



**MID-OHIO ENERGY
COOPERATIVE, INC.**

A Touchstone Energy[®]
Cooperative



Policies for Interconnection and Operation of Distributed Resources



Updated June 2019



Congratulations! You are taking an important step in promoting energy conservation and awareness by exploring renewable sources of power. The intent of this manual is to help guide cooperative members with the processes for interconnection and operation of distributed resources.

This manual contains policies, procedures, guidelines and agreements for interconnection to Mid-Ohio Energy Cooperative's distribution system. Within this manual you will find the following sections:

- **Operational Policies** – Includes Policy 525 *“Operational Policy for the Interconnection and Operation of Distributed Resources”* and Policy 507 *“Amended and Restated Operational Policy for Qualifying Cogeneration and Small Power Production Facilities”* determining whether a load is distributed to either Mid-Ohio Energy or Buckeye Power.
- **Rules & Regulations** – Includes Policy 521 *“Rules and Regulations for Distributed Resources”* which governs all interconnections to the Mid-Ohio Energy system.
- **Technical Guidelines** – This section includes the definitions and technical specifications for all Distributed Resource connections.
- **Net Metering** – This section is a rate schedule “NM” for residential loads of 25 kW and below, OR for non-residential loads that are 100 kW and below.
- **Back Up & Supplementary** – This section outlines rate schedule “S”, applied to residential generating loads above 25 kW and non-residential loads above 100 kW. In this case, credits would be applied from Buckeye Power, Inc.
- **Application for Distributed Resource** – This is the application containing information relevant for your interconnection project. Please note there is a \$50.00 application fee to be paid before the application will be reviewed by the cooperative.

In addition to the documents contained in this manual, all interconnected resources and facilities will need to fill out any required agreements and have a system impact study performed if necessary. Specifics required will be determined depending on the size and intended purpose of each installation.

If you have more questions upon your review of this manual, please contact one of our offices and we will be glad to assist you. Good luck with your project!

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POLICY 525

Operational Policy for the Interconnection and Operation of Distributed Resources (DR)

PURPOSE:

- A. To provide compliance by the Cooperative with Rural Utilities Service (RUS) regulations, 7 C.F.R. 1730.60 through 1730.65.
- B. To avoid significant degradation of the safety, quality and reliability of Cooperative's electric power system or other electric power systems interconnected to the Cooperative's electric power system caused by the interconnection or operation of DR.
- C. To offer a fair, reasonable and non-discriminatory procedure through which the Cooperative may permit the interconnection and synchronization of certain electric generation facilities owned or operated by manufacturers and similar large commercial and industrial electric power and energy consumers, in parallel operation with the Cooperative's facilities.

PROCEDURE:

The provisions of this policy will extend to all Distributed Resource facilities, including facilities as defined by the Federal Energy Regulatory Commission as qualifying cogeneration facilities or small power production facilities, located within the service territory of the Cooperative.

- A. Distributed Resources:

Distributed Resources (DR) are sources of electric power that are not directly connected to a bulk power transmission system, connected to the Cooperative's electric power system through a point of common coupling. DR facilities include both generators and energy storage technologies.

- B. Qualifying Cogeneration Facility:

Cogeneration is the combined production of electric energy and useful heat by the sequential use of energy from one fuel source. A Qualifying Cogeneration Facility is one which meets the ownership test as well as the operating and efficiency standards and all other definitional requirements of Sections 201 and 210 of the Public Utility Regulatory Policies Act of 1978, as amended, and all governmental regulations lawfully promulgated thereunder (PURPA).

- C. Qualifying Small Power Production Facility:

A Qualifying Small Power Production Facility is a facility generating not more than 80 megawatts of electric power through the employment of renewable

resources such as water power, solar energy, wind energy, geothermal energy, biomass or waste, as a primary fuel and meeting all other definitional requirements of PURPA.

D. Qualifying Facility:

A Qualifying Facility means any Qualifying Cogeneration Facility or Qualifying Small Power Production Facility.

E. Permitted Synchronized Generation Facilities:

Permitted Synchronized Generation Facilities are electric generation facilities other than Qualifying Facilities owned or operated by manufacturers and similar large commercial and industrial electric power and energy consumers in parallel operation with adjacent electric distribution facilities of the Cooperative under circumstances where (1) such generation facilities are operated for the sole purpose of (a) providing back-up generation when it is anticipated that there is a possibility of interruption of generation service provided by the Cooperative, or (b) minimizing or eliminating the consumer's contribution to a PJM 5-CP System Annual Demand, or (c) testing the consumer's electric facilities, and (B) no electric power and energy will be introduced into the electric system of the Cooperative or any other entity.

F. PJM 5-CP System Annual Demand:

PJM 5-CP System Annual Demand shall mean any of the five highest hourly kW coincident demands of all of the members of PJM Interconnection, LLC (or any successor thereto, "PJM"), as measured and determined by PJM for purposes of determining Buckeye's annual PJM capacity charges, or such other hourly kW demands used by PJM to determine Buckeye's responsibility for annual PJM capacity charges, for the applicable PJM planning year (June 1 – May 31), as determined by Buckeye from time to time.

POLICY:

- A. The Cooperative will permit the interconnection and parallel operation of Qualifying Facilities, consistent with Cooperative Policy 507 and Cooperative rules and regulations.
- B. With respect to DR facilities that are not Qualifying Facilities, the Cooperative will permit the interconnection and parallel operation of Permitted Synchronized Generation Facilities where (1) Buckeye has approved the same, (2) such facilities meet all of the Cooperative's Rules and Regulations, and (3) such facilities are equal to or greater than 25 kW but not more than 10 MVA.

- C. DR facilities are otherwise not permitted to interconnect with and operate in parallel with the Cooperative's electric distribution facilities except as approved by the Cooperative's Board of Trustees on a case by case basis.

RESPONSIBILITY:

It shall be the responsibility of the President of the Cooperative to administer the provisions of this policy. The Cooperative shall reconsider, and if necessary update, this policy every five years or more frequently as circumstances warrant.

Policy adopted 5/23/11

POLICY 507

Amended and Restated Operational Policy for Qualifying Cogeneration and Small Power Production Facilities

PURPOSE:

- A. To provide compliance by the Cooperative with the requirements of Sections 201 and 210 of the Public Utility Regulatory Policies Act of 1978, as amended, and all governmental regulations lawfully promulgated thereunder (PURPA).
- B. To encourage the development of cogeneration and small power production facilities which will conserve oil, gas, coal and other nonrenewable resources in accordance with the requirements of PURPA.
- C. To offer a fair, reasonable and nondiscriminatory procedure through which the Cooperative may interconnect with qualifying cogeneration and small power production facilities in accordance with the requirements of PURPA.

PROCEDURE:

The provisions of this policy will extend to all facilities as defined by the Federal Energy Regulatory Commission as qualifying cogeneration facilities or small power production facilities located within the service territory of the Cooperative.

- A. **Qualifying Cogeneration Facility:**

Cogeneration is the combined production of electric energy and useful heat by the sequential use of energy from one fuel source. A qualifying cogeneration facility is one which meets the ownership test as well as the operating and efficiency standards and all other definitional requirements of PURPA.

- B. **Qualifying Small Power Production Facility:**

A small power production facility is a facility generating not more than 80 megawatts of electric power through the employment of renewable resources such as water power, solar energy, wind energy, geothermal energy, biomass or waste, as a primary fuel and meeting all other definitional requirements of PURPA.

- C. **Qualifying Facility:**

A qualifying facility means any qualifying cogeneration facility or qualifying small power production facility.

POLICY:

- A. The Cooperative will interconnect with and operate in parallel with any qualifying facility which meets all of the Cooperative's rules and regulations.
- B. The Cooperative will net meter the energy of each of its non-residential consumer's qualifying facilities having a design capacity of 100 kilowatts or less, and each of its residential consumer's qualifying facilities having a design capacity of 25 kilowatts or less, in circumstances where the output of such facility is not reasonably anticipated to exceed the annual electric energy requirements of the consumer and provided that the total aggregate electric generating capacity of all qualifying facilities interconnected to the electric distribution systems of the members of Buckeye Power, Inc. (Buckeye) and net metered does not exceed 1% of Buckeye's aggregate peak electric demand of all of the Buckeye members, at rates and upon terms and conditions as set forth in the rules, regulations, policies and applicable rate schedules of the Cooperative.
- C. Buckeye will purchase the energy and associated capacity of each qualifying facility, at rates and upon terms and conditions as set forth in the rules, regulations, policies and applicable rate schedules of Buckeye, in the following circumstances:
 - (1) When the output of a non-residential consumer's qualifying facility is greater than 100 kilowatts but not more than 10 MVA; or
 - (2) When the output of a residential consumer's qualifying facility is greater than 25 kilowatts but not more than 10 MVA; or
 - (3) When the output of a qualifying facility up to 100 kilowatts, in the case of a non-residential consumer's facility, or up to 25 kilowatts, in the case of a residential consumer's facility, is reasonably anticipated to exceed the annual electric energy requirements of the consumer; or
 - (4) When the total aggregate electric generating capacity of all qualifying facilities interconnected to the electric distribution systems of the Buckeye members and net metered exceeds 1% of Buckeye's aggregate peak electric demand of all of the Buckeye members; or
 - (5) When the output of the qualifying facility is greater than 10 MVA and Buckeye, the Cooperative, and the consumer have agreed on the terms and conditions for service;
- D. Purchases of electric energy and the associated capacity from a qualifying facility having a design capacity of greater than 10 MVA shall be at rates and upon terms and conditions to be determined on a case by case basis and provided by contract between Buckeye and the qualifying facility owner. The purchase of electric energy and the associated capacity from such a qualifying facility will be at a rate

which reflects at least Buckeye's actual avoided costs, taking into account all relevant factors.

- E. The Cooperative will sell electric energy and the associated capacity to any net metered qualifying facility at rates and upon terms and conditions as specified in the Cooperative's applicable rules, regulations, policies and rate schedules.
- F. The Cooperative will sell back-up and supplementary energy and the associated capacity to any qualifying facility whose output is purchased directly by Buckeye, at rates and upon terms and conditions as specified in the Cooperative's applicable rules, regulations, policies and rate schedules.
- G. The owner or operator of a qualifying facility who desires to interconnect the facility with the electric system of the Cooperative shall pay all costs associated with the interconnection.
- H. The Cooperative shall develop and administer rules, regulations and one or more rate schedules in cooperation with Buckeye covering interconnections with and purchases from qualifying facilities which have a design capacity of not more than 10 MVA.
- I. The Cooperative shall cooperate with Buckeye in developing on a case by case basis, agreements covering interconnection with any qualifying facility having a design capacity of more than 10 MVA.

RESPONSIBILITY:

It shall be the responsibility of the President of the Cooperative to administer the provisions of this policy. The Cooperative shall reconsider, and if necessary update, this policy every five years or more frequently as circumstances warrant.

Policy adopted 5/23/11

POLICY 521

Rules and Regulations for Distributed Resources (DR)

PURPOSE:

To provide for the safety of consumers, Cooperative personnel and the public in general, and to assure reliable electric service consistent with the Cooperative's Operational Policy relating to DR facilities, the following rules and regulations are established for the interconnection and operation of consumer-owned or operated DR facilities. Capitalized terms used but not defined herein shall have the meanings assigned to them in the Cooperative's Operational Policy for DR facilities.

PROCEDURE AND POLICY:

I. The following rules and regulations apply to all Qualifying Facilities having a capacity of not more than 10 MVA, and to all DR facilities that are not Qualifying Facilities but that are approved by Buckeye and the Cooperative. Qualifying Facilities of more than 10 MVA of capacity will be treated on an individual case by case basis. These rules and regulations amend and restate the Rules and Regulations for Qualifying Cogeneration and Small Power Production Facilities, as previously adopted by the Cooperative. These rules and regulations apply to both existing and proposed installations, and are subject to change from time to time as may be deemed necessary or desirable by the Cooperative or as may be required by governmental authorities.

- A. All consumers wishing to interconnect a DR facility to the Cooperative distribution system shall submit for Cooperative review and approval detailed electrical circuit diagrams of the installation, equipment nameplate data for interface devices and control systems and a site plan. Such submittal shall be in sufficient detail to provide reasonable assurance that the DR facility can at all times be operated in a safe, reliable and lawful manner. Without limiting the generality of the foregoing, the owner or operator of the DR facility shall submit to the Cooperative a completed Application for Distributed Resource in the form attached hereto as Attachment 1, subject to such additional changes as the President of the Cooperative may deem necessary or appropriate, and shall submit any application fee as may be required by the Cooperative as noted on the application. As a part of its application review process, the Cooperative may require an opinion as to the safety and reliability of the system from a licensed professional engineer. No DR facility shall be interconnected and synchronized with the Cooperative's electric system without the Cooperative's advance approval of such facility as being in compliance with these rules and regulations.
- B. If a consumer's completed application indicates that the DR facility at issue is a Qualifying Facility, the interconnection and related rights and obligations of the Cooperative and the consumer shall be governed pursuant to the agreements set forth in Paragraphs (S), (T) and (U) below. If a consumer's completed

application indicates that the DR facility at issue is not a Qualifying Facility, the interconnection and/or operation of such facilities shall be governed pursuant to the agreements set forth in Paragraphs (Q) and (R) below. Only the “Responsible Party,” i.e. the owner or operator of a DR facility that is proposed for interconnection to the Cooperative’s distribution system, may apply for interconnection and contract with the Cooperative for the interconnection of a DR facility.

- C. The Cooperative shall clearly explain all costs to be recovered from an applicant with respect to the application process or the interconnection of a DR facility prior to the incurrence of such costs, and shall incur said costs only upon the applicant’s authorization thereof. The Cooperative may require separate, non-refundable deposits from an applicant prior to processing the consumer’s application for the interconnection and/or operation of a DR facility, and prior to the actual interconnection of a Qualifying Facility or a Permitted Synchronized Generation Facility in such amounts as are sufficient to insure the applicant’s intent to interconnect and/or operate the DR facility in accordance with the terms hereof.
- D. The Cooperative may require that the owner or operator of a DR facility enter into a system study agreement, in substantially the form attached hereto as Attachment 2, subject to such additional changes as the President of the Cooperative may deem necessary or appropriate, setting forth the terms and conditions upon which the Cooperative will perform a system impact study to assess the ability of the existing Cooperative system to accommodate the connection and safe operation of the DR facility, including the cost to be paid by the DR facility owner or operator for such study. The owner or operator shall pay for all costs associated with any addition or alteration to the Cooperative’s system required for metering and for the safe and reliable operation of the DR facility in parallel with the Cooperative’s electric system, including those set forth in the system impact study. Where alterations to the Cooperative’s electric system are required due to the collective presence of two or more DR facilities operating in parallel with the Cooperative, the cost of such additions or alterations shall be shared by those owners or operators on an equitable basis to be determined by the Cooperative.
- E. The completed installation must meet all applicable local, state and national codes, regulations or other laws, and electric utility standards for the safety of the public and personnel responsible for utility electric power system operations, maintenance and repair, and is subject to inspection by any authorities having jurisdiction before commencement of operation; the Responsible Party is responsible for such compliance. The installation of any Qualifying Facility or Permitted Synchronized Generation Facility that will operate in parallel with the Cooperative distribution system must comply with the Cooperative’s Technical Guidelines for Interconnection and Parallel Operation attached hereto as Attachment 3. The Cooperative may inspect or require a test of the facility at any time without advance notice.

- F. An approved disconnecting device operable by the Cooperative and suitable for disconnecting the DR facility may be required. Any such device shall be operated in accordance with the procedures agreed to by the owner or operator and the Cooperative.
- G. After the initial installation and acceptance by the Cooperative of a DR facility, the owner or operator shall obtain approval from the Cooperative prior to making any revisions to the DR facility, interface equipment, control devices, or protective system.
- H. The control and protective system and site plan of the DR facility must be approved by the Cooperative. The control and protective system must operate in accordance with these safety and reliability standards:
 - 1. The system shall provide for the immediate automatic shutdown or separation of the DR facility's generator and storage devices from the Cooperative's lines in the event of any of the following conditions, whether emanating from the Cooperative's system or the DR facility:
 - a. Momentary or extended interruption of power on the Cooperative's lines serving the DR facility.
 - b. Deviation of frequency or voltage on the Cooperative's lines serving the DR facility from within the Cooperative's normal standards.
 - c. If the DR facility is operating in parallel with three phase service, existence of abnormal rotation of phases or existence on any phase or phases of a condition listed in (a) or (b) above.
 - 2. The shutdown or separation shall continue until the interruption, deviation, or abnormal condition listed in (1) above has been eliminated and all applicable parameters listed in (1) above are returned to within the Cooperative's normal standards.
- I. In the event the Cooperative determines, in its sole judgment, that the DR facility poses any safety hazard to any person or property, poses a hazard to the reliability of the Cooperative's electric system or any system with which it is connected, unreasonably interferes with the use and enjoyment of property by any person, or that the DR facility's protective equipment is operating improperly, the Cooperative, through its authorized personnel, shall have the right to enter onto the property where the DR facility is located and immediately disconnect the DR facility from its lines.
- J. Cooperative shall have access rights to the DR facility during normal business hours and all emergency situations.

- K. Cooperative shall require the Responsible Party for any DR facility interconnected to and operating in parallel with Cooperative's distribution system to be responsible for the safe and effective operation and maintenance of the facility and to demonstrate that the facility will be capably developed, constructed and operated, maintained, and repaired.
- L. The owner or operator shall pay all costs of changes for safety purposes or repairs or losses due to adverse effects on the equipment or facilities of other consumers or the Cooperative itself caused by the connection or operation of a DR facility.
- M. Should parallel operation of a DR facility cause interference or adversely affect voltage, frequency, harmonic content, or power factor in the Cooperative's or other consumers' services, the Cooperative may require disconnection of the DR facility from the Cooperative's electric system until the condition has been corrected.
- N. The Cooperative may require such liability insurance coverage by the DR facility owner or operator as the Cooperative determines in its sole judgment to be appropriate in the circumstances, and the owner or operator shall provide such proof of insurance coverage as may be required by the Cooperative. Review or testing of the DR facility by the Cooperative does not constitute assumption of liability by the Cooperative for the safe, reliable and lawful operation of the DR facility.
- O. If the owner or operator of the DR facility fails to comply with the above rules and regulations, or if the DR facility at any time constitutes a safety hazard or hazard to the reliability of the Cooperative's electric system or any system with which it is connected or is in violation of any code, regulation or law, the Cooperative may at any time require termination of operation of the DR facility and the owner or operator shall be liable for any loss, damage or injury resulting from such failure, hazard or violation.
- P. Connections between a DR facility and the electric system of the Cooperative shall only be made pursuant to a written contract between the Cooperative and the owner or operator of such facility which shall be in accordance with applicable laws as well as the applicable rules, regulations, policies and rate schedules of the Cooperative.
- Q. If a DR facility is a Permitted Synchronized Generation Facility, and will therefore interconnect to and operate in parallel with Cooperative's electric distribution system, Cooperative shall require the owner or operator of such facility to enter into an Agreement for Electric Service with an Appendix, in substantially the form attached hereto as Attachment 4, subject to such additional changes as the President of the Cooperative may deem necessary or appropriate, setting forth the terms and conditions for synchronization of generation, which

shall be in accordance with applicable laws as well as the applicable rules, regulations, policies and rate schedules of the Cooperative.

- R. If a DR facility is operated for purposes of minimizing the consumer's contribution to a PJM 5-CP System Annual Demand, i.e. peak-shaving, Cooperative may enter into an agreement with consumer and Buckeye, in substantially the form attached hereto as Attachment 5, subject to such additional changes as the President of the Cooperative may deem necessary or appropriate, setting forth the terms and conditions upon which Cooperative will sell to consumer and install, and Buckeye will control the activation of, a peak warning device.
- S. If (i) a DR facility is a non-residential consumer's Qualifying Facility up to 100 kW, or a residential consumer's Qualifying Facility up to 25 kW, (ii) the output of such facility is not reasonably anticipated to exceed the annual electric energy requirements of the consumer and (iii) provided that the total aggregate electric generating capacity of all such facilities interconnected to the electric distribution systems of the Buckeye members and net metered does not exceed 1% of Buckeye's aggregate peak electric demand of all of the Buckeye members, Cooperative shall require the owner or operator of such facility to enter into:
1. An agreement setting forth the terms and conditions for the interconnection and parallel operation of such Qualifying Facility, in substantially the form attached hereto as Attachment 6, subject to such additional changes as the President of the Cooperative may deem necessary or appropriate; and
 2. An agreement setting forth the terms and conditions for electric service with net metering for such Qualifying Facility, in substantially the form attached hereto as Attachment 7, subject to such additional changes as the President of the Cooperative may deem necessary or appropriate, and attaching the Net Metering Rate Schedule, in substantially the form attached hereto as Attachment 8, subject to such additional changes as the President of the Cooperative may deem necessary or appropriate.
- T. If (i) a DR facility is a non-residential consumer's Qualifying Facility greater than 100 kW, or a residential consumer's Qualifying Facility greater than 25 kW, but not more than 10 MVA, or (ii) the output of a non-residential consumer's Qualifying Facility up to 100 kW or a residential consumer's Qualifying Facility up to 25 kW is reasonably anticipated to exceed the annual electric energy requirements of the consumer, or (iii) the total aggregate electric generating capacity of all non-residential consumers' Qualifying Facilities up to 100 kW and all residential consumers' Qualifying Facilities up to 25 kW interconnected to the electric distribution systems of the Buckeye members and net metered exceeds 1% of Buckeye's aggregate peak electric demand of all of the Buckeye members, the Cooperative shall require the owner or operator of such facility to enter into:

1. An agreement setting forth the terms and conditions for the interconnection and parallel operation of such Qualifying Facility, in substantially the form attached hereto as Attachment 9 subject to such additional changes as the President of the Cooperative may deem necessary or appropriate; and
 2.
 - a. If the consumer is selling the net output of the Qualifying Facility to Buckeye, an agreement setting forth the terms and conditions for back-up and supplementary electric service, in substantially the form attached hereto as Attachment 10, subject to such additional changes as the President of the Cooperative may deem necessary or appropriate, and attaching the Back-Up and Supplementary Electric Service Rate Schedule, in substantially the form attached hereto as Attachment 11, subject to such additional changes as the President of the Cooperative may deem necessary or appropriate; or
 - b. If the consumer is selling the gross output of the Qualifying Facility to Buckeye, the Cooperative's standard agreement for electric service and regular retail rate schedule, subject to such additional changes as the President of the Cooperative may deem necessary or appropriate.
- U. If a DR facility is a Qualifying Facility greater than 10 MVA and Buckeye, the Cooperative member, and the consumer have agreed on the terms and conditions for service, the Cooperative shall require the owner or operator of such facility to enter into such agreements as determined on a case by case basis.

RESPONSIBILITY:

It shall be the responsibility of the President of the Cooperative to administer the provisions of this policy. The Cooperative shall reconsider, and if necessary update, this policy every five years or more frequently as circumstances warrant.

Policy adopted 5/23/11

Mid-Ohio Energy Cooperative, Inc.
Technical Guidelines
for Interconnection and Parallel Operation

APPLICABILITY

These rules apply to interconnection and parallel operation of DR (Distributed Resource) equipment that, in sum, is rated less than 10 MVA on radially operated Cooperative distribution lines up to 12.47 Kv three phase (7.2 Kv single phase). Interconnections to higher voltage lines will be made at the discretion of the Cooperative.

1.0 DEFINITIONS

Distributed Resource (DR) / DR Facility – Any source of electric power that is not directly connected to the bulk power transmission system, having an installed capacity of not more than 10 MVA, connected to Cooperative’s electric power system through a point of common coupling, including both generators and energy storage technologies, including any qualifying cogeneration or small power production facility meeting all definitional requirements under the Public Utility Regulatory Policies Act of 1978, as amended, and all governmental regulations lawfully promulgated thereunder (Qualifying Facility), as well as any Permitted Synchronized Generation Facilities.

Flicker – A variation of input voltage sufficient in magnitude and duration to allow visual observation of a change in electric lighting source intensity, as defined in IEEE Standard 141-1993. See Also Exhibit 1, attached, specifically the curve “Border Line of Visibility”.

Facilities Study – An engineering study conducted to determine the modifications to the existing cooperative system that will be needed to accommodate connection and safe operation of the DR Facility.

Harmonic Distortion – Distortion of the normal sine waveform; typically caused by nonlinear loads or by inverters attached to the system on customer premises.

Interconnection Agreement – A legal contract for the connection of the DR Facility to the Cooperative’s lines, specifying the location, size, cost, manner of payment, terms of operation, and respective responsibilities of the Cooperative and the DR Facility owner.

Permitted Synchronized Generation Facilities – Electric generation facilities equal to or greater than 25 kW but not more than 10 MVA, other than Qualifying Facilities,

owned or operated by manufacturers and similar large commercial and industrial electric power and energy consumers in parallel operation with adjacent electric distribution facilities of the Cooperative under circumstances where (A) such generation facilities are operated for the sole purpose of (1) providing back-up generation when it is anticipated that there is a possibility of interruption of generation service provided by the Cooperative, or (2) minimizing or eliminating the consumer's contribution to a PJM 5-CP System Annual Demand, or (3) testing the consumer's electric facilities, and (B) no electric power and energy will be introduced into the electric system of the Cooperative or any other entity.

Point of Common Coupling – The point at which a DR Facility is connected to the Cooperative's electric distribution system.

Radially Operated System – An electric distribution system that is normally operated with only one supplying line connected to a load at any one time.

Single Phasing Condition – Occurs when electric flow through one phase of a three phase supply line or device is interrupted.

Short Circuit Contribution – The result, expressed as a percentage, of dividing the maximum short circuit contribution of the DR Facility (or Facilities) by the short circuit contribution available from the Cooperative's system, without the DR Facility (or Facilities).

Supplemental Review - Review of functional technical requirements to determine acceptability of equipment to be used to connect and safely operate the DR Facility on the Cooperative's lines.

System Impact Study – An engineering study to assess the ability of the existing cooperative system to accommodate connection and safe operation of the DR Facility.

Unintentional Island – An unplanned condition where a portion of the Cooperative's electric distribution system that is physically disconnected from the Cooperative's power supply remains energized as a result of power supplied by one or more DR facilities.

2.0 CUSTOMER DESIGN REQUIREMENTS

For an interconnection to be safe to Cooperative employees and equipment and to other customers, the following minimum conditions are required to be met by DR Facilities. At the discretion of the Cooperative, additional conditions may be required to be met:

- 2.1 DR Facilities must meet all applicable national, state, and local construction, operation and maintenance related safety codes, such as National Electrical Code (NEC), National Electrical Safety Code (NESC), and Occupational Safety and Health Administration (OSHA) requirements. All interconnections of DR Facilities must comply with IEEE 1547 – Standard for Interconnecting Distributed Resources with Electric Power Systems, approved June 12, 2003, and IEEE 1547.1 – Standard Conformance Test Procedures for Equipment Interconnecting Distributed Resources with Electric Power Systems, approved June 9, 2005, which standards are incorporated herein.
- 2.2 DR Facility owner must provide the Cooperative with a one-line diagram showing the configuration of the proposed DR system, including the protection and controls, disconnection devices, nameplate rating of each device, power factor rating, transformer connections, and other information deemed relevant by the DR owner and/or the Cooperative. If the proposed DR system does not pass the screening process for simplified interconnection, Exhibit 2 attached hereto, additional information may be necessary from the DR Facility owner, and Cooperative system changes may be required. In no event, other than from a Qualifying Facility, shall a consumer deliver into the electric distribution system of the Cooperative any of the electric power or energy, ancillary services (including, without limitation, reactive power), or other output of a DR facility. The owner or operator of the DR Facility, other than a Qualifying Facility, shall provide, install, own, operate and maintain, at its own cost and expense, all facilities and equipment as are required to prevent delivery into the Cooperative's electric distribution system of any of the electric power or energy, ancillary services (including, without limitation, reactive power), or other output of the DR Facility.
- 2.3 DR equipment must be equipped with adequate protection and control to trip¹ the unit off line during abnormal² system conditions, according to the following requirements:
 - 2.3.1 Undervoltage or overvoltage within the trip time indicated below. By agreement of both the DR owner and the Cooperative, different settings maybe used for the under voltage and over voltage trip levels or time delays.

¹ To trip is to automatically (without human intervention required) open the appropriate disconnection device to separate the DR equipment from the power system.

² Abnormal system conditions include faults due to adverse weather conditions including but not limited to, floods, lightning, vandalism, and other acts that are not under the control of the Cooperative. This may also result from improper design and operation of customer facilities resulting from non-compliance with accepted industry practices.

V= Nominal System Voltage	Maximum Trip Time
$V < 50\%$	10 cycles
$50\% \leq V < 88\%$	120 cycles
$110\% < V < 120\%$	60 cycles
$V \geq 120\%$	6 cycles

2.3.2 For three phase generation, loss of balanced three-phase voltage or a single phasing condition within the trip times indicated in 2.3.1 when voltage on at least one phase reaches the abnormal voltage levels.

2.3.3 Underfrequency or overfrequency: All DR Facilities shall follow the associated Cooperative distribution line frequency within the range 59.3 Hz to 60.5 Hz. DR Facilities rated at less than 10 kW shall disconnect from the Cooperative within 10 cycles if the frequency goes outside this range. A DR rated more than 10 kW shall (1) disconnect from the Cooperative within 10 cycles if the frequency exceeds 60.5 Hz, and (2) be capable of time delayed disconnection for frequencies in the range 59.3 Hz to 57 Hz. By agreement of both the DR operator and the Cooperative, different settings may be used for the under frequency and over frequency trip levels or time delays.

2.4 DR equipment requires the following additional protection to avoid damage to the Cooperative's system during normal, as well as abnormal system conditions.

2.4.1 Synchronizing controls to insure a safe interconnection with the Cooperative's distribution system. The DR equipment must be capable of interconnection with minimum voltage and current disturbances. Synchronous generator installations, as well as other types of installations, must meet the following: slip frequency less than 0.2 Hz, voltage deviation less than $\pm 10\%$, phase angle deviation less than ± 10 degrees, breaker closure time compensation (not needed for automatic synchronizer that can control machine speed).

2.4.2 A disconnect switch to isolate the DR equipment for purposes of safety during maintenance and during emergency conditions. The Cooperative may require a disconnect device to be provided, installed by, and paid for by the customer, which is readily accessible to and operable and lockable by Cooperative personnel, either at the primary voltage level, which shall include a lockable disconnect and a visible open, may include load-break cutouts, switches and elbows, or on the secondary voltage level, which may include a secondary breaker or switch. The switch must be clearly labeled as a DR disconnect switch.

2.5 DR equipment must have adequate fault interruption and withstand capacity, and adequate continuous current and voltage rating to operate properly³ with the Cooperative's system. A three-phase device shall interrupt all three phases simultaneously. The tripping control of the circuit interrupting device shall be powered independently of the utility AC source, for example by a battery or stored energy device, in order to permit operation upon loss of the Cooperative distribution system connection.

2.6 Test results shall be supplied by the manufacturer or independent testing lab that verify, to the satisfaction of the Cooperative, compliance with the following requirements contained in this document⁴:

- 2.6.1 Over/Under Voltage Trip Settings (ref. 2.3.1)
- 2.6.2 Over/Under Frequency Trip Settings (ref 2.3.3)
- 2.6.3 Synchronization (ref 2.4.1)
- 2.6.4 Harmonic Limits (tested at 25%⁵ of full load rating or at a level as close to the minimum level of rated output the unit is designed to operate as practical and at a level as close to 100% of full load rating as practical) (ref 2.7)
- 2.6.5 DC Current Injection Limits (Inverters) (ref 2.8)
- 2.6.6 Anti-Islanding (Inverters) (2.13)
- 2.6.7 Prevent Connection or Reconnection to De-energized System (ref 2.14)

If test results are acceptable to the Cooperative and if requested by a manufacturer, the Cooperative may supply a letter indicating the protective and control functions for a specific DR Facility model are approved for interconnection with the Cooperative's distribution system, subject to the other requirements in this document. The Cooperative reserves the right to review the suitability of previously approved protective and control functions.

The DR Facility owner shall have the DR Facility inspected by the Cooperative and any required local inspectors (i) to verify correct protective settings and connections of the DR Facility to the Cooperative system prior to the first parallel operation, and (ii) shall have testing performed to the satisfaction of the Cooperative to verify proper operation of the DR Facility.

2.7 Harmonics and Flicker: The DR equipment shall not be a source of excessive harmonic voltage and current distortion and/or voltage flicker. Limits for harmonic distortion (including inductive telephone influence factors) will be as published in the latest issues of ANSI/IEEE 519, "Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems." Flicker occurring at the point

³ Properly, in this context, means within the acceptable Cooperative or industry established practices.

⁴ For photovoltaic systems, a certification that the testing requirements of UL 1741 have been met may be used in place of these tests.

⁵ If the device is not designed to operate at this level, then the test should be at the lowest level at which it is designed to operate.

of compliance shall remain below the Border Line of Visibility curve on the IEEE/GE curve for fluctuations less than 1 per second or greater than 10 per second. However, in the range of 1 to 10 fluctuations per second, voltage flicker shall remain below 0.4%. Refer to Exhibit 1. When there is reasonable cause for concern due to the nature of the generation and its location, the Cooperative may require the installation of a monitoring system to permit ongoing assessment of compliance with these criteria. The monitoring system, if required, will be installed at the DR owner's expense. Situations where high harmonic voltages and/or currents originate from the distribution system are to be addressed in the Interconnection Agreement.

- 2.8 DC Current Injection from inverters shall be maintained at or below 0.5% of full rated inverter output current into the point of common coupling.
- 2.9 The DR Facility's generated voltage shall follow, not attempt to oppose or regulate, changes in the prevailing voltage level of the Cooperative at the point of common coupling, unless otherwise agreed to by the operators of the DR Facility and the Cooperative. DR Facilities installed on the downstream (load) side of the Cooperative's voltage regulators shall not degrade the voltage regulation provided to the downstream customers of the Cooperative to service voltages outside the limits of ANSI 84.1, Range A.
- 2.10 System Grounding: The DR Facility shall be grounded in accordance with applicable codes. The interconnection of the DR equipment with the Cooperative's system shall be compatible with the neutral grounding method in use on the Cooperative's system. For interconnections through a transformer to Cooperative system primary feeders of multi-grounded, four-wire construction, or to tap lines of such systems, the maximum unfaulted phase (line-to-ground) voltages on the Cooperative system primary feeder during single line-to-ground fault conditions with the Cooperative system source disconnected, shall not exceed those voltages which would occur during the fault with the Cooperative system source connected and no DR Facilities connected.
- 2.11 System Protection: The DR owner is responsible for providing adequate protection to Cooperative facilities for conditions arising from the operation of generation under all Cooperative distribution system operating conditions. The owner is also responsible for providing adequate protection to their facility under any Cooperative distribution system operating condition whether or not their DR is in operation. Such conditions may include but are not limited to:
 1. Loss of a single phase of supply,
 2. Distribution system faults,
 3. Equipment failures,
 4. Abnormal voltage or frequency,
 5. Lightning and switching surges,
 6. Excessive harmonic voltages,

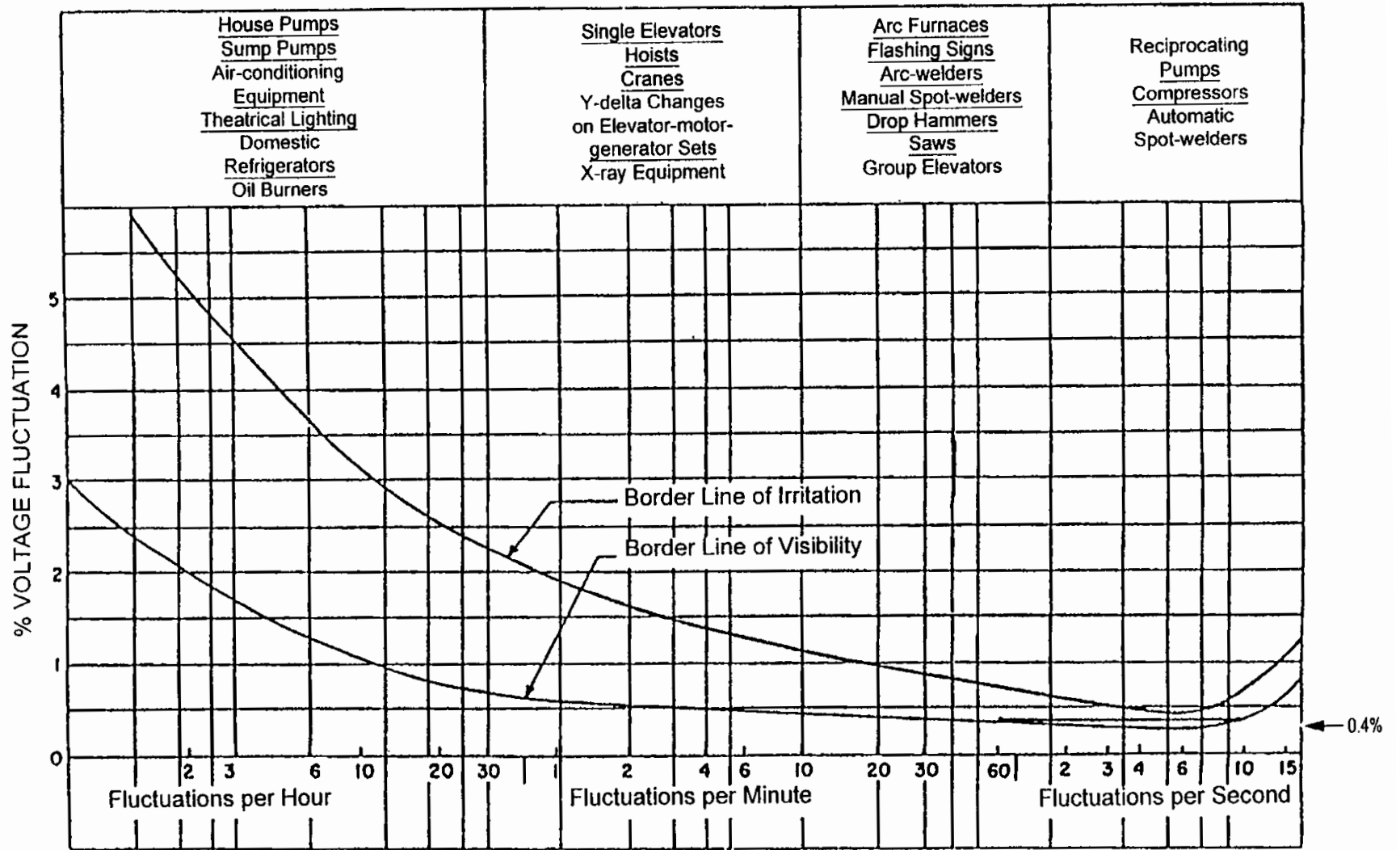
7. Excessive negative sequence voltages,
 8. Separation from supply,
 9. Synchronizing generation, and
 10. Re-synchronizing the Owner's generation after electric restoration of the supply.
- 2.12 Feeder Protective Coordination. In the case of a Cooperative protective function initiating a trip of a Cooperative protective device, the DR Facility protection and controls shall be designed to coordinate with the Cooperative protective device, and shall isolate the DR Facility from the Cooperative's lines.
- 2.13 Unintentional islanding: For an unintentional island in which the DR and a portion of the Cooperative's system remain energized through the point of common coupling, the DR shall cease to energize the Cooperative system.
- 2.14 The DR shall be designed to prevent the DR Facility from being connected to a de-energized Cooperative system. The customer should not reconnect the DR Facility to the Cooperative's system after a trip from a system protection device until the Cooperative's system is re-energized for a minimum of five minutes.
- 2.15 If the customer connects a backup generator directly to the customer's wiring to serve any load on the customer's site, he shall utilize a double-throw transfer switch in order to ensure that no power is fed back onto the Cooperative's distribution system. *This is a critical safety requirement.*
- 2.16 Voltage deviation from normal Cooperative line voltage at the point of common coupling caused by the DR Facility shall not under any condition exceed 3%, calculated by dividing the maximum deviation from average line voltage by the average line voltage, with the result multiplied by 100.

3.0 CUSTOMER OPERATING PROCEDURES

- 3.1 If high-voltage, low-voltage, or voltage flicker complaints arise from other customers due to the operation of customer DR, the customer may be required to disconnect his or her generation equipment from the Cooperative's system until the problem has been resolved.
- 3.2 The operation of the DR equipment must not result in harmonic currents or voltages at the point of common coupling that will interfere with the Cooperative's metering accuracy and/or proper operation of facilities and/or with the loads of other customers. Such adverse effects may include, but are not limited to heating of wiring and equipment, over voltage, communication interference, etc. If such a condition is found, the Cooperative may require the DR Facility to be disconnected from the Cooperative lines until the problem is resolved.

- 3.3 The DR Facility owner must discontinue parallel operation when requested by the Cooperative after prior notice. If the Cooperative has notified the DR Facility owner that an emergency situation exists, the DR Facility owner shall immediately discontinue parallel operation of the DR Facility with the Cooperative's lines.

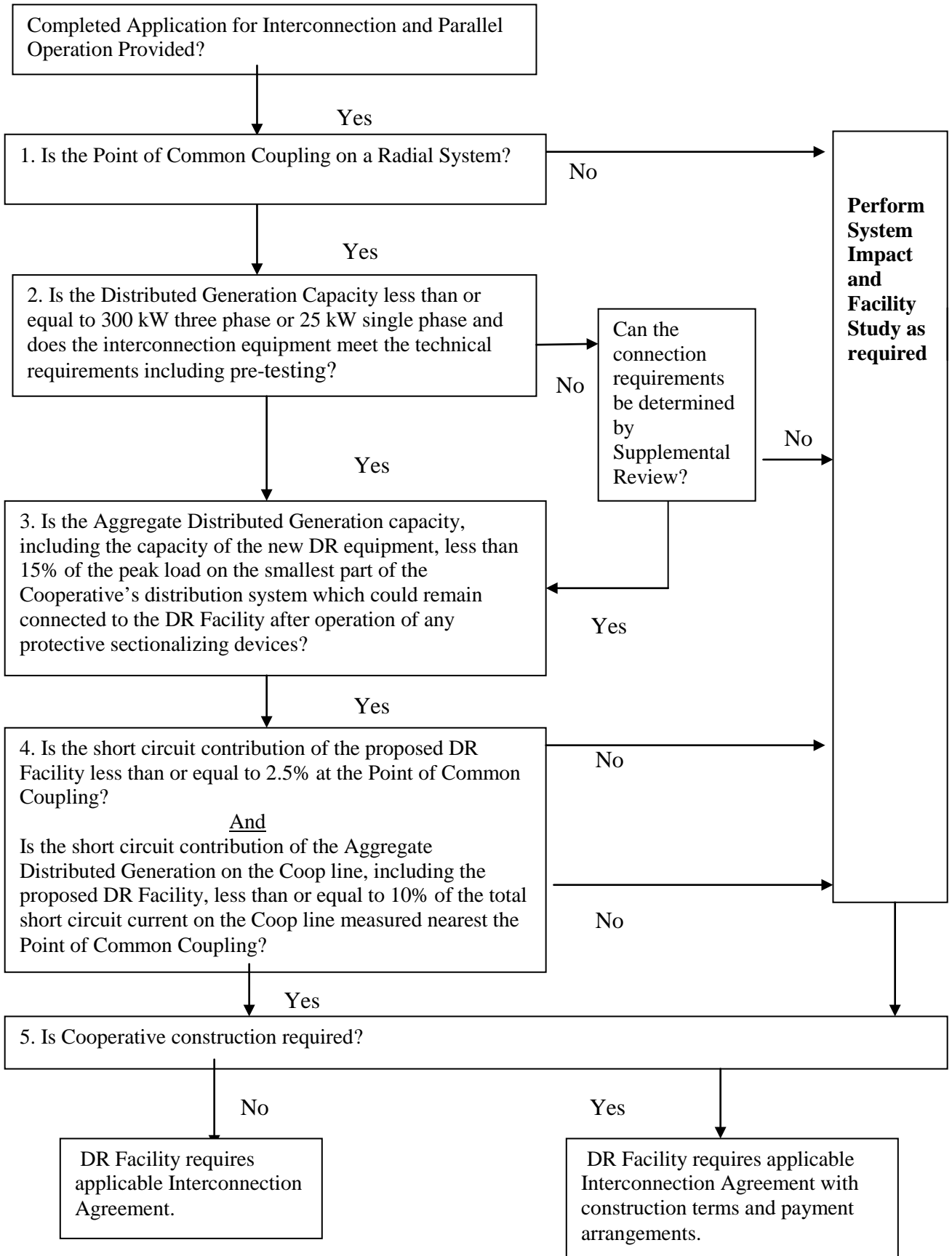
Exhibit 1



Composite curve of voltage flicker studies by General Electric Company, *General Electric Review*, August 1925; Kansas City Power & Light Company, *Electrical World*, May 19, 1934; T&D Committee, EEI, October 24, 1934, Chicago; Detroit Edison Company; West Pennsylvania Power Company; Public Service Company of Northern Illinois.

Relations of Voltage Fluctuations to Frequency of Their Occurrence (Incandescent Lamps)

INTERCONNECTION REQUEST SCREENING PROCESS



MID-OHIO ENERGY COOPERATIVE, INC.

RATE SCHEDULE NM Net Metering Rate Schedule

AVAILABILITY:

Available to Consumers contracting for electric service from the Power Company who, through the operation of qualifying cogeneration or small power production facilities, as defined in the Power Company's Operational Policy relating thereto, with a design capacity of 100 kilowatts or less in the case of non-residential Consumers, or with a design capacity of 25 kilowatts or less in the case of residential Consumers, have available electric energy and the associated capacity which they desire to sell to the Power Company in accordance with the requirements of the Public Utility Regulatory Policies Act of 1978, as amended, and all governmental regulations lawfully promulgated thereunder (PURPA) and the Power Company's applicable rules, regulations, policies and rate schedules, in circumstances where the output of such facility is not reasonably anticipated to exceed the annual electric energy requirements of the Consumer and provided that the total aggregate electric generating capacity of all qualifying facilities interconnected to the electric distribution systems of the members of Buckeye Power, Inc. (Buckeye) and net metered does not exceed 1% of Buckeye's aggregate peak electric demand of all of the Buckeye members. For purposes of this Rate Schedule, the generation facility's output will be presumed to be "not reasonably anticipated to exceed the annual electric energy requirements of the Consumer" if the electric generating facility annually generates less than 120% of the Consumer's annual electric energy requirements. The Consumer's "annual electric requirements" shall be the average amount of electricity consumed annually by the Consumer for the electric consuming facilities located on the Consumer's premises over the previous three years, using the annual period of June 1 to May 31.

NET METERING:

Compliance with applicable rules, regulations, policies and terms of this rate schedule is a condition precedent to purchases hereunder. The Consumer shall use the output of the qualifying facility first to meet the requirements of Consumer's electric consuming facilities located on the Premises on an hourly basis. Any output of the qualifying facility in excess of the requirements of Consumer's electric consuming facilities on an hourly basis shall be transferred to the Power Company and credited on a kWh basis against the Consumer's monthly bill for electric service hereunder in the same month in which the kWh billing credit is generated. Consumer shall only be entitled to receive a kWh billing credit for any such output of the qualifying facility in excess of the requirements of the Consumer's facilities on an hourly basis; provided, however, that, in the event that the Power Company has not elected to cease providing net metering, and Consumer generates hourly net metering kWh billing credits in any month in excess of Consumer's kWh usage for such monthly billing period, (a) the Power Company will inform Buckeye of the existence of such excess monthly kWh billing credits; (b) Buckeye will purchase such excess kWh monthly billing credits at Buckeye's avoided cost rate, as determined by Buckeye in its sole discretion, and credit Power Company's wholesale power bill for such dollar amount; (c) the Power Company's load shall not be reduced by the amount of such excess

monthly kWh billing credits purchased by Buckeye; (d) the Power Company shall credit Consumer's monthly power bill with the dollar amount of the monthly billing credits paid by Buckeye to the Power Company; and (e) in the event that at the end of the annual period ending May 31 of each year the aggregate dollar amount of the monthly billing credits for such year exceeds the aggregate dollar amount of the Power Company's charges to the Consumer for such year, the Power Company shall issue a check to the Consumer for such excess dollar amount

RATE:

The components of the rate for electric service shall be the rate for the respective class as established by Mid-Ohio Energy Cooperative, Inc., and the rate used to calculate any monthly billing credits not to exceed the Consumer's electric requirements on a monthly basis, shall be the same and shall be Buckeye's avoided cost rate. In addition, a NM service charge of \$ 10.00/month shall apply. Any remaining credit balance will be applied to the following month's bill until exhausted.

TERMS OF PAYMENT:

Payment for the service provided hereunder shall be made at the office of the Power Company located in Kenton, Ohio, or at such other place as the Power Company shall hereafter designate in writing. If the Consumer shall fail to make any such payment within fifteen (15) days after such payment is due, the Power Company may discontinue service to the Consumer upon giving no less than fifteen (15) days written notice to the Consumer of its intention to do so.

METERING:

Net metering will be accomplished using a single meter or pair of meters capable of registering the flow of electricity in each direction from the Power Company's electric distribution system to Consumer's electric consuming facilities located on the Premises, and from Consumer's qualifying facility to Power Company's electric distribution system.

RULES AND REGULATIONS:

The Power Company's rules and regulations relating to the purchases from qualifying cogeneration and small power production facilities as they are now in effect or as they may hereafter be amended from time to time, are incorporated into and made a part of this rate schedule as if contained herein. The Consumer shall comply with all the provisions of such rules and regulations.

APPROVED BY THE BOARD OF TRUSTEES:

DATE ADOPTED: October 1, 2006

DATE LAST REVISED: December 18, 2015

[For use only if the consumer is using the facility's output to serve its load. Otherwise, use the Cooperative's applicable retail rate schedule will be used]

MID-OHIO ENERGY COOPERATIVE, INC.

RATE SCHEDULE S

SUBJECT:

Back-Up and Supplementary Electric Service Rate Schedule

AVAILABILITY:

Available to Consumers contracting for electric service from the Power Company who, through the operation of qualifying cogeneration or small power production facilities, as defined in the Power Company's Operational Policy relating thereto, have available electric energy and the associated capacity which they desire to first use to meet the requirements of the Consumer's electric consuming facilities located on the Premises, and then sell to Buckeye Power, Inc. (Buckeye) any such output in excess of the requirements of the Consumer's electric consuming facilities in accordance with the requirements of the Public Utility Regulatory Policies Act of 1978, as amended, and all governmental regulations lawfully promulgated thereunder (PURPA) and the Power Company's and Buckeye's applicable rules, regulations, policies and rate schedules, in the following circumstances:

- (a) When the output of a non-residential Consumer's qualifying facility is greater than 100 kW but less than 10 MVA; or
- (b) When the output of a residential Consumer's qualifying facility is greater than 25 kW but less than 10 MVA; or
- (c) When the output of the Consumer's qualifying cogeneration or small power production facility up to 100 kW, in the case of a non-residential Consumer's facility, or up to 25 kW, in the case of a residential Consumer's facility, is reasonably anticipated to exceed the annual electric energy requirements of the Consumer; or
- (d) When the total aggregate electric generating capacity of all non-residential Consumers' qualifying facilities up to 100 kW and all residential Consumers' qualifying facilities up to 25 kW interconnected to the electric distribution systems of the Buckeye members and net metered exceeds 1% of Buckeye's aggregate peak electric demand of all of the Buckeye members; or
- (e) When the output of the qualifying facility is equal to or greater than 10 MVA and Buckeye, the Power Company, and the Consumer have agreed on the terms and conditions for service.

BACK-UP AND SUPPLEMENTARY ELECTRIC SERVICE:

The Consumer shall use the output of the qualifying facility first to meet the requirements of the Consumer's electric consuming facilities located on the Premises. Any output of the qualifying facility in excess of the requirements of Consumer's electric consuming facilities located on the Premises shall be sold to Buckeye. Any requirements of Consumer's electric consuming facilities located on the Premises not met by the output of Consumer's qualifying facility shall be supplied to the Consumer by the Power Company under this Rate Schedule.

RATE:

The rate for back-up and supplementary electric service shall be equal to Mid-Ohio Energy's current rate schedules for the appropriate rate class.

TERMS OF PAYMENT:

Payment for the service provided hereunder shall be made at the office of the Power Company located in Hardin County, Ohio, or at such other place as the Power Company shall hereafter designate in writing. If the Consumer shall fail to make any such payment within fifteen (15) days after such payment is due, the Power Company may discontinue service to the Consumer upon giving no less than fifteen (15) days written notice to the Consumer of its intention to do so

RULES AND REGULATIONS:

The Power Company's rules and regulations relating to qualifying cogeneration and small power production facilities as they are now in effect or as they may hereafter be amended from time to time, are incorporated into and made a part of this rate schedule as if contained herein. The Consumer shall comply with all the provisions of such rules and regulations.