

JACKSON ELECTRIC MEMBERSHIP CORPORATION



**DISTRIBUTED GENERATION
INTERCONNECTION PROCEDURE**

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JACKSON ELECTRIC MEMBERSHIP CORPORATION
DISTRIBUTED GENERATION INTERCONNECTION
PROCEDURE

TABLE OF CONTENTS

PurposePage 2

DefinitionsPage 2

Requirements for InterconnectionPage 3

Application ProcessPage 5

Insurance and IndemnityPage 7

Appendix A: Application Process FlowchartPage 8

Appendix B: Interconnection Request.....Page 9

Appendix C: Interconnection Agreement.....Page 12

JACKSON ELECTRIC MEMBERSHIP CORPORATION

DISTRIBUTED GENERATION INTERCONNECTION PROCEDURE

I. PURPOSE

The purpose of this procedure is to define the minimum requirements for the interconnection of Distributed Generation (DG) to Jackson Electric Membership Corporation's (JEMC) Distribution System. It is to be used as a guide for JEMC customers wanting to install generation and operate it in parallel to the Distribution System (Interconnection Customer). The procedure applies to generators with a capacity of less than 10 MVA that operate in parallel for more than 100 milliseconds.

The requirements are intended to achieve the following:

1. Permit the Interconnection Customer to operate the Distributed Generation equipment in parallel with the Distribution System in a safe and efficient manner.
2. Ensure the safety of the general public and JEMC personnel.
3. Minimize the possible damage to the property of the general public, JEMC, and JEMC customers.
4. Minimize adverse operating conditions of the Distribution System.
5. Maintain quality service to other JEMC customers.
6. Comply with all local, independent, state, and federal governmental regulations.
7. Describe cost responsibility for interconnection.
8. Provide standard agreements and application processes.

II. DEFINITIONS

The following words and terms shall have the following meanings:

1. "Business Day" means any JEMC workday Monday thru Friday except for JEMC holidays during which the offices of JEMC are closed. These are including New Year's Day, Martin Luther King Day, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the day after Thanksgiving Day, Christmas Eve, and Christmas Day.
2. "Certified" means to adhering to applicable operational and safety standards including ANSI/IEEE standards, Underwriters Laboratory (UL) standards, NEC, and the NESC. Certified equipment shall be certified by testing according to the appropriate standard and documentation of testing and certification should be available upon request to JEMC.

3. “Certified Inverter” means a device that changes direct current (DC) electrical power to alternating current (AC) electrical power and is certified to UL-1741, UL-1741SA, and complies with IEEE 1547 and referenced standards.
4. “Non-certified inverters” shall be certified by a professional engineer to be in compliance with all the requirements of IEEE 1547 and requirements documented herein.
5. “Certification of Completion” means a certificate issued by the county inspector or the generation installer stating that the installation is constructed according to approved design, specifications, and is compliant with federal, state, independent, and local regulations.
6. “Distributed Generation” or (DG) means a facility owned or operated by a JEMC customer for the production of electrical energy, including energy storage, that is located on the customer’s premises and that operates in parallel with the Distribution System. By special permission as described in the Addendum to the Interconnection Agreement, the DG facility may be owned and operated by a third party which is not a JEMC customer.
7. “Distribution System” means the collection of lines, poles, and equipment owned and operated by JEMC for the purpose of delivering electrical power to its customers.
8. “Fast Track Process” means an acceptance of the Interconnection Request by JEMC without further engineering studies upon the DG facility qualifying using the screens in Section IV part 2.
9. “Interconnection Request” means the submittal of the Application in which the Interconnection Customer expresses intent to interconnect a DG facility to the Distribution System.
10. “Line Section” means a section of the Distribution System between two sectionalizing devices.
11. “Point of Common Coupling” means the point where the JEMC-owned/operated facilities connect to the Interconnection Customer-owned/operated facilities, usually but not necessarily at the metering point.
12. “Reclosing” means the sequence of open and close operations by fault protective devices which are automatic and intended to clear or isolate a fault on the Distribution System with the least service interruption to JEMC customers.
13. “Single-Phase Shared Secondary” means any section of the Distribution System operated at single phase service utilization voltage (typically 240 Volts) that provides electrical power to more than one customer.
14. “Study Process” means the process of identifying, completing, and reviewing necessary engineering studies to evaluate the Interconnection Request. The Study Process is an interactive process between JEMC and the Interconnection Customer described in Section IV parts 3 and 4.

III. REQUIREMENTS FOR INTERCONNECTION

1. Evaluation of Requirements

Each DG will be evaluated by JEMC to determine what engineering studies are required for safety and power quality concerns. The interconnection of the DG shall not cause any reduction in the quality of service being provided to other customers. The impact of the DG on the Distribution System is highly dependent on its location.

The following are criteria that each DG shall abide by:

- a. The DG will not cause JEMC service voltage to go outside the requirements of ANSI C84.1 Range A.
- b. The grounding scheme of the DG shall not cause over voltages that exceed the rating of equipment connected to the Distribution System and shall not disrupt the coordination of protective devices.
- c. The DG shall tie into the Distribution System without causing a voltage fluctuation as defined by IEEE 1547 Section 7.2. For low voltage connection the DER shall not cause step or ramp changes in the RMA voltage exceeding 5% of nominal and exceeding 5% per second averaged over a period of one second. Further, the flicker measured at the PCC shall not exceed the limits defined by IEC/TR 61000-3-7. For abnormal conditions (voltage and frequency), the DG shall cease to be energized for variations in voltage and frequency. The clearing timing will be as defined in IEEE 1547 (Tables 11-12 and Table 18).
- d. The mode of operation of any inverters would be specified in the application (i.e. constant PF, voltage-reactive power mode, active power-reactive mode, etc).
- e. Unless specifically agreed to by the Cooperative, the DG shall be operated so that it does not energize any conductors or equipment on the Distribution System when an upstream JEMC protective device is open or the utility feed to the DG is otherwise open (i.e. the DG shall be anti-islanding).
- f. For DG systems that have energy storage, the energy storage capacity will be included in the total DG capacity.
- g. Harmonics measured at the Point of Common Coupling shall comply with the limits in IEEE 1547.
- h. The Cooperative can require monitoring and control for any DG with a capacity over 200 kW.
- i. The DG shall only reconnect after the Distribution System has been within voltage and frequency limits, as defined in IEEE 1547, Table 4) for 5 minutes.

The Interconnection Customer is solely responsible for protecting their equipment from damage due to faults or other disturbances on the Distribution System.

2. General Requirements

The following are requirements for any DG that will be operated in parallel with the Distribution System.

- a. The DG system design must be reviewed and accepted by JEMC before installation. This includes all devices and equipment.
- b. Any relay settings used will be reviewed and accepted by JEMC. However, JEMC is not responsible for the protection of the DG system or DG's equipment.
- c. A disconnect device shall be installed to electrically isolate the Distribution System from the DG. This device shall provide a visible air gap between the DG and Distribution System and be lockable in the open position. JEMC shall have access to operate the disconnect. Signage for the DG equipment shall comply with the current National Electrical Code.

3. Operating Requirements

The total generation output is required to be less than the minimum substation load under maximum single distribution contingency to prevent power flowing into the transmission system

4. Protection Requirements

The location of the Point of Common Coupling shall be determined by JEMC. The DG shall be designed with proper protective devices to promptly and automatically disconnect the generation from the Distribution System in the event of a fault or other system abnormality as described in IEEE 1547. The disconnecting device should be capable of carrying the maximum generation output and interrupting the maximum available fault current supplied by the generating equipment and the Distribution System.

5. Electrical Code Compliance

The Interconnection Customer shall be responsible for complying with all applicable local, independent, state and federal codes such as, but not limited to, building codes, National Electric Code (NEC), National Electrical Safety Code (NESC), noise, and emissions standards.

The DG shall comply with the latest revisions of the ANSI/IEEE standards applicable to the installation, including IEEE 1547 "Standard for Interconnecting Distributed Resources with Electric Power Systems."

IV. APPLICATION PROCESS

A customer who intends to interconnect a DG system with the Distribution System will undergo the following process:

1. The Interconnection Customer completes the Interconnection Request (Application) and submits it to JEMC. JEMC acknowledges receipt of the Application within three Business Days. JEMC evaluates the Application for completeness and notifies the Interconnection Customer within ten Business Days if the Application is complete and, if not, advises what material is missing.
2. JEMC verifies that the DG Facility can be interconnected safely and reliably using the screens contained in the Fast Track Process within 15 Business Days of receiving the completed Interconnection Request. If the proposed DG is a Certified Inverter-based system no larger than 10 kW for a residential system and 100 kW for a commercial system, it can apply using the Fast Track Process. Otherwise, the following are screens used to determine the applicability of the Fast Track Process.
 - a. The proposed DG system, in aggregation with other generation and storage on the same service transformer is no larger than the nameplate rating of the service transformer.
 - b. The proposed DG in aggregation with other generators serviced by the Line Section does not exceed 15% of the annual minimum load for the Line Section with which it will interconnect.
 - c. The proposed DG, in aggregation with other generation on the distribution circuit, shall not contribute more than 10% to the distribution circuit's maximum fault current at the point of the nearest interconnection with the JEMC primary distribution voltage.
 - d. The proposed DG, in aggregation with other generation on the distribution circuit, shall not cause any distribution protective device and equipment (including, but not limited to, substation breakers, fuse cutouts, and line reclosers), or Interconnection Customer equipment on the system to exceed 87.5% of the short circuit interrupting capability.
 - e. If the proposed DG is to be interconnected to a Single-Phase Shared Secondary, the aggregate generation capacity on the secondary, including the proposed DG, shall not exceed 65% of the transformer nameplate.
 - f. If the proposed DG is single-phase and is to be interconnected on a center tap neutral of a 240 volt service, its addition shall not create an imbalance between the two sides of the 240 volt service of more than 20% of the nameplate rating of the service transformer.
 - g. No construction of facilities beyond a change in metering equipment by JEMC on its own system shall be required to accommodate the small DG .

If the proposed DG passes the screens for the Fast Track Process, and unless JEMC determines that the DG Facility cannot be interconnected consistent with safety, reliability, and power quality standards in accordance with Section II, then JEMC shall approve the Interconnection Request and provide the Interconnection Customer an executable Interconnection Agreement within five Business Days after the determination.

In either of the cases above, steps 3 and 4 of the Application Process (below) are deemed completed. However, if the proposed DG fails any of the screens and JEMC determines that the DG Facility cannot be interconnected consistent with safety, reliability, and power quality standards in accordance with Section II, the Interconnection Customer will have the opportunity to attend a scoping meeting as described in step 3.

3. If the proposed DG (1) is larger than 100 kW, or (2) is not Certified, or (3) is Certified but did not pass the Fast Track Process, the Study Process shall be used. The Study Process starts with a scoping meeting to discuss the Interconnection Request. In this meeting any further studies, such as a feasibility study, a system impact study, or a facility study will be discussed, along with any further fees needed to perform these studies. Also, in the case that modifications to the request are required in order to comply with the requirements of Section II, the modifications will be identified by JEMC and communicated to the Interconnection Customer. At this point, the Interconnection Customer can determine whether or not to proceed with the further studies, pay applicable fees, and/or make necessary modifications to the Application.
4. After JEMC completes a system impact study and a facilities study,, the results of the studies will be shared with the Interconnection Customer. These results will include identification of system upgrades and dedicated facilities, estimates of the interconnection costs, any monitoring, special metering or control requirements, any special protection requirements, or any other applicable study results. At this point, the Interconnection Customer can determine whether or not to proceed with a final design submission and pay any identified interconnection costs. JEMC will review the final design and unless JEMC determines that the DG Facility cannot be interconnected consistent with safety, reliability, and power quality standards in accordance with Section II, then JEMC shall approve the Interconnection Request and shall provide the Interconnection Customer an executable Interconnection Agreement within five Business Days after the determination.
5. After execution of the Interconnection Agreement and payment for the identified interconnection costs, if applicable, the Interconnection Customer can proceed with installation of the DG system. JEMC will use prudent utility practices to coordinate with the Interconnection Customer to complete the system installation and construct any needed Distribution System facilities. After installation and all applicable equipment modifications or additions are completed the Interconnection Customer shall cause the installation to be inspected or otherwise certified by the appropriate local electrical wiring inspector with jurisdiction and shall return the Certificate of Completion to JEMC.
6. Prior to parallel operation of the DG, a witness test shall be performed by JEMC to insure the proper installation, programming, and operation of the interconnection protective devices in compliance with applicable standards. If the witness test is not satisfactory, JEMC has the right to disconnect the DG Facility and notify the Interconnection Customer of what steps it must take to pass inspection. If the witness test is satisfactory, JEMC will notify the Customer in writing that interconnection of the DG facility is authorized and schedule any necessary metering replacement. The Interconnection Customer has no right to operate the DG in parallel until authorized by JEMC. JEMC is obligated to complete this witness test within ten Business Days of the receipt of the Certificate of Completion. If JEMC does not perform the witness test within ten Business Days or within a schedule determined by mutual agreement of the parties, the witness test is deemed waived. The witness test serves the purpose of ensuring the

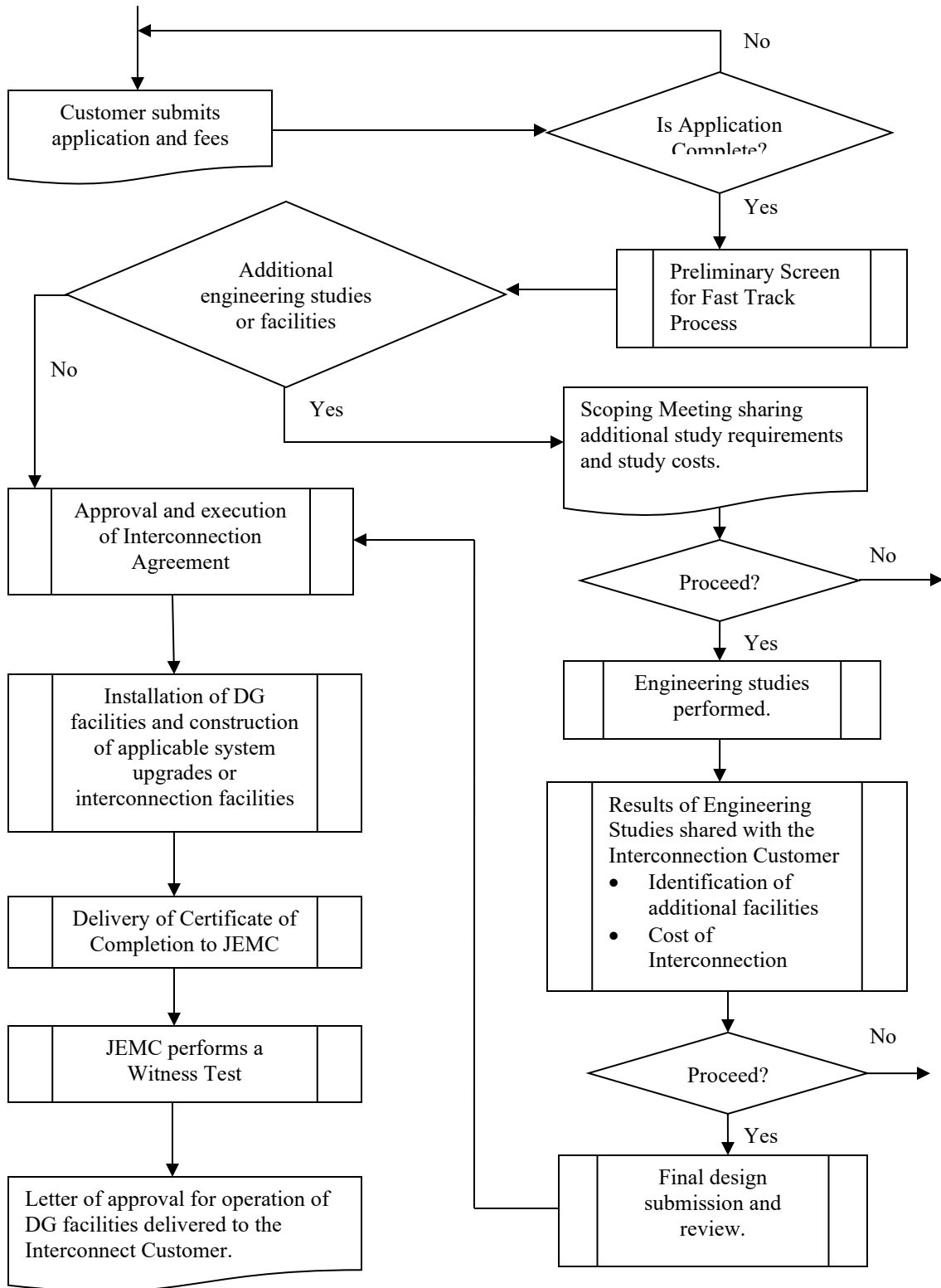
parallel operation of the DG will not negatively impact the quality of electric service provided by the Cooperative or compromise the safety of Cooperative employees or the public. Neither the witness test nor the granting of approval to connect shall serve to relieve the Interconnection Customer of any liability for injury, death or damage attributable to the negligence of the Interconnection Customer.

V. INSURANCE AND INDEMNITY

Interconnection Customer may consider obtaining liability insurance which insures the Interconnection Customer against all claims for property damage and for personal injury or death arising out of, resulting from or in any manner connected with the installation, operation, and maintenance of the DG equipment. Otherwise, the Cooperative's liability is limited herein and in accordance with its Tariff and Business Rules, and Interconnection Customer agrees to indemnify and hold the Cooperative harmless from all claims except as may be specified herein or in the Tariff and Business Rules.

APPENDIX A

INTERCONNECTION APPLICATION PROCESS FLOWCHART



APPENDIX B
INTERCONNECTION REQUEST
(APPLICATION)

JACKSON ELECTRIC MEMBERSHIP CORPORATION

**INTERCONNECTION REQUEST
(APPLICATION)**

Processing Fee

A non-refundable processing fee of \$100 must accompany this Application.

Interconnection Customer

Name: _____
Contact Person: _____
Address: _____
City, State, Zip: _____
Telephone (Day): _____
(Evening): _____
Fax: _____
E-Mail Address: _____

Contact (if different from Interconnection Customer)

Name: _____
Contact Person: _____
Address: _____
City, State, Zip: _____
Telephone (Day): _____
(Evening): _____
Fax: _____
E-Mail Address: _____

Distributed Generation Facility Information

Location (if different from above): _____
Account Number: _____

Prime Mover: Photovoltaic _____ Reciprocating Engine _____ Fuel Cell _____
Turbine _____ Other _____
Energy Source: Solar _____ Wind _____ Hydro _____ Diesel _____
Natural Gas _____ Fuel Oil _____ Battery _____ Other (describe) _____
System Design Capacity (Total Panel DC Capacity): _____ (kW)

Generator (or Panel) Manufacturer: _____ Model: _____

Inverter Information (if applicable)

Inverter Manufacturer: _____ Model: _____

Nameplate Rating: _____ (kW) _____ (AC Volts)
_____ Single Phase _____ Three Phase

Is the equipment UL 1741 Listed? Yes _____ No _____

If Yes, attach manufacturer's cut-sheet showing UL 1741 listing.

Battery Manufacturer: _____

Battery Energy: _____ (kWh) Battery Power: _____ (kW)

Disconnect Switch Manufacturer _____ Model: _____

Disconnect Switch Rating: _____ (AC Amps)

List components of the Distributed Generation Facility equipment package that are currently certified:

Equipment Type	Certifying Entity
1.	
2.	
3.	
4.	
5.	

Please attach a detailed one-line diagram of the proposed Distributed Generation Facility, major equipment specifications (generators, transformers, inverters, circuit breakers, protective relays, disconnect switches, etc), and any other applicable drawings or documents necessary to for the proper design of the interconnection.

Estimated Installation Date:

Estimated In-Service Date:

Interconnection Customer Signature

I hereby certify that, to the best of my knowledge, the information provided in this Application is true. I agree to provide any further information required during the Interconnection Application Process and to install and operate the interconnecting equipment according to the Terms and Conditions as outlined in Jackson Electric Membership Corporation's Distribution Interconnection Procedure.

Signed: _____

Title: _____

Date: _____

APPENDIX C
INTERCONNECTION AGREEMENT

JACKSON ELECTRIC MEMBERSHIP CORPORATION

DISTRIBUTED GENERATION FACILITY INTERCONNECTION AGREEMENT

This Agreement made _____, 20__ between Jackson Electric Membership Corporation (hereinafter called “Cooperative”), and _____ (name) located at _____

_____ (address) (hereinafter called the “Interconnection Customer”), (hereinafter sometimes individually referred to as a “Party” and sometimes collectively referred to as the “Parties”).

WHEREAS, the Cooperative is an electric membership corporation providing retail electric service, and

WHEREAS, the Interconnection Customer is a member of the Cooperative; and

WHEREAS, the Interconnection Customer desires to install, operate, and maintain a Distributed Generation (DG) facility as defined in the Cooperative’s Distributed Generation Interconnection Procedure; and

WHEREAS, the Interconnection Customer desires to operate its generation equipment in parallel with the Cooperative’s System.

WHEREAS, if the Interconnection Customer desires to sell electrical energy to the Cooperative, the metering required, and rate shall be determined by the Net Metering Rider of the Cooperative unless another agreement is reached between the Parties.

NOW THEREFORE, it is understood and agreed that the Cooperative shall permit the Interconnection Customer to connect its generation system to the Cooperative’s Distribution System and to operate its generation equipment in parallel with the Cooperative’s Distribution System subject to the following terms and conditions:

1) CONSTRUCTION OF THE FACILITY

The Interconnection Customer may proceed to construct (including operational testing not to exceed two hours) the DG Facility when the Cooperative approves the Interconnection Request and executes this Agreement.

2) INTERCONNECTION AND OPERATION

The Interconnection Customer may operate DG Facility and interconnect with the Cooperative’s electric system once all of the following have occurred:

- 2.1) Upon completing construction, the Interconnection Customer will cause the DG Facility to be inspected or otherwise certified by the appropriate local electrical wiring inspector with jurisdiction, and

- 2.2) The Interconnection Customer returns the Certification of Completion to the Cooperative, and
- 2.3) The Cooperative has either:
 - 2.3.1) Completed its witness test of the DG Facility for safe, parallel operation including operation of the interconnection protective devices in compliance with applicable standards. The witness test shall be conducted by the Cooperative, at its own expense, within ten Business Days after receipt of the Certificate of Completion and shall take place at a time agreeable to the Parties. The Cooperative shall provide a written statement that the DG Facility has passed inspection or shall notify the Interconnection Customer of what steps it must take to pass inspection as soon as practicable after the inspection takes place; or
 - 2.3.2) If the Cooperative does not schedule an inspection of the DG Facility within ten Business Days after receiving the Certificate of Completion, the witness test is deemed waived (unless the Parties agree otherwise); or
 - 2.3.3) The Cooperative waives the right to complete a witness test of the DG Facility.
 - 2.3.4) The witness test serves the purpose of ensuring the parallel operation of the DG will not negatively impact the quality of electric service provided by the Cooperative or compromise the safety of Cooperative employees or the public. Neither the witness test nor the granting of approval to connect shall serve to relieve the Interconnection Customer of any liability for injury, death or damage attributable to the negligence of the Interconnection Customer.
- 2.4) The Cooperative has the right to disconnect the DG Facility in the event of improper installation or failure to return the Certificate of Completion.
- 2.5) Revenue quality bidirectional metering equipment must be installed and tested in accordance with applicable ANSI standards by the Cooperative.
- 2.6) The Cooperative reserves the right to automatically or manually disconnect the Distributed Generation Customer's generation equipment without prior notice whenever, at the Cooperative's sole discretion, the Distributed Generation Customer is deemed by the Cooperative to not be in compliance with the minimum interconnection requirements as specified via this Agreement. The interconnection will remain open until corrective action is taken and suitable testing is completed.
- 2.7) Distributed Generator Customer agrees to not to modify, change, or replaced components of the protection scheme without written permission from JEMC. Further the Distribution Generator Customers agrees not to increase the capacity for the distribution generation resource agreed to herein nor add battery storage systems.

3) SAFE OPERATION AND MAINTENANCE

The Interconnection Customer shall be fully responsible to operate, maintain, and repair the DG Facility as required to ensure that it complies at all times with the requirements of interconnection as provided for in the Interconnection Procedure section III.

4) ACCESS

The Cooperative shall have access to the disconnect switch for the DG Facility at all times. The Cooperative shall provide reasonable notice to the Interconnection Customer when possible prior to using its right of access.

5) DISCONNECTION

The Cooperative may temporarily disconnect the DG Facility upon the following conditions:

- 5.1) For scheduled outages upon reasonable notice. The Cooperative shall inform the Interconnection Customer in advance of any scheduled disconnection.
- 5.2) For unscheduled outages or emergency conditions.
- 5.3) If the DG Facility does not operate in the manner consistent with these Terms and Conditions.

6) INSURANCE

Interconnection Customer may consider obtaining liability insurance which insures the Interconnection Customer against all claims for property damage and for personal injury or death arising out of, resulting from or in any manner connected with the installation, operation, and maintenance of the DG equipment.

7) LIMITATION OF LIABILITY AND INDEMNIFICATION

The Cooperative's liability is limited herein and in accordance with its Tariff and Business Rules, and Interconnection Customer agrees to indemnify and hold the Cooperative harmless from all claims except as may be specified herein or in the Tariff and Business Rules.

8) ADDITIONAL TERMS AND CONDITIONS

Any additional terms and conditions not addressed the body of this Agreement may be attached in an Addendum A.

9) TERMINATION

The agreement to operate in parallel may be terminated under the following conditions:

- 10.1) By the Interconnection Customer - By providing written notice to the Cooperative.
- 10.2) By the Cooperative - If the DG Facility fails to operate for any consecutive 12-month period or the Interconnection Customer fails to remedy a violation of these Terms and Conditions.
- 10.3) Permanent Disconnection - In the event this Agreement is terminated, the Cooperative shall have the right to disconnect its facilities or direct the Interconnection Customer to disconnect its DG Facility.

10.4) Survival Rights - This Agreement shall continue in effect after termination to the extent necessary to allow or require either Party to fulfill rights or obligations that arose under the Agreement.

10) ASSIGNMENT/TRANSFER OF INTERCONNECTION AGREEMENT

This Agreement shall survive the transfer of the electric service for the DG Facility to a new Interconnection Customer unless the agreement is terminated by the new Interconnection Customer. The new Interconnection Customer agrees to comply with the terms of this Agreement upon transfer of electric service for the DG Facility.

IN WITNESS WHEREOF, the Parties hereto have executed this Agreement all as of the day and year first above written.

Jackson Electric Membership Corporation

By: _____

Name: Jonathan Weaver

Title: Director, System Engineering

Interconnection Customer

By: _____

Name: _____

Title: _____