to prevent the generator from being connected to a de-energized circuit owned by the utility.
 - (3) The customer's generator shall be equipped with the necessary protective hardware and software designed to prevent connection or parallel operation of the generating equipment with the utility system unless the utility system service voltage and frequency is of normal magnitude.
 - (4) Pre-certified equipment may be installed on a company's utility systems in accordance with an approved interconnection control and protection scheme without further review of their design by the utility. When the customer is exporting to the utility system using pre-certified equipment, the protective settings and operations shall be those specified by the utility.
 - (5) The customer will be responsible for protecting its generating equipment in such a manner that utility system outages, short circuits or other disturbances including zero sequence currents and ferroresonant over-voltages do not damage the customer's generating equipment. The customer's protective equipment shall also prevent unnecessary tripping of the utility system breakers that would affect the utility system's capability of providing reliable service to other customers.
 - (6) For facilities greater than two megawatts (MW), the utility may require that a communication channel be provided by the customer to provide communication between the utility and the customer's facility. The channel may be a leased telephone circuit, power line carrier, pilot wire circuit, microwave, or other mutually agreed upon medium.
 - (7) Circuit breakers or other interrupting devices at the point of common coupling must be capable of interrupting maximum available fault current. Facilities larger than two MW and exporting to the utility system shall have a redundant circuit breaker unless a listed device suitable for the rated application is used.

- (8) The customer will furnish and install a manual disconnect device that has a visual break that is appropriate to the voltage level (a disconnect switch, a draw-out breaker, or fuse block), and is accessible to the utility personnel, and capable of being locked in the open position. The customer shall follow the utility's switching, clearance, tagging, and locking procedures, which the utility shall provide for the customer.
- (c) **Prevention of interference.** To eliminate undesirable interference caused by operation of the customer's generating equipment, the customer's generator shall meet the following criteria:
- (1) **Voltage.** The customer will operate its generating equipment in such a manner that the voltage levels on the utility system are in the same range as if the generating equipment were not connected to the utility's system. The customer shall provide an automatic method of disconnecting the generating equipment from the utility system if a sustained voltage deviation in excess of +5.0 % or -10% from nominal voltage persists for more than 30 seconds, or a deviation in excess of +10% or -30% from nominal voltage persists for more than ten cycles. The customer may reconnect when the utility system voltage and frequency return to normal range and the system is stabilized.
 - (2) **Flicker.** The customer's equipment shall not cause excessive voltage flicker on the utility system. This flicker shall not exceed 3.0% voltage dip, in accordance with Institute of Electrical and Electronics Engineers (IEEE) 519 as measured at the point of common coupling.
 - (3) **Frequency.** The operating frequency of the customer's generating equipment shall not deviate more than +0.5 Hertz (Hz) or -0.7 Hz from a 60 Hz base. The customer shall automatically disconnect the generating equipment from the utility system within 15 cycles if this frequency tolerance cannot be maintained. The customer may reconnect when the utility system voltage and frequency return to normal range and the system is stabilized.
 - (4) **Harmonics.** In accordance with IEEE 519 the total harmonic distortion (THD) voltage shall not exceed 5.0% of the fundamental 60 Hz frequency nor 3.0% of the fundamental frequency for any individual harmonic when measured at the point of common coupling with the utility system.
 - (5) **Fault and line clearing.** The customer shall automatically disconnect from the utility system within ten cycles if the voltage on one or more phases falls below -30% of nominal voltage on the utility system serving the customer premises. This disconnect timing also ensures that the generator is disconnected from the utility system prior to automatic re-close of breakers. The customer may reconnect when the utility system voltage and frequency return to normal range and the system is stabilized. To enhance reliability and safety and with the utility's approval, the customer may employ a modified relay scheme with delayed tripping or blocking using communications equipment between customer and company.
- (d) **Control, protection and safety equipment requirements specific to single phase generators of 50 kilowatts (kW) or less connected to the utility's system.** Exporting to the utility system may require additional operational or protection devices and will require coordination of operations with the host utility. The necessary control, protection, and safety equipment specific to single-phase generators of 50 kW or less connected to secondary or primary systems include an interconnect disconnect device, a generator disconnect device, an over-voltage trip, an under-voltage trip, an over/under frequency trip, and a synchronizing check for synchronous and other types of generators with stand-alone capability.
- (e) **Control, protection and safety equipment requirements specific to three-phase synchronous generators, induction generators, and inverter systems.** This subsection specifies the control, protection, and safety equipment requirements specific to three phase synchronous generators, induction generators, and inverter systems. Exporting to the utility

system may require additional operational or protection devices and will require coordination of operations with the utility.

- (1) **Three phase synchronous generators.** The customer's generator circuit breakers shall be three-phase devices with electronic or electromechanical control. The customer is solely responsible for properly synchronizing its generator with the utility. The excitation system response ratio shall not be less than 0.5. The generator's excitation system(s) shall conform, as near as reasonably achievable, to the field voltage versus time criteria specified in American National Standards Institute Standard C50.13-1989 in order to permit adequate field forcing during transient conditions. For generating systems greater than two MW the customer shall maintain the automatic voltage regulator (AVR) of each generating unit in service and operable at all times. If the AVR is removed from service for maintenance or repair, the utility's dispatching office shall be notified.
- (2) **Three-phase induction generators and inverter systems.** Induction generation may be connected and brought up to synchronous speed (as an induction motor) if it can be demonstrated that the initial voltage drop measured on the utility system side at the point of common coupling is within the visible flicker stated in subsection (c)(2) of this section. Otherwise, the customer may be required to install hardware or employ other techniques to bring voltage fluctuations to acceptable levels. Line-commutated inverters do not require synchronizing equipment. Self-commutated inverters whether of the utility-interactive type or stand-alone type shall be used in parallel with the utility system only with synchronizing equipment. Direct-current generation shall not be operated in parallel with the utility system.
- (3) **Protective function requirements.** The protective function requirements for three phase facilities of different size and technology are listed below.
 - (A) Facilities rated ten kilowatts (kW) or less must have an interconnect disconnect device, a generator disconnect device, an over-voltage trip, an under-voltage trip, an over/under frequency trip, and a manual or automatic synchronizing check (for facilities with stand alone capability).
 - (B) Facilities rated in excess of ten kW but not more than 500 kW must have an interconnect disconnect device, a generator disconnect device, an over-voltage trip, an under-voltage trip, an over/under frequency trip, a manual or automatic synchronizing check (for facilities with stand alone capability), either a ground over-voltage trip or a ground over-current trip depending on the grounding system if required by the company, and reverse power sensing if the facility is not exporting (unless the generator is less than the minimum load of the customer).
 - (C) Facilities rated more than 500 kW but not more than 2,000 kW must have an interconnect disconnect device, a generator disconnect device, an over-voltage trip, an under-voltage trip, an over/under frequency trip, either a ground over-voltage trip or a ground over-current trip depending on the grounding system if required by the company, an automatic synchronizing check (for facilities with stand alone capability) and reverse power sensing if the facility is not exporting (unless the facility is less than the minimum load of the customer). If the facility is exporting power, the power direction protective function may be used to block or delay the under frequency trip with the agreement of the utility.
 - (D) Facilities rated more than 2,000 kW but not more than 10,000 kW must have an interconnect disconnect device, a generator disconnect device, an over-voltage trip, an under-voltage trip, an over/under frequency trip, either a ground over-voltage trip or a ground over-current trip depending on the grounding system if required by the company, an automatic synchronizing check and AVR for facilities with stand alone capability, and reverse power sensing if the facility is not exporting (unless the facility is less than the minimum load of the customer). If the facility is exporting power, the power direction protective function may be used to block or delay the under frequency trip with the agreement of the utility. A

telemetry/transfer trip may also be required by the company as part of a transfer tripping or blocking protective scheme.

- (f) **Facilities not identified.** In the event that standards for a specific unit or facility are not set out in this section, the company and customer may interconnect a facility using mutually agreed upon technical standards.
- (g) **Requirements specific to a facility paralleling for sixty cycles or less (closed transition switching).** The protective devices required for facilities ten MW or less which parallel with the utility system for 60 cycles or less are an interconnect disconnect device, a generator disconnect device, an automatic synchronizing check for generators with stand alone capability, an over-voltage trip, an under-voltage trip, an over/under frequency trip, and either a ground over-voltage trip or a ground over-current trip depending on the grounding system, if required by the utility.
- (h) **Inspection and start-up testing.** The customer shall provide the utility with notice at least two weeks before the initial energizing and start-up testing of the customer's generating equipment and the utility may witness the testing of any equipment and protective systems associated with the interconnection. The customer shall revise and re-submit the application with information reflecting any proposed modification that may affect the safe and reliable operation of the utility system.
- (i) **Site testing and commissioning.** Testing of protection systems shall include procedures to functionally test all protective elements of the system up to and including tripping of the generator and interconnection point. Testing will verify all protective set points and relay/breaker trip timing. The utility may witness the testing of installed switchgear, protection systems, and generator. The customer is responsible for routine maintenance of the generator and control and protective equipment. The customer will maintain records of such maintenance activities, which the utility may review at reasonable times. For generation systems greater than 500 kW, a log of generator operations shall be kept. At a minimum, the log shall include the date, generator time on, and generator time off, and megawatt and megavar output. The utility may review such logs at reasonable times.
- (j) **Metering.** Consistent with Chapter 25, Subchapter F of this title (relating to Metering), the utility may supply, own, and maintain all necessary meters and associated equipment to record energy purchases by the customer and energy exports to the utility system. The customer shall supply at no cost to the utility a suitable location on its premises for the installation of the utility's meters and other equipment. If metering at the generator is required in such applications, metering that is part of the generator control package will be considered sufficient if it meets all the measurements criteria that would be required by a separate stand alone meter.