

***Appendix H***

***Form Distribution Interconnection  
Process Documentation***

***For***

***2016 Request For Proposals***

***For***

***Long-Term Renewable  
Generation Resources***

***For***

***Entergy New Orleans, Inc.***

Entergy Services, Inc.  
July 13, 2016

## **APPENDIX H**

### **FORM DISTRIBUTION INTERCONNECTION PROCESS DOCUMENTATION**

Exhibits H-1, H-2, and H-3 contained within Appendix H, describe detailed information about the interconnection process for resources seeking to interconnect at a distribution service level, including applications for service. Additional information regarding distribution-level interconnection applications can be found in the Main Body sections 2.4 and 2.4.1.

Exhibit H-1, “Connecting Small Electric Generators to the Entergy Distribution System (less than 300kVA),” describes the requirements and procedures for safe and effective connection and operation of electric generators smaller than 300kV on the Company Distribution electric grid.

Exhibit H-2, “Connecting Large Electric Generators to the Entergy Distribution System (300kVA to 20MVA),” describes the requirements and procedures for safe and effective connection and operation of electric generators 300kVA to 20MVA on the Entergy Distribution electric system.

Exhibit H-3, “Distribution Inter-Connection Process,” describes the overall process for queuing, processing, executing, and maintaining Interconnection Agreements for Generators 20MW and smaller in size connecting to the Entergy System via Distribution.

**Exhibit H-1**  
**Connecting Small Electric Generators to the Entergy Distribution System**  
**(less than 300kVA)**

Title: Connecting Small Electric Generators to the Entergy Distribution System (less than 300kVA)		Effective Date: <b>May 04, 2016</b>
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## 1 Introduction

### 1.1 Purpose

A Customer may operate an Electric Generator at 60 Hertz (Hz), single- or three-phase at voltages up to and including 34.5 kV in parallel with the Company's Distribution Delivery System provided that the equipment meets or exceeds the requirements of Company standards.

The purpose of this standard is to describe the **requirements and procedures for safe and effective connection and operation of electric generators smaller than 300kVA** on the Company Distribution electric grid. Customers who have 300kVA to 20MVA generators to connect should refer to *Connecting Large Electric Generators to the Entergy Distribution System*. Customers larger than 20MVA or who would interconnect at Transmission level voltages (69 kV and above) should contact Entergy Transmission. Cost of interconnect, service, payment for electricity and other economic considerations are regulated by the governing Public Service Commission.

Special Rates are allowed by Utility Regulators for consumers who own and interconnect (generally small) renewable energy facilities, such as wind, solar power or home fuel cells. In some areas this is called Net Metering. . Consult the Entergy webpage of your franchise or the appropriate Public utility for details. (These Customers are described by Case 5 in Section 1.2 Scope)

If they do not meet the requirements above or want another option, FERC Qualifying facilities or small power producers also have special rates in each jurisdiction allowing them to sell power to the Company at avoided cost. Agreement from the Company is required to inject Electric Power onto the Company Distribution System.

**The process of Connection is started by a Customer submitting a completed Application (Available on the internet. Go to [www.entergy.com](http://www.entergy.com), select your state or jurisdiction, select residential and select Net Metering or contact 1 800 ENTERGY.) The Customer may request the vendor of the equipment or the electrician help fill out the application.** The third step is to contact your local Entergy Representative or call 1-800-ENTERGY to get a representative assigned.

#### 1.1.1 Operating Agreement Requirements

A written agreement (which is available from your Company Representative and on the Internet) will be required between the Company and the Customer specifying the liability provisions, indemnities, terms of payment of cost to modify Distribution Delivery System (if not paid in advance), and other items affecting service under this document. This agreement will explain in detail the authority

or responsibilities of the parties involved. **An Interconnection between the Company's Distribution Delivery System and a Customer's Electric Generator System will not be allowed prior to the execution of a written Standard Interconnection Agreement for the Facilities.**

Interconnected Electric Generators in Central Business District Grids is discussed in Section 3.8.11

### **1.1.2 Explicit Criteria for Parallel Operations**

Two objectives must be met to arrive at compliance by the proposed installation:

#### **1.1.2.1 Safety**

Customer's Electric Generators will be held to the same Standard of Care, as the Company is required to maintain. In addition, the safety of the general public and the personnel and equipment of the Company shall in no way be reduced or impaired as a result of the Interconnection.

- a Customer's Electrical Generator shall be equipped with Protective Functions designed to prevent the Generator from being connected to a de-energized circuit owned by the Company.
- b Customer's Electrical Generation Facility shall be equipped with the necessary Protective Functions designed to prevent connection or Parallel Operation of the Customer's facility with the Distribution Delivery System unless the Distribution Delivery System service voltage and frequency are of normal magnitude. The design of some systems provides these functions without adding equipment at the Point of Common Coupling (PCC). Each system not providing additional devices at the PCC must be shown to be capable of these functions.

#### **1.1.2.2 Customer Impact**

The quality, reliability and the availability of service to the Company's other Customers shall not be diminished or impaired as a result of the Interconnection.

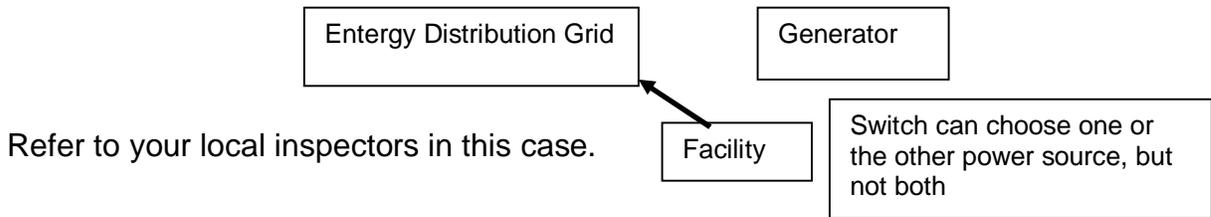
This standard describes typical connection requirements. Some installations, however, may require more extensive Interconnection Facilities, and will be addressed on a case by case basis. This is most likely to be required when several Customers desire to connect Electric Generators to the same transformer or on the same distribution feeder.

As specified in FERC Order 2006 10 kw and less UL1741 Listed Pre Certified - Inverter based units order will be accepted. Customers should supply that information as part of the application.

**1.2 Scope**

Distribution generation installed within Company’s service area will fall into one of seven scenarios:

Case 1.	<p>The Customer may build facilities that are NEVER connected to the Entergy distribution system some examples are:</p> <ul style="list-style-type: none"> <li>• An emergency generator. Where electric cords are run directly to this generator for essential lights and appliances.</li> <li>• A house with a switch, rated for the customers generator size that does not allow electricity to flow from the generator into the facility when the facility is connected to the grid.</li> </ul>
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Case 2.	<p>The Customer may build facilities that are connected to their building or internal electrical system and are not intended to be connected to the distribution system. The Customer shall supply a open and visible break verifiable by Company personnel. The location shall be on the outside of the facility accessible to Company personnel at all hours. A main disconnect in the off position qualifies as an open break. It is recommended that the customer tag the disconnect to help prevent accidental closing.</p> <p><b>Failure to have a visible break is reason for being disconnected,</b> and subjects Customer to liability for resulting injury to people or property.</p>
Case 3.	<p>The Customer may build facilities that are NOT NORMALLY connected to the distribution system. Total connection time is 10 CYCLES OR LESS (@60 cycles/second). All loads become displaced. Stand-by facilities may or may not be requested. No energy is sold or sent to the Company. This Case is covered in <i>Connecting Large Electric Generators to the Entergy Distribution System (300kVA to 20MVA)</i></p>
Case 4.	<p>The Customer may build facilities that are connected to the distribution system more than 10 cycles (may be hours, days, months, etc.). Some or the entire load becomes displaced. Stand-by facilities may or may not be requested. No energy is sold or sent to the Company.</p>

Case 5.	The Customer may build facilities that are normally connected to the distribution system. Some or the entire load becomes displaced. Stand-by facilities are requested. A contract is signed for selling energy to the Company. The Company is required to buy electricity from FERC Qualified facilities This Case includes Net Metering Customers. Consult the Company.
Case 6	The Customer may build facilities that are normally connected to the distribution system. The Customer has no on-site load. A contract is signed for selling energy output to the Company. The Company is required to buy electricity from FERC Qualified facilities. Consult the Company.
Case 7.	The Customer may build facilities that are normally connected to the distribution system. A contract is signed with the Company for wheeling or wholesaling all energy output. This Case is covered in <i>Connecting Large Electric Generators to the Entergy Distribution System (300kVA to 20MVA)</i> and Entergy Transmission Standard PM3901.

**2 Definitions**

Abnormal Operating Conditions – A situation in which the Company is operating the Distribution Delivery System in a manner inconsistent with normal configuration or under conditions that do not normally exist. Examples of abnormal operating conditions are times when the Company must switch distribution feeder circuits out of use for repairs and switch other alternate feeders into use to deliver energy to Customers.

Central Business District Grids, Spot Network Grids and Downtown Underground Radially Fed Installations (CBD) are typically located in downtown areas in New Orleans, Baton Rouge, Lake Charles, West Monroe, Beaumont, Jackson, Little Rock, Pine Bluff, and Hot Springs. The common CBD setup is to have two or more transformers, each connected to a separate feeder and paralleled on the low voltage side through network protectors associated with each transformer. These protectors are commonly configured so that a small amount of fault current (usually in the range of one Amp) will cause the protector to trip. Injecting electric power (with a generator) will have a negative effect on reliability. Also see Network Service

Company - Entergy operating subsidiaries within the United States boundaries.

Customer - Any entity interconnected to the Company’s Distribution Delivery System who takes electric service under one of Company’s rate schedules.

Displaced load - The Customer's entire electrical requirement or a portion of it that, except for the output of the Customer's Energy Facilities, would have been served by the Company.

Distribution Delivery System - The Company's wires, equipment, and facilities having a voltage of 34.5 kV or below to which the Customer's Facility is interconnected.

Interconnection - The physical connection of facilities to the Distribution Delivery System so that Parallel Operation can occur

Interconnection Agreement - The Standard Interconnection Agreement for Facilities. (Available on the internet. Go to [www.entergy.com](http://www.entergy.com), select your state or jurisdiction, select residential and select Net Metering or contact 1 800 ENTERGY.)

Interconnection Facilities - Facilities installed solely to interconnect the Customer's system with that of the Company to facilitate the exchange of power between the Customer's Energy Facilities and the Company's power system including, but not limited to, connection, transmission, distribution, engineering, transformation, switching, metering, and safety equipment. Interconnection Facilities shall include any additions and/or modifications to the Company's system deemed by the Company to be necessary.

Network Service - Two or more primary distribution feeder sources electrically connected on the secondary (or low voltage) side to form one power source for one or more Customers. This configuration is designed to maintain service to the Customers even after the loss of one of these primary distribution feeder sources. Also see Central Business District Grids.

Net metering is an electricity policy for consumers who own (generally small) renewable energy facilities, such as wind, solar power or home fuel cells. "Net", in this context, is used in the sense of meaning "what remains after deductions" — in this case, the deduction of any energy outflows from metered energy inflows. Under net metering, a system owner receives retail credit for the electricity they generate using electricity meters accurately recording electric flow in both directions. Consult the Entergy webpage of your franchise or the appropriate Public utility for details.

Small Interconnected Electric Generators Customer's Facility - Hardware and software installed to measure the energy flow both into and out of the Customer's facilities for the purpose of determining the usage for billing, if any.

Parallel Operation - The operation of Energy Facilities by a Customer physically and electrically interconnected to the Company's Distribution Delivery System.

Point of Common Coupling (PCC) - The point where transfer of any electric power between the Customer's facilities and the Company's Distribution Delivery System takes place, normally at the point of attachment.

Protective Function - Unsafe Operating Conditions shall be prevented from occurring before, during, and after the Interconnection of a Customer Electric Generator System with the Distribution Delivery System. This system typically uses hardware (including switching devices), relay protection schemes and software that and shall be designed to isolate the Customer's System or to disconnect it from the Distribution Delivery System under Unsafe Operating Conditions or outages.

Quality of Service - An operating state of the Distribution Delivery System that provides usable power to a Customer. This state of usable power includes the parameters specified for power factor, voltage surges and sags, voltage flicker, frequency and harmonics. For more information on these parameters, refer to the first page of this standard for these sections.

Renewable Electric Generator System - A system of hardware and software by which electric energy is generated using sun, wind, water, or biomass products as the source and as allowed to be interconnected to the Company's Distribution Delivery System.

Stabilized - The Distribution Delivery System is considered stabilized when, following a disturbance, the system returns to the normal range of voltage and frequency for duration of five minutes.

Standard of Care - A term defining the level of awareness to maintain workplace and public safety in the design, installation and operation of facilities which generate power.

System Protection Facilities - The equipment required to protect the Company's system and its other Customers' facilities from Unsafe Operating Conditions occurring at the Customer's Energy Facilities. The protection requirements shall be met at the Point of Common Coupling (PCC), although the devices and functions providing the Protective Functions can be located elsewhere.

Unsafe Operating Conditions - A situation that if left uncorrected would result in: (1) harm to any personnel or damage to any equipment, (2) unacceptable system stability or, (3) operation outside established parameters affecting the Quality of Service to other Customers connected to the Distribution Delivery System.

### 3 Details

#### 3.1 Available Voltage Systems

The Company's primary Distribution Delivery Systems available for parallel generation operations are of grounded wye. Generally, all voltage levels from 120/240 V to 34.5 kV single-phase or three-phase (except delta, open-wye and Central Business District Grids) are available for Interconnection. Delta and open-wye secondary voltage configurations require special evaluation prior to Interconnection. The voltage level available for connecting the Customer Electric Generator System in parallel with the system depends on the desired location on the Company's Distribution Delivery System and the size of the Customer's Electrical Generator Facility. **Interconnected Electric Generators in Central Business District Grids is discussed in Section 3.8.11**

#### 3.2 Manually Operated Load Break Switch /Labeling/ Reasons for Disconnect from the Distribution Delivery System

##### 3.2.1 Manually Operated Load Break Switch

One visible blade opening, lockable, inspect-able disconnect for all the Net Metering generation within sight of service entrance meter preferably adjacent to meter, but within 10 feet of meter which is accessible to and lockable by Company personnel at all hours without notice shall be furnished by the Customer to the Company's specifications. (A pull-out type switch not accepted)

Company will accept one breaker (per customer) in lieu of blade opening type disconnect for non-battery backup solar units 25kVA and below. This breaker could be in a house panel/breaker box which is accessible to Company personnel at all hours without notice, and shall meet all of the other conditions of this section.

##### 3.2.2 Labels

Customer shall label

- Meter (or Breaker box if it is within one foot of meter) with type and size of generator with arrow pointing to it stating distance to disconnect. (Example 2.5 kW Solar & batteries, 3 ft → or 2.5 kW Solar & batteries, inside [when using breaker box only])
- If using breaker – The outside of the breaker box (that is more than one foot from meter) shall be labeled (example Solar Disconnect inside) and the breaker shall be labeled with arrow (Example solar disconnect ⇒)
- If using blade opening type disconnect – it shall be labeled with type of generator (Example Solar disconnect or wind power disconnect)

Label shall be red background with white letters and UV resistant. The lettering on each label/tag shall be 3/16 inch or larger and be either raised or incised on

each tag. Each tag shall be riveted or glued to the meter loop or switch or disconnect. Permanently attached tags are required.

The customer shall get **written approval of any and all variances** preferably in the design and planning stage. Contact the local Entergy Representative (or call 1-800-ENTERGY to get a representative assigned)

### **3.2.3 Reasons for Disconnect from the Distribution Delivery System**

The Company reserves the right, but has no responsibility either actual or implied, to open the disconnect switch without prior notice to the Customer for any of the following reasons:

- A. Distribution system emergency,
- B. Routine maintenance, repairs, and modifications,
- C. Elimination of a safety hazard, protection of the public or on-site personnel, or if instructed to do so by public safety personnel (law enforcement, fire department or other governmental personnel),
- D. Inspection of Customer's generating equipment and protective equipment reveals a hazardous condition, a lack of scheduled maintenance or maintenance records,
- E. The operation of the Customer's generating equipment results in a deteriorated quality of service or safety issue with other Customers or with the operation of the Company's system, or

The Company may disconnect a distributed generation unit from the distribution system under the following conditions:

- F. Expiration or termination of interconnection agreement
- G. Non-compliance with the technical requirements
- H. Lack of approved application and interconnection agreement
- I. Unauthorized modifications to the Customer's interface equipment

When possible, the Company shall provide the Customer with reasonable notice and reconnect the Customer as quickly as reasonably practical.

### **3.3 Electrical Current and Voltage of Existing Service**

The Company shall ascertain if the proposed generator output exceeds the current carrying capability and matches the voltage of the existing secondary service wires and transformers. If the Customer supplies his own transformation it should be configured for the Customer to monitor the Company's distribution system and react based upon specifications in this Standard. Grounded Wye to Grounded Wye transformers are preferred and Company approval is required before connection.

**The Company will advise Customer of any Customer costs which may be incurred if upgrades are required and the voltage, load carrying ability or transformation of the existing service.**

### **3.4 System Changes**

#### **3.4.1 Company Changes to Distribution Delivery System**

The Distribution Delivery System is a dynamic and changing system. If the Company changes the distribution voltage, the Customer will be responsible for paying for all modifications to the Customer's facilities required for reconnecting to the Company's reconfigured Distribution Delivery System. The Company will notify the Customer of reconfiguration programs.

#### **3.4.2 Customer Changes to Interconnection**

The Customer shall notify the Company to obtain prior approval for any proposed modifications to the interconnecting scheme.

### **3.5 Allowable Tie Points**

Normally, only one tie point between the Customer's facilities and the Company's Distribution Delivery System will be allowed.

### **3.6 Energy Flow during Emergencies**

Power flow from or to a Customer's facilities during periods of system emergencies may be discontinued. The Company shall pay for kWh actually received, not for Customer potential capacity.

### **3.7 Types of Allowed Generators**

Single- or three-phase alternating current generating units may be operated in parallel with the Distribution Delivery System. They may be synchronous generators, induction generators, or inverter-controlled systems. Direct-current generation shall not be directly connected to the Company's alternating-current Distribution Delivery System.

### **3.8 General Interconnection Requirements**

The Customer's Electrical Generation Facilities shall meet the technical requirements as prescribed in this section, in IEEE 1547 and IEEE 1547.1 latest version and in Section 4.0 References.

#### **3.8.1 Customer's Equipment and Interconnection Standards**

The Customer's Electrical Generation Facilities and Interconnection installation must meet all applicable national, state, and local construction and safety codes. The Customer shall be responsible for the design, installation, operation and maintenance of all equipment and facilities installed or that will be installed on the Customer's side of the Point of Common Coupling. Such design shall meet the latest standards of Institute of Electrical and Electronic Engineers, National Electric Manufacturers Association, American National Standards Institute, National Electric Code, other national codes and local codes pertaining to the design and construction of electrical facilities in effect at the time of installation.

The facility shall be subject to the requirements of all authorities having jurisdiction and shall comply with all applicable codes and ordinances.

### **3.8.2 Rating of Customer's Equipment**

The equipment selected by the Customer shall be rated for continuous Parallel Operation with the Company's system.

Customer's Electrical Generation Systems that are intended to provide the Customer with power during periods when the Company's facilities are unavailable shall be equipped with a transfer switch to prevent energizing a non-energized Company circuit consistent with sections 3.2, 3.13.3 and 3.8.1 of this policy.

### **3.8.3 Protection of Customer's Equipment**

The Customer will be responsible for protecting its facilities in such a manner that Distribution Delivery System outages, short circuits or other disturbances, including zero sequence currents and Ferro resonant over-voltages, do not damage the Customer's facilities.

The Customer's protective equipment shall be installed to prevent the Customer Electric Generator System from causing unnecessary tripping of the Distribution Delivery System breakers that would affect the Distribution Delivery System's ability to provide reliable service to other Customers.

Faults, single-phasing events, or other Abnormal Operating Conditions occurring on the Company's transmission system could affect a Customer's facilities connected to the Company's Distribution Delivery System. It is the Customer's responsibility to protect the Customer's facilities from these conditions.

### **3.8.4 Required Drawings**

Adequate drawings of the Customer's proposed Electric Generator System, which will include a one line diagram and proposed relay systems, must be submitted to the Company for review during the planning stage. Additional drawings may be required on a case by case basis.

### **3.8.5 Changes to Company Facilities**

The total cost of any additional equipment that must be installed by the Company on its Distribution Delivery System to allow Parallel Operation must be paid for by the Small Interconnected Electric Generators Customer, including the transformers and any facilities which must be added due to increased fault current or special operating conditions.

**3.8.6 Power Factor**

The power factor of the Customer Electric Generator System at the Point of Common Coupling shall be according to the appropriate rate schedule for this installation. The presence of the Customer Electric Generator System shall not cause the power factor to be lower than it was prior to installation and operation of the Customer Electric Generator System.

**3.8.7 Reactive Power Requirements**

The Customer's Electric Generator System shall normally be responsible for supplying the facility's own reactive power as required by the load to which it supplies power.

**3.8.8 Voltage Surges or Sags**

The Customer will operate its Electric Generator System in such a manner that the voltage levels on the Distribution Delivery System are in the same range (+5% or -5% from nominal voltage) as if the facilities were not connected to the Company's system. The Customer shall be responsible for any damages to the Customer's facilities, and shall be liable for any damages to the Company's facilities or the facilities of other Customers due to any under voltage or over voltage contribution from the Customer.

The Customer shall provide an automatic method of disconnecting the generating equipment from the distribution delivery system if:

Voltage Range (% of base voltage)	Time from beginning of event (seconds)
Less than 50%	0.16
50 to 89%	2.00
110% to 120%	1.00
Greater than 120%	0.16

**3.8.9 Voltage Flicker, Harmonic Distortion, Transients and other Power Quality Issues**

The Customer shall not create objectionable flicker, Harmonic Distortion, Transients, etc. for the Company's other Customers. Also consult Entergy's Power Quality Standards for Electric Service, latest edition which is available on The Entergy web site at [www.entergy.com](http://www.entergy.com). Go to your state, "Your Business", Builder Standards.

### 3.8.10 Frequency

When the operating frequency of the Customer's generating equipment deviates from the 60 Hz base. The Customer shall automatically disconnect the generating equipment from the distribution delivery system based upon the table below:

#### Interconnection System Response to Abnormal Frequencies

Generator size	Frequency range (Hz)	Time from beginning of event (seconds)
Less than or equal to 30kW	Greater than 60.5	0.16
	Less than 59.3	0.16
Greater than 30 kW	Greater than 60.5	0.16
	Less than 59.8 to 57	Adjustable 0.16 to 300 (consult Company)
	Less than 57	0.16

The Company may require the Customer to wait up to five minutes to reconnect after the distribution delivery system voltage and frequency return to normal range and the system is stabilized. Consult the Company for details. (IEEE 1547 4.2.6)

### 3.8.11 Interconnected Electric Generators in Central Business District Grids

The Company will not allow interconnection in Central Business District Underground Secondary Networks, Spot Network Grids and Downtown Underground Radially Fed Installations. In Central Business District Grids, Spot Networks, and Downtown Underground Radially Fed Installations a generator will have a negative effect on reliability and the safety of employees that maintain these systems. This policy will affect Spot Networks, CBD Grids and Downtown Underground Radially Fed Installations including those in New Orleans, Baton Rouge, Lake Charles, West Monroe, Beaumont, Jackson, Little Rock, Pine Bluff, and Hot Springs

### 3.9 Inspection Prior to Operations and Additional Requirements

The Company reserves the right to impose any herein described but unmet requirements and to make subsequent final inspection before the Customer Electric Generator System operates to verify that all such unmet requirements have been satisfied. However, the Company has no actual or implied responsibility in this regard. The Customer shall be responsible for making necessary changes, at the Customer's expense; to the facility should such changes be required.

Inspection by the Company of the Customer's equipment and Interconnection Facilities shall not constitute a determination by the Company of the continuing suitability of such equipment and Interconnection. An inspection by the Company shall in no way constitute a warranty or representation by the Company against future negligence, misuse, faulty repairs, or subsequently

developing defects, and the Company assumes no responsibility or liability therefore.

### **3.10 Responsibility for Customer's Operations**

The Company is not responsible for proper operations of the Customer's Electric Generator System upon and after Interconnection to the Company's Distribution Delivery System.

### **3.11 Responsibility for Customer's Annual Maintenance**

Annual maintenance of the Customer's facility is the Customer's sole responsibility. The Customer shall maintain records of such maintenance activities, which the Company may review at reasonable times. Such maintenance records shall be made available for the Company's inspection upon request. The Company reserves the right to inspect the records, but has no responsibilities for maintenance either actual or implied.

### **3.12 Protection/Interface Requirements**

Protecting both the Small Interconnected Electric Generators Customer's facilities and the Company's system are of great importance. Proper protective systems shall be established in the design phase and confirmed prior to start-up of the Customer's Electrical Generation Facility. An Interconnection between the Company and the Customer will not be allowed prior to the proper coordination of protective devices. The Customer shall be responsible for providing to the Company the necessary documentation certifying that maintenance and testing have been satisfactorily performed.

#### **3.12.1 Changes to Company Fault Interruption Equipment**

Customer Energy Facilities that are installed on the Company's Distribution Delivery System will provide additional fault current to the Distribution Delivery System. Thus, in special circumstances it is possible that the added facilities will necessitate the modification of the existing fault interrupting devices on the distribution feeder. The Customer will be responsible for paying the cost of these changes to the Company's system.

It is also possible that the added facilities will increase the available fault current on the Distribution Delivery System beyond the interrupting capability of the existing devices on the Distribution Delivery System. The Customer may be required to limit the fault current contribution from the Customer Electric Generator System. Should the Company also be required to make changes, the Customer shall pay the cost of the required changes. The issues will be examined on a case-by-case basis.

### **3.12.2 Tests of the Customer's Equipment**

The Company reserves the right, but has no responsibility either actual or implied, to observe the Customer's tests and/or inspection of any of the Customer's protective equipment that is essential to the Interconnection, including relays, circuit breakers, protective devices and related equipment. Inspection may include simulated test tripping of the Customer's Interconnection breakers by the protective relays to verify all protective set points and relay/breaker trip timing prior to Interconnection to the Company system.

Inspection by the Company of the Customer's equipment and Interconnection Facilities shall not constitute a determination by the Company of the continuing suitability of such equipment and Interconnection. An inspection by the Company shall in no way constitute a warranty or representation by the Company against future negligence, misuse, faulty repairs, or subsequently developing defects, and the Company assumes no responsibility or liability therefore.

The Customer shall provide the Company with notice at least two weeks before the initial energizing and start-up testing of the Customer's facilities so that the Company may witness the testing of any equipment and protective systems associated with the Interconnection.

If upon connecting to the Company's system a system emergency develops, safety issues arise, or the Quality of Service to other Customers is affected, the Company may then require additional inspections or tests of the Customer's protective equipment as per IEEE 1547 latest version.

### **3.12.3 Requirements for Specific Technologies**

Various technologies require unique control, protection, and safety equipment to be installed. The specifications in this section list those requirements unique to the technologies.

#### **3.12.3.1 Synchronous Generators**

For a Customer's synchronous generator, circuit breakers shall be three-phase devices with electronic or electro-mechanical control. The Customer is solely responsible for properly synchronizing its generator with the Company's Distribution Delivery System. The excitation system response ratio shall be 0.5 or greater. 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.

### **3.12.3.2 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 Distribution Delivery System side of the Point of Common Coupling is within the allowable visible flicker standard - see §3.8.9. Otherwise, the Customer may be required to install hardware or employ other techniques to bring voltage fluctuations to acceptable levels.

Self-commutated inverters whether of the utility-interactive type or stand-alone type shall be used in parallel with the Distribution Delivery System only with synchronizing equipment.

Line-commutated inverters do not require synchronizing equipment. When a line commutated inverter system is used, no other fault-interrupting device is required. The inverter interrupts the fault.

### **3.13 Synchronizing Requirements**

The Customer shall be solely responsible for synchronizing and properly connecting and disconnecting its electrical system relative to Parallel Operation with the Company's system. The Customer shall provide an automatic synchronizing scheme to prevent the closing of its circuit breaker when the two electrical systems are out of synchronism. Also see Section 3.8.10.

### **3.14 Metering Requirements**

Based on the applicable rate schedule and the Company's standard practices, the Customer will provide the meter socket. The Company will supply the special meter that will measure the Customer's energy flow.

The Customer will be required to provide the Company with information regarding the total connected load. The Customer may be required to provide and / or install the meter socket, metering transformer enclosure, and adequate attachments or devices for attaching Company's metering facilities to the building. For additional information see the Company's *Customer Installation Standards for Electric Service* which is available on The Entergy web site at [www.entergy.com](http://www.entergy.com). Go to your state, "Your Business", Builder Standards.

#### **4 References**

*IEEE Guide for Protective Relaying of Utility-Consumer Interconnection C37.95 (Latest revision)*

*IEEE Recommended Practices and Requirements for Harmonic Control in Electric Power Systems, 519-1992*

*IEEE Recommended Practice for Electric Power Distribution for Industrial Plants, 141-1993*

*IEEE Standard for Interconnecting Distributed Resources with Electric Power Systems 1547*

*IEEE Standard Conformance for Test Procedures for Interconnecting Distributed Resources with Electric Power Systems 1547.1*

*American National Standards Institute Standard C50.13-1989*

*UL 1741 Inverters, Converters, Controllers and Interconnection System Equipment for Use with Distributed Energy Resources*

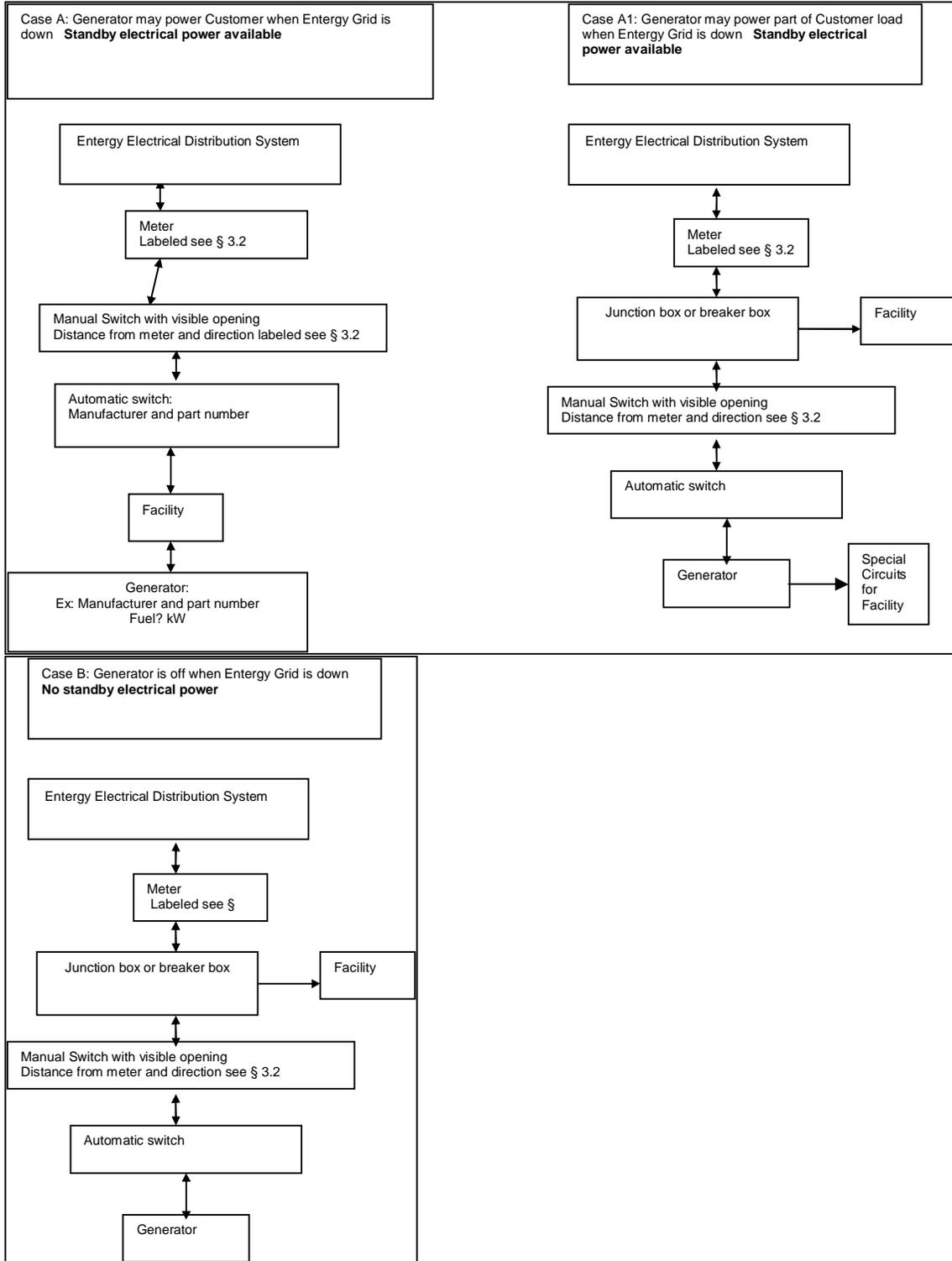
*Jurisdictional Rules and Rates for Arkansas, Louisiana, New Orleans and Texas*

*Entergy Customer Installation Standards for Electric Service, latest edition*

*Entergy Power Quality Standards for Electric Service, latest edition*

*Connecting Large Electric Generators to the Entergy Distribution System (300kVA to 20MVA) Entergy Standard DR701*

## 5 FLOW CHARTS (One Line Diagrams)



Title: **Connecting Small Electric Generators to the Entergy Distribution System (less than 300kVA)**

Effective Date:  
**May 04, 2016**

Note: A one line diagram submitted to the Company could be like the ones above with equipment specific information included

**6 Revisions**

06	<ul style="list-style-type: none"> <li>• Title of Standard changed from <i>Net Metering Facilities Safety and Performance Standards</i> to <i>Connecting Small Electric Generators to the Entergy Distribution System (less than 500kVA)</i> and expanded to include all interconnected generators below 500kVA.</li> <li>• Application moved to end of Standard</li> <li>• Added questions on application to learn if generator is to be connected less than 10 cycles.</li> <li>• Move Manually Operated Load Break Switch requirements from §3.8.1 and merge into §3.2 Reasons for Disconnection from the Distribution Delivery System</li> <li>• 3.14 Susceptibility to Transmission Faults moved to 3.8.3 Protection of Customer's Equipment</li> <li>• 3.8.11 sentence "Interconnections for Electric Generators will be allowed in Central Business Districts in overhead or standard underground distribution circuits which can comply with Company's Standards." Removed either the unit is in a legal downtown network grid or not</li> <li>• References to §3.2 added to 5.0 Flow Charts</li> </ul>	11/11/08
07	<ul style="list-style-type: none"> <li>• 3.2 The customer shall get written approval of any and all variances, preferably in the design and planning stage. Contact the local Entergy Representative (or call 1-800-ENTERGY to get a representative assigned).</li> <li>• In Application, short circuit rating of entire system only needed.</li> </ul>	10/15/09
08	<ul style="list-style-type: none"> <li>• Customer referred to website or 1 800 ENTERGY for application and Standards Interconnection Agreement form</li> <li>• Add to 3.2 .(A pull-out type switch not accepted unless it was installed, in place or approved before 1/26/2011)</li> </ul>	1/26/11
09	<ul style="list-style-type: none"> <li>• 3.2 Only one disconnect allowed for all Net metering generation at site. (submitted for clarity it was always one) per IEEE1547-2003 § 4.1.7</li> <li>• Disconnect must be within 10 feet of meter</li> </ul>	7/ 22/11

<p>10</p>	<p>Section 1.2 Scope Case 2. Has been changed to: “The Customer may build facilities that are connected to their building or internal electrical system and are not intended to be connected to the distribution system. The Customer shall supply a open and visible break verifiable by Company personnel. The location shall be on the outside of the facility accessible to Company personnel at all hours. A main disconnect in the off position qualifies as an open break. It is recommended that the customer tag the disconnect to help prevent accidental closing. Failure to have a visible break is reason for being disconnected, and subjects Customer to liability for resulting injury to people or property.” 3.2 Manually Operated Load Break Switch / Reasons for Disconnect from the Distribution Delivery System <b>Company will accept a breaker in lieu of blade opening type disconnect for non-battery backup solar units 25kVA and below. This breaker could be in a house panel/breaker box which is accessible to Company personnel at all hours without notice, and shall meet all of the other conditions of this section.</b></p>	<p>4/17/2012</p>
<p>11</p>	<p>Modified requirements for labels 3.2.2 Labels Customer shall label</p> <ul style="list-style-type: none"> <li>• Meter (or Breaker box if it is within one foot of meter) with type and size of generator with arrow pointing to it stating distance to disconnect. (Example 2.5 kW Solar &amp; batteries, 3 ft → or 2.5 kW Solar &amp; batteries, inside [when using breaker box only])</li> <li>• If using breaker – The outside of the breaker box (that is more than one foot from meter) shall be labeled (example Solar Disconnect inside) and the breaker shall be labeled with arrow (Example solar disconnect ⇒)</li> <li>• If using blade opening type disconnect – it shall be labeled with type of generator (Example Solar disconnect or wind power disconnect)</li> </ul> <p>Label shall be red background with white letters and UV resistant. The lettering on each label/tag shall be 3/16 inch or larger and be either raised or incised on each tag. Each tag shall be riveted or glued to the meter loop or switch or disconnect. Permanently attached tags are required.</p>	<p>3/12/12</p>
<p>Rev 12</p>	<p>Classified as Manual &amp; reviewed/ reorganized for easier reading</p>	<p>4/30/12</p>

Rev 13	Changed Connecting Large Electric Generators to the Entergy Distribution System lower range from 500 kVA to 300 kVA to align with the less than 300kVA limit for Net Metering Inquiry and Application Processes Standard due to minimum impact on the Distribution System.	5/04/16
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**Exhibit H-2**  
**Connecting Large Electric Generators to the Entergy Distribution System**  
**(300kVA to 20MVA)**



Title: <b>Connecting Large Electric Generators to the Entergy Distribution System (300kVA to 20MVA)</b>		Effective Date: <b>May 04, 2016</b>
Prepared By: Michael R. Gray Distribution Design Basis / Standards	Approved By: James R. Hickman Manager of Distribution Design Basis / Standards	

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## 1 Introduction

### 1.1 Purpose

A Customer may operate 60 Hertz (Hz), three-phase or single-phase generating equipment in parallel with the distribution delivery system pursuant to an interconnection agreement, provided that the equipment meets or exceeds the Company standards. FERC Qualifying facilities or small power producers also have rates in each jurisdiction allowing them to sell power to the Company. Customers who do not meet the above conditions shall not inject Electric Power onto the Company Distribution System without agreement from the Company.

The purpose of this standard is to describe the requirements and procedures for safe and effective connection and operation of electric generators 300kVA to 20MVA on the Entergy Distribution electric system. Customers who are smaller than 300kVA (including QF-12 Mississippi Customers and Net Metering Customers) should refer to *Connecting Small Electric Generators to the Entergy Distribution System (less than 300kVA)*. Customers larger than 20 MVA or who would interconnect at Transmission level voltages (69kV and above) should contact Entergy Transmission. **Customers are encouraged to contact the Company early in the process, and learn about Customer requirement and specific requirements due to their location on the electric grid.** Customers may call 1 800 ENTERGY to get a local engineer assigned.

The **Distributed Generation Technical Requirements Compliance Checklist** at the end of this Standard is a summary of the requirements. The process of Connection is started by a Customer submitting a completed **Application** and a completed **Distributed Generation Technical Requirements Compliance Checklist** (both are at the end of this Standard).

This standard describes typical interconnection requirements. Certain specific interconnection locations and conditions may require more information from the Customer or the installation and use of more sophisticated protective devices and operating schemes, especially when the facility is exporting power through the distribution delivery system. **Interconnection in Central Business District Networks is discussed in Section 3.8.13.**

If the Company concludes that an Application to Connect Electric Generators to the Entergy Distribution System describes facilities that may require additional devices and operating schemes, the Company shall make those additional requirements known to the Customer at the time the interconnection studies are completed.

### **1.1.1 Operating Agreement Requirements**

A written agreement will be required between the Company and the Customer outlining the liability provisions, indemnities, payment of cost to modify distribution system (if not paid in advance), and other items affecting service under this document. This agreement will explain in detail the authority or responsibilities of the parties involved. **An interconnection between the Company and a Customer will not be allowed prior to the execution of a written Operating Agreement covering parallel operation.**

### **1.1.2 Explicit Criteria for Parallel Operations**

Two objectives must be met to arrive at compliance by the proposed installation:

#### **1.1.2.1 Safety**

The Customer's Electric Generators will be held to the same Standard of Care, as the Company is required to maintain. In addition, the safety of the general public and the personnel and equipment of the Company shall in no way be reduced or impaired as a result of the Interconnection.

The Customer's Electrical Generator shall be equipped with Protective Functions designed to prevent the Generator from being connected to a de-energized circuit owned by the Company.

The Customer's Electrical Generation Facility shall be equipped with the necessary Protective Functions designed to prevent connection or Parallel Operation of the Customer's facility with the Distribution Delivery System unless the Distribution Delivery System service voltage and frequency are of normal magnitude. The design of some systems provides these functions without adding equipment at the Point of Common Coupling. Each system not providing additional devices at the Point of Common Coupling must be shown to be capable of these functions.

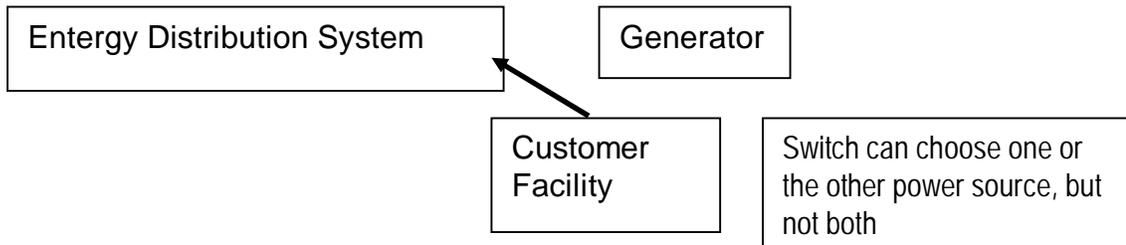
#### **1.1.2.2 Customer Impact**

The quality, reliability and the availability of service to the Company's other Customers shall not be diminished or impaired as a result of the Interconnection. This standard describes typical connection requirements. Some installations, however, may require more extensive Interconnection Facilities, and will be addressed on a case by case basis. This is most likely to be required when several Customers desire to connect Electric Generators to the same transformer or on the same distribution feeder.

**1.2 Scope**

Distribution generation installed within Entergy’s service area will fall into one of seven scenarios:

Case 1.	The Customer may build facilities that are NEVER connected to the Entergy distribution system some examples are: An emergency generator. Where electric cords are run directly to this generator for essential lights and appliances. A house with a switch, rated for the customers generator size that does not allow electricity to flow from the generator into the facility when the facility is connected to the electric utility system.
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**Refer to your local inspectors in this case.**

Case 2.	The Customer may build facilities that are connected to their building or internal electrical system and are not intended to be connected to the distribution system. The Customer shall supply an open and visible break verifiable by Company personnel. The location shall be on the outside of the facility accessible to Company personnel at all hours. A main disconnect in the off position qualifies as an open break. It is recommended that the customer tag the disconnect to help prevent accidental closing. <b>Failure to have a visible break is reason for being disconnected,</b> and subjects Customer to liability for resulting injury to people or property.
Case 3.	The Customer may build facilities that are NOT NORMALLY connected to the distribution system. Total connection time is 10 CYCLES OR LESS (@60 cycles/second). All loads become displaced. Stand-by facilities may or may not be requested. No energy is sold or sent to the Company.
Case 4.	The Customer may build facilities that are connected to the distribution system more than 10 cycles (may be hours, days, months, etc.). Some or the entire load becomes displaced. Stand-by facilities may or may not be requested. No energy is sold or sent to the Company.
Case 5.	The Customer may build facilities that are normally connected to the distribution system. Some or the entire load becomes displaced. Stand-by facilities are requested. A contract is signed for selling energy to the Company.

List continued on next page

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Case 6	The Customer may build facilities that are normally connected to the distribution system. The Customer has no on-site load. A contract is signed for selling energy output to the Company.
Case 7.	The Customer may build facilities that are normally connected to the distribution system. A contract is signed with the Company for wheeling or wholesaling energy output. <b>Transmission Company involvement required.</b> Also see Section 3.17.2& 3.17.3

These provisions are the minimum requirements of non-Entergy Corporation distributed generation units for operation of the units in parallel with the Company’s distribution system for voltages up to and including 34.5kV. (Refer to Entergy Transmission Standard PM3901, Generator Interconnection Customer Requirements Standard and Section 3.17.2 & 3.17.3 for provisions to connect to the Company’s transmission system for voltages above 34.5kV.)

Generation systems of significant size on radial distribution systems can cause relaying and voltage control problems. The Company therefore retains the option to connect any generation facilities at either the transmission or the distribution voltage level.

**2 Definitions**

Abnormal operating conditions – When the Company is operating the distribution delivery system in other than normal configuration or under conditions that do not normally exist. Examples of abnormal operating conditions are: (1) high usage days when Customers are requested to conserve energy or, (2) switching feeders out of use for repairs and switching in alternate feeders to deliver energy to Customers.

Application to Connect Electric Generators to the Entergy Distribution System - The standard form of application attached the end to of this document.

Central Business District Networks, Spot Networks and Downtown Underground Radially Fed Installations (CBD) are typically located in downtown areas in New Orleans, Baton Rouge, Lake Charles, West Monroe, Beaumont, Jackson, Little Rock, Pine Bluff, and Hot Springs. The common CBD setup is to have two or more transformers, each connected to a separate feeder and paralleled on the low voltage side through network protectors associated with each transformer. These protectors are commonly configured so that a small amount of fault current (usually in the range of one Amp) will cause the protector to trip. Injecting electric power (with a generator) will have a negative effect on reliability. Also see Network Service

Company - Entergy operating subsidiaries within the United States boundaries.

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Customer - Any entity interconnected to the Company's distribution delivery system for the purpose of receiving or exporting electric power through the Company's distribution delivery system.

Displaced load - The Customer's entire electrical requirement or a portion of it that, except for the output of the Customer's Energy Facilities, would have been served by the Company.

Distributed generation (DG) – See On-site distributed generation.

Distribution delivery system – The Company's wires, equipment, and facilities with a voltage below 69kV to which the generation equipment is interconnected.

Facility - An electrical generating installation consisting of one or more on-site distributed generation units. The total capacity of a facility's individual on-site distributed generation units may exceed twenty megawatts (MW). Units greater than 2MW will require consultation with Transmission.

Interconnection - The physical connection of distributed generation to the distribution delivery system in accordance with the requirements of this standard so that parallel operation can occur.

Interconnection agreement – The document that sets forth the contractual conditions under which the Company and a Customer agree that one or more facilities may be interconnected with the Company's distribution delivery system.

Interconnection facilities - All facilities installed solely to interconnect and deliver/receive power from/to the Customer's generation facility to/from the Company's system including, but not limited to, connection, transmission, distribution, engineering, administration, transformation, switching, metering, and safety equipment. Interconnection Facilities shall include any additions and/or modifications to the Company's system deemed by the Company to be necessary.

Net Metering - To encourage Customers to generate electric power using solar, wind, hydropower, geothermal, or qualified biomass resources, these Customers may be entitled to sell electricity to their electric utility at more favorable rates. This varies by Jurisdiction. These Customers are all covered by **Connecting Small Electric Generators to the Entergy Distribution System (<300kVA)**

Network service - Two or more primary distribution feeder sources electrically tied together on the secondary (or low voltage) side to form one power source for one or more Customers. This configuration is designed to maintain service to the Customers even after the loss of one of these primary distribution feeder sources.

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On-site distributed generation (distributed generation or DG) - An electrical generating facility located at a Customer's point of delivery (point of common coupling) of twenty Mega Volt-Amps called "apparent power" (MVA) or less and connected at a voltage less than or equal to 35 kilovolts (kV) which may be connected in parallel operation to the distribution delivery system.

Parallel operation - The operation of on-site distributed generation by a Customer while the Customer's facilities are electrically connected to the Company's distribution delivery system.

Point of common coupling - The point where transfer of any electric power between the Customer's facilities and the distribution delivery system takes place, normally at the point of attachment.

Pre-interconnection study - A study or studies that may be undertaken by the Company in response to its receipt of a completed application for interconnection and parallel operation with the distribution delivery system. Pre-interconnection studies may include, but are not limited to:

Scoping meetings/Studies *includes*

A fact finding meeting/telecom with Customer and discussion of Customer responsibilities and requirements and applicable policies. (Customer Relations and Asset Planning)

Asset Planning to determine if interference with the system protective equipment may occur, electricity may flow back to the substation and impact transmission, available fault current, capacitor bank impact, frequency, and voltage may be effected under normal and worst case situations. Conductors / Lines or other devices and elements that may be undersized or otherwise need settings changes as a result of the proposed generation

Discussion/Meeting with Customer to either

If no impacts on Distribution or the Transmission grid are identified, accept the project and Customer Relations presents a contract, or Share potential impacts and future studies necessary, advise estimated costs of chosen study(s) and may provide order of magnitude estimates on facilities costs.

If transmission is to be involved to discuss this with Customer and get Transmission to contact Customer and discuss *Entergy Small Generator Interconnection Procedures* and other policies or procedures involved.

Product is the minimum information for attaching a small distributed generation unit at a particular location on the distribution system or results in identifying the necessity of further engineering studies or if transmission involvement is necessary.

**Feasibility Study – A formal study identifying**

Any system protection equipment short circuit capacity limits exceeded,

Thermal overload, frequency or voltage limit violations resulting from the interconnection,

Initial review of grounding requirements and coordination.

Transfer trip analysis,

Product is initial and non-binding estimates of facilities, cost to interconnect and identification of further studies needed and their cost.

Entergy requires a **\$1,000** deposit for the Feasibility Study. Study is done at Customer cost.

**System Impact Study – shall**

Identify and detail the electric system impacts that would result if the proposed Small Generating Facility were interconnected without project modifications or electric system modifications, focusing on the adverse system impacts identified in the feasibility study,

Study potential impacts, including but not limited to those identified in the scoping meeting.

Product is an evaluation of the impact of the proposed interconnection on the reliability of the electric system.

Entergy requires a **\$50,000** deposit for the System Impact Study. Study is done at Customer cost.

**Facilities study –**

Shall specify and estimate the cost of the equipment, engineering, procurement and construction work (including overheads) needed to implement the conclusions of the system impact study(s).

Entergy requires a deposit of the good faith estimated costs for the facilities study from the Customer. Study is done at Customer cost.

Protective function - A system that uses hardware (including switching devices), relay protection schemes and software that prevents unsafe operating conditions from occurring before, during, and after the interconnection of the generating unit with the distribution delivery system. This system will include isolating the Customer's Generation or decoupling it from the distribution delivery system.

Quality of service – An operating state of the distribution delivery system that provides usable power to a Customer. This state of usable power includes the parameters specified for voltage flicker (Section 3.8.10), voltage surges and sags (Section 3.8.9), power factor (Section 3.8.7 & 3.8.8), frequency (Section 3.8.11) and harmonics (Section 3.8.10).

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Stabilized - The distribution delivery system is considered stabilized when, following a disturbance, the system returns to the normal range of voltage and frequency for a duration of five minutes or a shorter time as mutually agreed to by the Company and Customer.

Standard of care - A term defining the level of awareness to maintain workplace and public safety in the design, installation and operation of a DG facility.

System protection facilities - The equipment required to protect the Company's system and its other Customers from unsafe operating conditions occurring at the Customer's generation facility. This includes inverter systems and any other devices provided with the on-site distributed generating unit for providing the system protection functions.

Unsafe operating conditions – A situation that if left uncorrected would result in: (1) harm to any personnel, damage to any equipment, (2) unacceptable system instability or, (3) operating outside legally established parameters affecting the quality of service to other Customers connected to the distribution delivery system.

### **3 Details**

#### **3.1 Available Voltage Systems**

The Company's distribution systems available for parallel generation operations are grounded wye configuration of various existing voltage levels from secondary voltage levels to 34.5kV (phase to phase). The voltage level available for connecting the DG in parallel with the system depends on the location and the size of the generation.

#### **3.2 Manually Operated Load Break Switch / Reasons for Disconnect from the Distribution Delivery System**

The Customer's generation facilities shall have a lockable, manually operated, visible-break isolation load break switch that shall be in a location accessible to the Company's personnel at all hours with no notice. (Pull out type switches are not accepted) For a three phase generator, this disconnect must be a group operated device that through one operation will open/close all three phases simultaneously. Customer shall label meter can with type and size of generator with arrow pointing to it stating distance to disconnect. (Example 300kVA Gas engine generator, 3 ft.⇒) Permanently attached tags are required. The lettering on each tag shall be 3/16 inch or larger and be either raised or incised on each tag. Each tag shall be riveted or glued to the meter can. (If the circuit breaker is accessible to Company personnel, this requirement may be waived.) The Company reserves the right, but has no responsibility either actual or implied, to open the disconnect switch without prior notice to the Customer for any of the following reasons:

- A. Distribution system emergency,
- B. Routine maintenance, repairs, and modifications,

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- C. Elimination of a safety hazard, protection of the public or on-site personnel, or if instructed to do so by public safety personnel (law enforcement, fire department or other governmental personnel),
- D. Inspection of Customer's generating equipment and protective equipment reveals a hazardous condition, a lack of scheduled maintenance or maintenance records,
- E. The operation of the Customer's generating equipment results in a deteriorated quality of service or safety issue with other Customers or with the operation of the Company's system, or

The Company may disconnect a distributed generation unit from the distribution system under the following conditions:

- F. Expiration or termination of interconnection agreement
- G. Non-compliance with the technical requirements
- H. Lack of approved application and interconnection agreement
- I. Unauthorized modifications to the Customer's interface equipment

When possible, the Company shall provide the Customer with reasonable notice and reconnect the Customer as quickly as reasonably practical.

### **3.3 Pre-Interconnection Studies for Interconnection of Distributed Generation.**

The Company shall, at the Customer's expense, conduct one or more pre-interconnect studies prior to interconnection of a distributed generation facility.

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 ability of the distributed generator owner to have access to the distribution delivery system and/or the transmission grid may be limited. The Company shall conduct pre-interconnection and network studies to determine to what amount additional distributed generation facilities can be safely added to the network or accommodated in some other fashion.

In Entergy Office of Records Series 1274– Planning Studies, the Company shall retain its documentation (of its evaluation of the reliability impact of the new facilities and their connections on the interconnected transmission systems) for three years and shall provide the documentation to the Regional Reliability Organization(s) and NERC on request (within 30 calendar days).

### **3.4 System Changes**

#### **3.4.1 Company Changes to Distribution System**

The distribution system is a dynamic and changing system. If the Company changes the distribution voltage, the Customer will be responsible for paying for all modifications required for reconnecting to the Company's reconfigured distribution system.

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### **3.4.2 Customer Changes to Interconnection**

The Customer shall notify the Company to obtain prior approval for any proposed modifications to the interconnecting scheme.

### **3.5 Allowable Tie Points**

Normally, only one tie point between the Customer and the Company will be allowed at the Customer's site.

### **3.6 Energy Flow during Emergencies**

Purchases from or sales to a Customer during periods of system emergencies may be discontinued according to the regulatory body's rules, and the Company's rates, riders or contract with the Customer.

### **3.7 Types of Allowed Generators**

Single phase or three-phase alternating current generating units can be operated in parallel with the distribution system. They may be synchronous generators, induction generators, or inverter controlled systems. When the total connected capacity exceeds 10MW or when current will flow onto the Transmission grid application will be also sent to Transmission as per sections 3.17.2 & 3.17.3. Direct-current generation shall not be directly connected to the Company's alternating-current Distribution Delivery System.

#### **3.7.1 Limits on Three Phase Generators**

If three-phase service is not available in the area or if Company facilities must be upgraded or increased in order to enable the Customer to connect to these facilities, the Customer must bear the additional cost for such service or improvements as determined by the Company. The Company reserves the right to refuse three-phase service under certain circumstances.

#### **3.7.2 Limits on Single Phase Generators**

Where necessary to avoid the potential for a generating facility to cause problems with the service of other Customers, the Company may limit the capacity and operating characteristics of single-phase generators in a manner consistent with its existing limitations for single-phase motors and local line equipment and configuration.

### **3.8 General Interconnection Requirements**

The Customer's distributed generation facilities shall meet the technical requirements as prescribed in this section and in IEEE 1547 latest version.

#### **3.8.1 Customer's Equipment and Interconnection Standards**

The Customer's generation and interconnection installation must meet all applicable national, state, and local construction and safety codes.

The Customer shall be responsible for the design, installation, operation, testing and maintenance of all equipment and facilities installed or that will be installed on the

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Customer's side of the Point of Common Coupling. Such design shall meet the latest standards of IEEE, NEMA, ANSI, NEC, FERC other national codes and any local codes pertaining to the design and construction of electrical facilities. The facility shall be subject to the requirements of all authorities having jurisdiction and shall comply with all applicable codes and ordinances.

### **3.8.2 Rating of Customer's Equipment**

The equipment selected by the Customer shall be rated for continuous parallel operation with the Company's system.

### **3.8.3 Protection of Customer's Equipment**

The Customer will be responsible for protecting its generating equipment in such a manner that distribution delivery system outages, short circuits or other disturbances including zero sequence currents and Ferro resonant over-voltages do not damage the Customer's generating equipment. The Customer's protective equipment shall also prevent unnecessary tripping of the distribution delivery system breakers that would affect the distribution delivery system's capability of providing reliable service to other Customers.

### **3.8.4 Required Drawings**

Adequate drawings of the proposed Customer's generation facility, which will include a one line diagram and proposed relay systems, must be submitted to the Company for review during the planning stage. Additional drawings may be required which will be determined on a case by case basis.

### **3.8.5 Changes to Company Facilities**

The total cost of any additional equipment that must be installed by the Company on its distribution system to allow parallel operation must be borne by the Customer, including the transformers and any facilities which must be added due to increased fault current or special operating conditions.

### **3.8.6 Communications Facilities**

For generating facilities greater than one megawatt (MW), the Company may require that a communication channel be supplied by the Customer to provide communication between the Company and the Customer's facility.

### **3.8.7 Power Factor**

The power factor of the Customer's generation facilities at the interconnection point with the Company shall be according to the appropriate rate schedule for this installation.

### **3.8.8 Reactive Power Requirements**

The Customer's generation facility shall normally be responsible for supplying its own reactive power as required by the load supplied from its own generation. Should the Customer be unable or unwilling to supply the reactive power, a separate rate schedule shall apply and the installation shall be metered for VAR flow.

**3.8.9 Voltage Surges or Sags**

The Customer will operate its generating equipment in such a manner that the voltages levels on the distribution delivery system are in the same range as if the generating equipment were not connected to the Company's system. The Customer shall be liable for any damages done to their own facilities, the Company's facilities, or the facilities of other Customers due to any under voltage or over voltage contribution from the DG unit.

The Customer shall provide an automatic method of disconnecting the generating equipment from the distribution delivery system if:

Voltage Range (% of base voltage)	Time from beginning of event (seconds)
Less than 50%	0.16
50 to 89%	2.00
110% to 120%	1.00
Greater than 120%	0.16

**3.8.10 Voltage Flicker, Harmonic Distortion, Transients and other Power Quality Issues**

The Customer Energy Facility shall not create objectionable flicker, Harmonic Distortion, Transients, etc. for the Company's other Customers. Also consult Entergy's Power Quality Standards for Electric Service, latest edition which is available on The Entergy web site at [www.energy.com](http://www.energy.com). Go to your state, "Your Business", Builder Standards.

**3.8.11 Frequency**

When the operating frequency of the Customer's generating equipment deviates from the 60 Hz base. The Customer shall automatically disconnect the generating equipment from the distribution delivery system based upon the table below:

Interconnection System Response to Abnormal Frequencies

Frequency range (Hz)	Time from beginning of event (seconds)
Greater than 60.5	0.16
Less than 57	0.16

**3.8.12 Reconnection to distribution delivery system**

The Company may require the Customer to wait up to five minutes to reconnect after the distribution delivery system voltage and frequency return to normal range and the system is stabilized. Consult the Company for details. (IEEE 1547 4.2.6)

### **3.8.13 Central Business District Network**

The Company will not allow interconnection in Central Business District Underground Secondary Networks, Spot Networks and Downtown Underground Radially Fed Installations. In Central Business District Networks, Spot Networks, and Downtown Underground Radially Fed Installations a generator will have a negative effect on reliability and the safety of employees that maintain these systems. This policy will affect Spot Networks, CBD Networks and Downtown Underground Radially Fed Installations including those in New Orleans, Baton Rouge, Lake Charles, West Monroe, Beaumont, Jackson, Little Rock, Pine Bluff, and Hot Springs.

### **3.9 Inspection Prior to Operations and Additional Requirements**

The Company reserves the right, but has no responsibility either actual or implied; to impose any additional requirements necessary and to make final inspection before the system operates to verify that all requirements have been satisfied. The Customer shall be responsible for making necessary changes, at the Customer's expense; to the equipment should such changes be required.

### **3.10 Responsibility for Customer's Operations**

The Company is not responsible for proper operations of the Customer's generation facilities upon connection to the distribution system.

### **3.11 Responsibility for Customer's Maintenance**

The maintenance of the Customer's electrical equipment is their sole responsibility. The Customer will maintain records of such maintenance activities, which the Company may review at reasonable times. For generation systems greater than 50 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. Maintenance records should be made available for the Company's inspection upon request. The Company reserves the right to inspect the records, but has no responsibilities for maintenance either actual or implied.

### **3.12 Load Shed Responsibilities**

If the DG drops off line, an automatic load shed scheme shall be used to shed the Customer's load should this additional load exceed the available capacity of or causes excessive voltage sag on the distribution circuit. The load shall be shed within 10 cycles of the generator dropping off line. Such requirements shall be noted in the contract and communicated to the appropriate Operations Information Center.

For Customers whose DG operations are described by Case 2, Case 3, or Case 4, and who also have a contract for stand-by or maintenance power, arrangements should be made in the design of the Customer's system to allow for load shed under emergency conditions on the distribution delivery system.

### **3.13 Protection/Interface Requirements**

Protecting both the Customer's facilities and the Company's facilities are of great importance. Proper protective systems shall be established in the design phase and confirmed prior to start-up of the Customer's generation facilities. **An interconnection between the Company and the Customer will not be allowed prior to the proper coordination of protective devices.** The Customer shall be responsible for providing to the Company the necessary documentation certifying that maintenance and testing have been satisfactorily performed.

#### **3.13.1 Changes to Company Fault Interruption Equipment**

A generator source on the distribution system will provide an additional source of fault current to the distribution system. It is possible that the Customer's contribution will require the existing coordination of fault interrupting devices on the distribution feeder be changed. The Customer will be responsible for cost of these changes to the Company's system. It is also possible that the Customer's contribution will increase the available fault current on the distribution system beyond the interrupting capability of the existing devices on the distribution system. The Customer may be required to limit their fault current. Should the Company also be required to make changes, the Customer shall pay the cost of the required changes. The issues will be examined on a case by case basis.

#### **3.13.2 Tests of the Customer's Equipment**

The Company reserves the right, but has no responsibility either actual or implied, to observe the Customer's tests and/or inspection of any of the Customer's protective equipment that is essential to the interconnection, including relays, circuit breakers, protective devices and related equipment. Inspection may include simulated test tripping of the Customer's interconnection breakers by the protective relays to verify all protective set points and relay/breaker trip timing prior to connection to the Company system.

The Customer shall provide the Company with notice at least two weeks before the initial energizing and start-up testing of the Customer's generating equipment so that the Company may witness the testing of any equipment and protective systems associated with the interconnection.

#### **3.13.3 Specifying Protective Equipment**

The Company will have the right to specify certain protective devices, including relays and circuit breakers that the Customer must install. The Company will specify all relay settings on the intertie. Settings of interconnection protective devices on the Customer's system will be specified by the Customer, but will be checked, coordinated with, and reviewed by the Company before application and subsequent modification.

### **3.13.4 Service Interruption Equipment**

Circuit breakers or other interrupting devices at the Point of Common Coupling must be capable of interrupting maximum available fault current. If facilities are larger than 1MVA and an inverter or similar system is used, consult Company for additional requirements.

### **3.13.5 Exception to Automatic Disconnect Equipment Requirements**

Generator systems which require an AC source to operate, such as an induction generator, are not required to have an automatic fast disconnect means if the VAR support is provided by the Company. Also, a study must be conducted to determine if the capacitors on the distribution system could continue to energize the generator when the distribution feeder is not energized. Unless supported by capacitor banks when the distribution feeder is not energized, these systems will not produce output on loss of the AC source and will generally function as an induction motor. They will be allowed to coast down. The Customer is still required to provide a manual means for isolating the generator from the system so that re-energizing the distribution system will not energize the generator.

### **3.13.6 Fault Interrupting Device**

A fault-interrupting device must be installed at the point of intertie between the Company and the Customer. The device could be single-phase fuses with a group operated load break switch or a three phase breaker. The choice will be the Company's and will be made on a case by case basis depending on location, available fault current, and size of the facility.

### **3.13.7 Equipment to Block Energizing Dead Circuits**

**Under no condition will the Customer be permitted to energize a non-energized Company distribution circuit.** Equipment to effectively block the Customer from energizing a non-energized Company circuit shall be installed.

## **3.14 Control, Protection and Safety Equipment Requirements for Specific Technologies**

Different technologies have some unique requirements. The specifications in this section list those requirements unique to the technologies.

### **3.14.1 Synchronous Generators**

For a Customer's synchronous 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 distribution delivery system. The excitation system response ratio shall be 0.5 or greater. 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 latest version in order to permit adequate field forcing during transient conditions. For generating systems greater than one 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 Company's dispatching office shall be notified.

### **3.14.2 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 distribution delivery system side at the Point of Common Coupling is within the allowable visible flicker standard (see § 3.8.11). 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 distribution delivery system only with synchronizing equipment.

### **3.15 Susceptibility to Transmission Faults**

A Customer connected to the distribution system might be affected by faults occurring on the Company's transmission system. A member of the Company's System Protection Department should review the proposed generation facilities to make recommendations concerning the Customer's susceptibility to transmission faults.

### **3.16 Synchronizing Requirements**

The Customer shall be solely responsible for synchronizing and properly connecting and disconnecting its electrical system relative to parallel operation with the Company's system. The Customer shall provide an automatic or semi-automatic synchronizing scheme to prevent the closing of its circuit breaker when the two electrical systems are out of synchronism. (See § 3.8.11 Frequency.)

### **3.17 Summary of Protective Function Requirements**

The size of the DG facility dictates many of the functional requirements. These sections summarize the required functions by the installed capacity of the facilities.

#### **3.17.1 All Facilities**

All facilities must have function summarized in the Distributed Generation Technical Requirements Compliance Checklist and

- an over-voltage trip,
- an under-voltage trip,
- an over/under frequency trip,

Either a ground over-voltage or over-current trip relay scheme depending on the grounding system as specified by the Company.

Will be investigated based under minimum feeder load circumstances. This investigation may alter the requirements.

For generating facilities not exporting power, a reverse power-sensing scheme is also required. (This requirement may be waived if the generator is rated at less than the minimum load of the Customer.)

### **3.17.2 Facilities Rated More than 2MVA**

The facilities must have everything discussed in section 3.17.1. The facility shall have an automatic voltage regulator. A telemetry/transfer trip will be investigated and may also be required by the Company as part of a transfer tripping or blocking protective scheme. If Company is called upon to wheel or move power across its transmission system Entergy's OATT (Open Access Transmission Tariff), FERC orders 2006, 2006A and 2006B, NERC Reliability Standard FAC-002 (latest version), Entergy Transmission Standard PM3901, Generator Interconnection Customer Requirements, and Entergy Transmission Standard AM3901 (Latest Edition) Affected System New Facilities Coordination will apply. Consult the Company.

### **3.17.3 Facilities Rated More than 10MVA**

The facilities must have everything discussed in section 3.17.2. Facilities in this range may be covered under Entergy Transmission Standard PM3901, *Generator Interconnection Customer Requirements* for provisions to connect to the Company's transmission system for voltages above 34.5 kV.

### **3.18 Metering Requirements**

The Attachments (6.0) outlines the three metering arrangements approved by the Company. The Customer has the right to choose the metering option that best fits a particular situation. The Customer will pay any additional metering costs if the requested metering setup exceeds the configurations approved in Attachments.

The generator step-up transformer losses will be the Customer's responsibility, therefore the metering shall be at the distribution voltage level. Rate considerations will reflect these requirements.

### **3.19 Communication Criteria for Requiring Telemetry**

Telemetry requirements will be based on the cases described under **Section 1.2, Scope:**

1. Cases 1 through 4, no telemetry will be required.
2. Cases 5 and 6 may or may not require telemetry depending on the output of the Customer's generating facility.
  - A. For Customers' installations generating less than 1MVA:  
The Customer shall furnish a telephone number that is manned during all hours of operation where the Company dispatcher can contact the Customer in the event of trouble on the distribution circuit serving the Customer.

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- The Company **may** require a dedicated telephone circuit at the site of the Customer's intertie to provide communication with the Company's dispatcher.
- B. For Customer's installation generating 1MVA or greater:
- The Company and the Customer shall maintain operating communications at the Customer's expense with the Company's system dispatcher or the designated representative. The operating communications shall include, but not be limited to, system paralleling or separation, scheduled and unscheduled shutdowns, equipment clearances and hourly and daily load schedules and reports.
- An RTU (Remote Terminal Unit) shall be installed by the Customer to gather accumulated and instantaneous data to be telemetered to a specified Company control center. The Company shall approve the RTU and its configuration. Instantaneous analog Watt flow and VAr flow information and breaker/switch status must be telemetered directly to the center. These signals will display the current status of the generation facility. Additionally, these signals will be used as input to the Company's control center computer system. These inputs will assist in providing decisions on economic dispatch for optimum system operation. Additional programs within the control center computer system will use the input data to assist in numerous other areas of system operation, such as load forecasting, generation scheduling and maintenance, contingency analysis, and training.

These interconnected facilities must be properly integrated into the Company communication and control systems.

Case 7 will always require the Customer to install telemetering as described in 2B above regardless of the size of the generating facilities.

### **3.20 Transformation Requirements**

**Customers are encouraged to contact the Company early in the process, and learn about Customer requirement and specific requirements due to their location on the electric grid.** Customers may call 1 800 ENTERGY to get a local engineer assigned.

If Customers' existing generation facilities need additional transformation, a different grounding system or other upgrades, the Customer shall be required to design, pay for and maintain all upgrades necessary to comply with Company's Connection Standards.

The Customer's grounding, transformer, relaying and generator system shall be designed to handle the normal imbalance on the distribution system.

Customer's additional generation related transformation and other facilities should be owned, operated and maintained by the Customer. At Entergy's option, a standard Entergy transformer/ transformer bank may be provided at Customer expense.

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**For Cases 3-7**, the Customer shall monitor the Company's distribution system and react based upon specifications in this Standard. Grounded Wye to Grounded Wye transformers are preferred with no impedance or resistance grounds. (see next page)

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Feasibility studies are required to design/ specify a monitoring method (transfer trip or another method of reading the Entergy feeder) if:

- Zero sequence path isolation occurs, some examples
  - Impedance/resistance grounds limit fault current and fault signal.
  - Ungrounded connections/ configurations between the Customers generators and Entergy may not consistently detect faults on the Company's distribution system.
- Delta configurations exist because they:
  - balance the Company's distribution system load per phase, making the feeder difficult to monitor
  - may be ungrounded.

#### **4 References**

IEEE 1547 Standard for Interconnecting Distributed Resources with Electric Power Systems

FERC Orders 2006, 2006A, 2006B

IEEE *Guide for Protective Relaying of Utility-Consumer Interconnection* C37.95 (Latest revision)

IEEE 519 *Recommended Practices and Requirements for Harmonic Control in Electric Power Systems*, (Latest Edition)

IEEE 141 *Recommended Practice for Electric Power Distribution for Industrial Plants*, (Latest Edition)

ANSI C84.1 (Latest Edition)

*Connecting Small Electric Generators to the Entergy Distribution System (less than 300kVA)* (Latest Edition), Entergy Standard Number DR0702

*Entergy Customer Installation Standards for Electric Service (Latest edition)*

Entergy Power Quality Standards for Electric Service, latest edition

Entergy Transmission Standard AM3901 (Latest Edition) Affected System New Facilities Coordination

Entergy Transmission Generator Interconnection Customer Requirements Standard PM3901 (Latest Edition)

NERC Reliability Standard FAC-002 (latest version)

Entergy's OATT (Open Access Transmission Tariff), latest version

Operating Company Agreements

#### **5 Responsibilities**

##### **5.1 Interpretation**

Interpretation of this document is the responsibility of the Manager of Standards & Engineering Services or his designee with concurrence of the Asset Planning Department and the Distribution Business Department.

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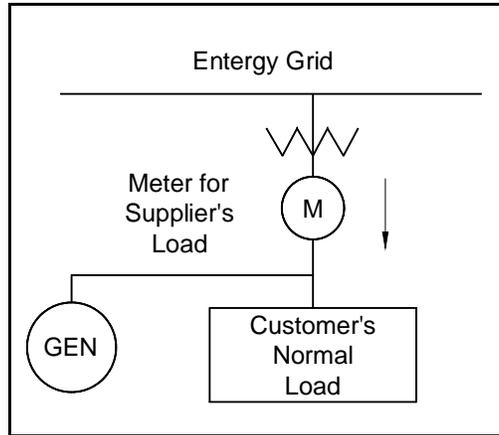
## 5.2 Deviation

The Manager of Standards & Engineering Services is responsible for ensuring that this document is written in accordance with federal, state, and national code requirements. Any deviations must be reported to the Manager of Standards & Engineering Services for consideration for inclusion in this document.

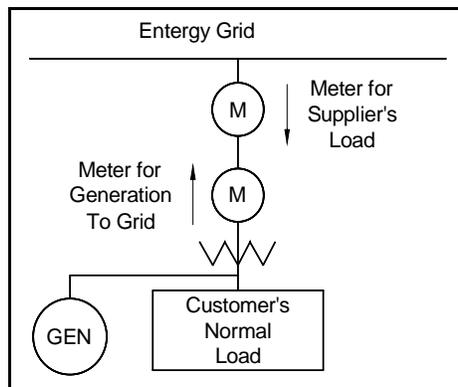
In the event that standards for a specific unit or facility are not set out in this document, the Customer may interconnect a facility using mutually agreed upon technical standards, as authorized by the Manager of Standards & Engineering Services. Deviation from this document may be made only with the consent of the Manager of Standards & Engineering Services or his designee. No other employee is granted independent authority to grant deviations.

**6 Attachments - Metering Arrangements**

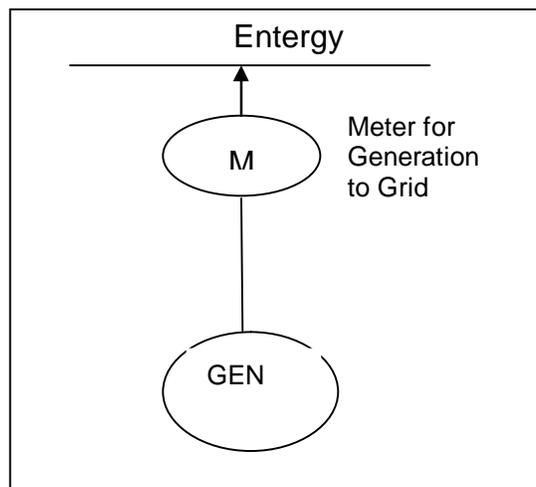
Cases 1-4 (§1.2page5)  
Displaced load only. Supplier does not sell any power.  
Meter measures power in for billing.



**Case 5** (§1.2page5) & Maybe Case 7  
Power Supplier sells excess generation.  
One meter measures power in for billing.  
One meter measures power out for payment to supplier.  
In many cases one meter can perform both functions. Consult the Company



Case 6 & Sometimes Case 7 (§1.2page5)  
Power Supplier sells all generation  
One meter measures power out for payment to supplier.



**Revisions**

Rev 12	Classified as Manual & reviewed/ reorganized for easier reading	4/30/12									
Rev 13	<p><b>§1. 2 Scope</b> Case 7 added Transmission Company involvement required.</p> <p><b>§3.20 Transformation Requirements</b> rewritten to explain Zero sequence path isolation</p> <p><b>§3.8.11 Frequency</b> Interconnection System Response to Abnormal Frequencies</p> <table border="1" data-bbox="407 779 1260 972"> <thead> <tr> <th data-bbox="407 779 643 894">Generator size</th> <th data-bbox="643 779 943 894">Frequency range (Hz)</th> <th data-bbox="943 779 1260 894">Time from beginning of event (seconds)</th> </tr> </thead> <tbody> <tr> <td data-bbox="407 894 643 932">Greater than 30 kVA</td> <td data-bbox="643 894 943 932">Greater than 60.5</td> <td data-bbox="943 894 1260 932">0.16</td> </tr> <tr> <td data-bbox="407 932 643 972"></td> <td data-bbox="643 932 943 972">Less than 59.8</td> <td data-bbox="943 932 1260 972">0.16</td> </tr> </tbody> </table> <p>++ used to say Less than 59.8 to 57 --Adjustable 0.16 – 300 sec (Consult Entergy)</p> <p>Added to Application Manufacturer certified relay response curves submitted ____</p> <p>Put in more noticeable place in Application Customer’s Generation Case (§1.2-page )_____</p> <p>Layout sketch showing lockable, "visible" disconnect device for hot circuits? _____</p> <p><b>§8 Attachments</b> - Metering Arrangements Metering associated with Cases in §1.2</p>	Generator size	Frequency range (Hz)	Time from beginning of event (seconds)	Greater than 30 kVA	Greater than 60.5	0.16		Less than 59.8	0.16	8/7/13
Generator size	Frequency range (Hz)	Time from beginning of event (seconds)									
Greater than 30 kVA	Greater than 60.5	0.16									
	Less than 59.8	0.16									
Rev 14	Changed Connecting Large Electric Generators to the Entergy Distribution System lower range from 500 kVA to 300 kVA to align with the less than 300kVA limit for Net Metering Inquiry and Application Processes Standard due to minimum impact on the Distribution System. Also unit standardization.	5/4/16									

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**8 Application**

Return Completed Application to your local Entergy representative or if you do not have an assigned representative contact 1-800 - Entergy to be assigned a representative.

**The Customer may want to have the vendor of the equipment or a Professional Engineer help fill out this application and checklist.**

Customer's Name: \_\_\_\_\_

Address: \_\_\_\_\_

Contact Person: \_\_\_\_\_

Telephone Number: \_\_\_\_\_ e-mail: \_\_\_\_\_

Fax: \_\_\_\_\_

Service Point Address:

Information Prepared and Submitted By: (Name and Address)

Signature \_\_\_\_\_

Customer's Generation Case (§1.2-page 4) \_\_\_\_\_

Layout sketch showing lockable, "visible" disconnect device for hot circuits?

\_\_\_\_\_ Yes

The Customer or Customer's designated representative shall supply the following information. All applicable items must be accurately completed in order that Entergy may effectively evaluate the Customer's generating facilities for interconnection with the Company's distribution system.

	Source of Power Generation: (Natural Gas Turbine Generator, Solar, Wind, Hydro, Geothermal, Biomass, Fuel Cell, Micro turbine, other(state or describe))	Type of Interface ( Inverter, Synchronous, Induction or other(state or describe))
Manufacturer:		
Model:		
Number of Units		
Generator Rating (s) (kW): (95°F at location)		
Generator Rating (s) (kVA):(95°F at location)		
Power Factor:		
Voltage Rating:		
Ampere Rating:		

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Short Circuit Current:		
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(Note: If more units will be used, complete a separate attachment with the information above)

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Customer/Company \_\_\_\_\_ Date \_\_\_\_\_

Number of Phases: \_\_\_\_\_

Frequency: \_\_\_\_\_

Short Circuit Current: \_\_\_\_\_

Will you supply the necessary VAr requirements? \_\_\_\_\_ Yes \_\_\_\_\_ No

Do you plan to export power? \_\_\_\_\_ Yes \_\_\_\_\_ No

If Yes, maximum amount expected: \_\_\_\_\_

Expected Energizing and Start-up Date: \_\_\_\_\_

Normal Operation of Interconnection: (examples: provide power to meet base load, demand management, standby, back-up, other (please describe)) \_\_\_\_\_  
\_\_\_\_\_

One-line diagram attached: \_\_\_\_\_ Yes

(Adequate drawings of the Customer's proposed facility, which will include a one line diagram and proposed relay systems, must be submitted to the Company for review during the planning stage. Additional drawings may be required on a case by case basis. (3.8.4))

Manufacturer certified relay response curves submitted/included \_\_\_\_\_

List of specifications on protective devices attached? \_\_\_\_\_

Has the generator Manufacturer supplied its dynamic modeling values to Entergy?

Distributed Generation Technical Requirements Compliance Checklist included as attachment with answers to requirements based upon Customer's Generation Case  
\_\_\_ Yes \_\_\_ No

[CUSTOMER NAME]

BY: \_\_\_\_\_

TITLE: \_\_\_\_\_

DATE: \_\_\_\_\_

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Customer/Company \_\_\_\_\_

Date \_\_\_\_\_

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**9 Distributed Generation Technical Requirements Compliance Checklist**

**The Customer is responsible for all the applicable requirements in this Standard.** This checklist is a guide to the requirements that can be found in detail in distribution standard DR07-01, (Section numbers are provided after each requirement.) Two objectives must be met to arrive at compliance by the proposed installation:

**Safety:** The Customer’s facilities will be held to the same standard of care, as the Company is required to maintain. In addition, the safety of the general public and the personnel and equipment of the Company shall in no way be reduced or impaired as a result of the interconnection.

**Customer Impact:** The quality, reliability and the availability of service to the Company’s other Customers shall not be diminished or impaired as a result of the Interconnection.

**(Customer shall supply Description of Proposed Compliance information consistent with the Generation Case)**

Customer’s Generation Case (§1.2-page 4)\_\_\_\_\_

**Customers 1 MVA and larger should also see sections 3.17, 3.19**

Entergy Requirement	Description of Proposed Compliance	Adequate (Y/N)	Comments
<b>Required for Case 2</b>			
1. Provide accessible gang operated load break switch. (3.2)			
<b>Also required for Case 3</b>			
2. Block generator from energizing dead circuits. (3.13.3.4)			
3. Synchronize system within ½ cycle. (3.16)			
4. Appropriate Transformation (3.20)			
5. Specify protective devices and settings. (3.13,3.14 & 3.17)			
6. Supply reactive power. (3.8.7 & 3.8.8)			

Title: **Connecting Large Electric Generators to the Entergy Distribution System(300kVA to 20MVA)**

Effective Date:  
**May 04, 2016**

**Additional Requirements for Cases 4,5,6 & 7 on following page**

**Application page 4 of 4** Customer/Company  
Customer's Generation Case (§1.2-page 4)

**Date**

Entergy Requirement	Description of Proposed Compliance	Adequate (Y/N)	Comments
<b>Requirements for Cases 2 &amp; 3 which apply to Cases 4,5,6&amp; 7 on previous page</b>			
<b>Also required for Case 4</b>			
7. Disconnect intertie within 10 cycles of a service interruption or fault. (3.8.9, 3.8.11, 3.13.3, 3.15 & 3.20)and do not come back on the system for five minutes (3.8.12)			
8. Install fault-interrupting device (3.13.3.3)			
9. Limit voltage flicker, harmonic voltage and current. (3.8.10)			
10. Limit voltage surges and sags to range of ±10% of nominal voltage. (3.8.9)			
11. Limit abnormal frequency (3.8.11)			
<b>Also required for Cases 5-6</b>			
12. Install metering and telemetering equipment. (3.18 & 3.19)			
13. Maintain continual operating communications. (3.19)			
<b>Also Required for Case 7</b>			
14. Transmission Standard PM3901			
15. FERC Orders 2006, 2006A & 2006B (see 4.0 References)			

**Exhibit H-3**  
**Distribution Inter-Connection Process**

Title: <b>DISTRIBUTION INTER-CONNECTION PROCESS</b>	Effective Date: <b>May 04, 2016</b>
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Prepared By: Michael R. Gray	Approved By: James R. Hickman
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Distribution Design Basis / Standards

Manager of Distribution Design Basis / Standards

### 1.0 Purpose

The Distribution Inter-Connection Process is the overall process for queuing, processing, executing, and maintaining Interconnection Agreements for Generators 20MVA and smaller in size connecting to the Entergy System via Distribution

### 2.0 References

- 2.1 *Net Metering Inquiry and Application Process*, Distribution Standard Number DR07-04, latest version
- 2.2 *Connecting Large Electric Generators to the Entergy Distribution System (300kV to 20MVA)*, Standard Number DR07-01, latest version (includes application)
- 2.3 *Connecting Small Electric Generators to the Entergy Distribution System (less than 300kVA)*, Standard Number DR07-02, latest version (includes application)
- 2.4 *Entergy Small Generator Interconnection Procedures, Transmission Procedure RC-AD-055* latest version
- 2.5 *Small Generator Interconnection Agreement*, latest version

### 3.0 Definitions

- 3.1 Customer Relations – In Distribution may be Customer Service Manager, Manager, Major Accounts, and Account Service Manager.
- 3.2 CUTD - Customer Technical Design, an internal Entergy document that assigns a project to Distribution Design for processing
- 3.3 Distribution Voltage – Below 69kV. These Customers are covered by this Standard
- 3.4 Transmission Voltage – 69kV and higher. These customers are referred to Transmission and the Entergy Small Generator Interconnection Procedures
- 3.5 FERC Jurisdiction – Any Small Generation Interconnection Customer engaging in interstate commerce. These customers are referred to Transmission and the Entergy Small Generator Interconnection Procedures
- 3.6 Interstate Commerce – Wholesale electric marketing or any electric power purchase agreement not between the Small Generator Interconnection Customer (or their agent) and the connecting utility
- 3.7 Small Generator Interconnection Customer – Any customer desiring to interconnect a generator to the Entergy system with a total capacity less than or equal to 20 MVA.
- 3.8 Pre-interconnection study - A study or studies that may be undertaken by the Company in response to its receipt of a completed application for interconnection and parallel operation with the distribution delivery system. Pre-interconnection studies may include, but are not limited to:
  - 3.8.1 Scoping meetings/Studies *includes*
    - 3.8.1.1 A fact finding meeting/telecom with Customer and discussion of Customer responsibilities and requirements and applicable policies. (Customer Relations and Asset Planning)
    - 3.8.1.2 Asset Planning to determine if interference with the system protective equipment may occur, electricity may flow back to the substation and impact transmission, available fault current, capacitor bank impact, frequency, and voltage may be effected under normal and worst case situations. Conductors / Lines or other devices and elements that may be undersized or otherwise need settings changes as a result of the proposed generation

- 3.8.1.3 Discussion/Meeting with Customer to either
  - 3.8.1.3.1 If no impacts on grid are identified, accept the project and Customer Relations presents a contract, or
  - 3.8.1.3.2 Share potential impact on grid and future studies necessary, advise estimated costs of chosen study(s) and may provide order of magnitude estimates on facilities costs.
  - 3.8.1.3.3 If transmission is to be involved to discuss this with Customer and get Transmission to contact Customer and discuss *Entergy Small Generator Interconnection Procedures* and other policies or procedures involved.
- 3.8.1.4 Product is the minimum information for attaching a small distributed generation unit at a particular location on the distribution system or results in identifying the necessity of further engineering studies or if transmission involvement is necessary.
  
- 3.8.2 Feasibility Study – A formal study identifying
  - 3.8.2.1 Any system protection equipment short circuit capacity limits exceeded,
  - 3.8.2.2 Thermal overload, frequency or voltage limit violations resulting from the interconnection,
  - 3.8.2.3 Initial review of grounding requirements and coordination.
  - 3.8.2.4 Product is initial and non-binding estimates of facilities, cost to interconnect and identification of further studies needed and their cost.
  - 3.8.2.5 Entergy requires a \$1,000 deposit for the Feasibility Study. Study is done at Customer cost.
  
- 3.8.3 System Impact Study – shall
  - 3.8.3.1 Identify and detail the electric system impacts that would result if the proposed Small Generating Facility were interconnected without project modifications or electric system modifications, focusing on the adverse system impacts identified in the feasibility study,
  - 3.8.3.2 Study potential impacts, including but not limited to those identified in the scoping meeting.
  - 3.8.3.3 Product is an evaluation of the impact of the proposed interconnection on the reliability of the electric system.
  - 3.8.3.4 Entergy requires a \$50,000 deposit for the System Impact Study. Study is done at Customer cost.
  
- 3.8.4 Facilities study –
  - 3.8.4.1 Shall specify and estimate the cost of the equipment, engineering, procurement and construction work (including overheads) needed to implement the conclusions of the system impact study(s).
  - 3.8.4.2 Entergy requires a deposit of the good faith estimated costs for the facilities study from the Customer. Study is done at Customer cost.

4.0 Customer Request

- 4.1 Customer contacts Entergy about connecting an electric generator to the system
- 4.2 Inquiries received from
  - 4.2.1 Call Center are forwarded to Appropriate local Distribution Design Group via a CUTD

- 4.2.2 Internet are forwarded to Distribution Design
- 4.2.3 Known Entergy contacts should be forwarded to Distribution Design via a CUTD
- 4.3 Distribution design with the as needed assistance of Customer Relations, Asset Planning Engineer, Distribution and Senior Wholesale Executive, Transmission Project Development contacts the customer to verify customer request and answer questions
  - 4.3.1 Customer Relations will answer any questions about rates
  - 4.3.2 If less than 300kVA, and connected at Distribution Voltage – Below 69kV, and no impact on Distribution, Distribution Design will follow
    - 4.3.2.1 *Net Metering Inquiry and Application Processes Standard*, if qualified, or
    - 4.3.2.2 Manage remaining customer interface in accordance *Connecting Small Electric Generators to the Entergy Distribution System (less than 300kVA)*
  - 4.3.3 Distribution Design will handoff to Asset Planning if
    - 4.3.3.1 Generation connected at Transmission Voltage – 69kV and higher, or
    - 4.3.3.2 Customer wants to wheel power across the transmission grid, or
    - 4.3.3.3 Generator greater than 300kVA
    - 4.3.3.4 Generator impacts Distribution line sizing, coordination, etc.
  - 4.3.4 Asset Planning will handoff to Senior Wholesale Executive, Transmission Project Development if
    - 4.3.4.1 Generation connected Transmission Voltage – 69kV and higher, or
    - 4.3.4.2 Customer wants to wheel power across the transmission grid (FERC jurisdiction), or
    - 4.3.4.3 Generator greater than 20MVA
- 5.0 Customer submits appropriate Distribution interconnection application (see references 2.2& 2.3)
  - 5.1 Applications received via
    - 5.1.1 Call Center are forwarded to Appropriate Distribution Design Group via a CUTD
    - 5.1.2 Internet are forwarded to Distribution Design
    - 5.1.3 Known contacts are forwarded to Distribution Design via a CUTD
  - 5.2 Distribution design receives and verifies application
    - 5.2.1 If less than 300kVA, and connected at Distribution Voltage – Below 69kV, and no impact on Distribution, Distribution Design will follow
      - 5.2.1.1 *Net Metering Inquiry and Application Processes Standard*, if qualified, or
      - 5.2.1.2 Manage remaining customer interface in accordance *Connecting Small Electric Generators to the Entergy Distribution System (less than 300kVA)*
    - 5.2.2 Distribution Design will handoff to Asset Planning if
      - 5.2.2.1 Generation connected at Transmission Voltage – 69kV and higher, or
      - 5.2.2.2 Customer wants to wheel power across the transmission grid, or
      - 5.2.2.3 Generator greater than 300kVA
      - 5.2.2.4 Generator impacts Distribution line sizing, coordination, etc.
    - 5.2.3 Asset Planning will handoff to Senior Wholesale Executive, Transmission Project Development if
      - 5.2.3.1 Generation connected Transmission Voltage – 69kV and higher, or
      - 5.2.3.2 Customer wants to wheel power across the transmission grid, or
      - 5.2.3.3 Generator greater than 20MVA

- 6.0 Asset Planning contacts and discusses with Customer, makes site visit and performs Scoping Study. Asset Planning determines:
  - 6.1 If Feasibility Studies and System Impact Studies are required and
  - 6.2 The potential for Transmission Grid impact i.e.
    - 6.2.1 Generation connected at a Transmission Voltage, or
    - 6.2.2 Customer wants to wheel power across the transmission grid, or
    - 6.2.3 Electric power will flow onto Transmission Grid
  
- 7.0 If the Transmission System is impacted(as defined in 6.2), and generator is to be connected at Distribution Voltage the Asset Planner and Customer Relations must contact the Transmission Project Development group for feedback and to follow Transmission procedure and process. If Transmission is involved other studies may be done on Transmission side (see *Entergy Small Generator Interconnection Procedures and Small Generator Interconnection Agreement*)
  
- 8.0 If Feasibility Studies and System Impact Studies are required Customer Relations is notified to setup a meeting with the customer via conference calls or face to face.
  
- 9.0 Customer Relations obtains from customer a signed pre-interconnection study agreement (letter agreement) and deposit(s) which allows Asset Planning to proceed with the Feasibility Study and System Impact Study if required.
  
- 10.0 Interconnection agreements are signed only after Distribution and (if necessary) Transmission issues are resolved.
  
- 11.0 If the customer wishes to terminate the Interconnection Process at any time, Customer must notify assigned Entergy Customer contact of this intent.

## 12.0 Revisions

01	Changed Connecting Large Electric Generators to the Entergy Distribution System lower range from 500 kVA to 300 kVA to align with the less than 300kVA limit for Net Metering Inquiry and Application Processes Standard due to minimum impact on the Distribution System. Also minor units standardization.	5/4/16
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