



Buckeye REC
Your Touchstone Energy® Cooperative 

Buckeye REC Guide to Solar

Table of Contents

Page(s)

1	Cover Sheet
2	Table of Contents
3	Disclaimer
4	Meter Disconnect Requirement /Supply Side Taps
5	Fees
6	Solar Checklist
7-8	One Line Diagram Example
9-10	Solar Application
11-32	Solar Agreement

Disclaimer

This packet is for informational purposes only, is general in nature, and is subject to change. Buckeye Rural Electric Cooperative, Inc. (“BREC”), reserves the right to make changes to the documents contained in this packet at any time, without notice. Nothing in this packet shall be construed as any promise to act, or any offer on behalf of BREC, nor is it intended to create, and receipt of the same does not create a contractual relationship with BREC. BREC assumes no responsibility or liability for any errors, or omissions in the content of these informational documents, and further provides no guarantees of completeness, accuracy, usefulness, or timeliness. BREC further assumes no responsibility of liability for any reliance of the recipient upon these documents based upon the information contained therein.

Meter Disconnect Requirement

Buckeye REC requires that a disconnect be placed after the meter for new services and service upgrades. This is NOT required for solar installs, but it is still recommended for the safety of first responders and for the members benefit in the future. This disconnect allows for the member to turn off their power without needing a Buckeye REC employee to pull a meter.

Supply Side Taps

We do not allow supply side taps unless it is downstream from a meter with a disconnect following the meter. Meaning, we will allow a supply side tap in the member breaker panel IF there is still a disconnect up stream before our meter base. If you submit plans that indicate a supply side tap, please edit the plans to show a meter/disconnect upstream, and supply a photo of the meter/disconnect combo for reference.

Solar Fees

Solar system fees are broken up into two parts.

1. Application Fee: \$250
 - a. This is due before installation, along with the items listed in the Solar Checklist.
2. Aid to Construction: \$530
 - a. This is the remainder of the fees associated with the solar system addition. This includes the following items.
 - i. New bi-directional meter.
 - ii. One trip by Buckeye REC lineworker to exchange meters.
 - iii. Office/Indirect labor.

There is a possibility of additional trips required by lineworkers to assist the solar installer with the system setup.

1. Each Additional Trip Fee: \$100.00

Solar Checklist

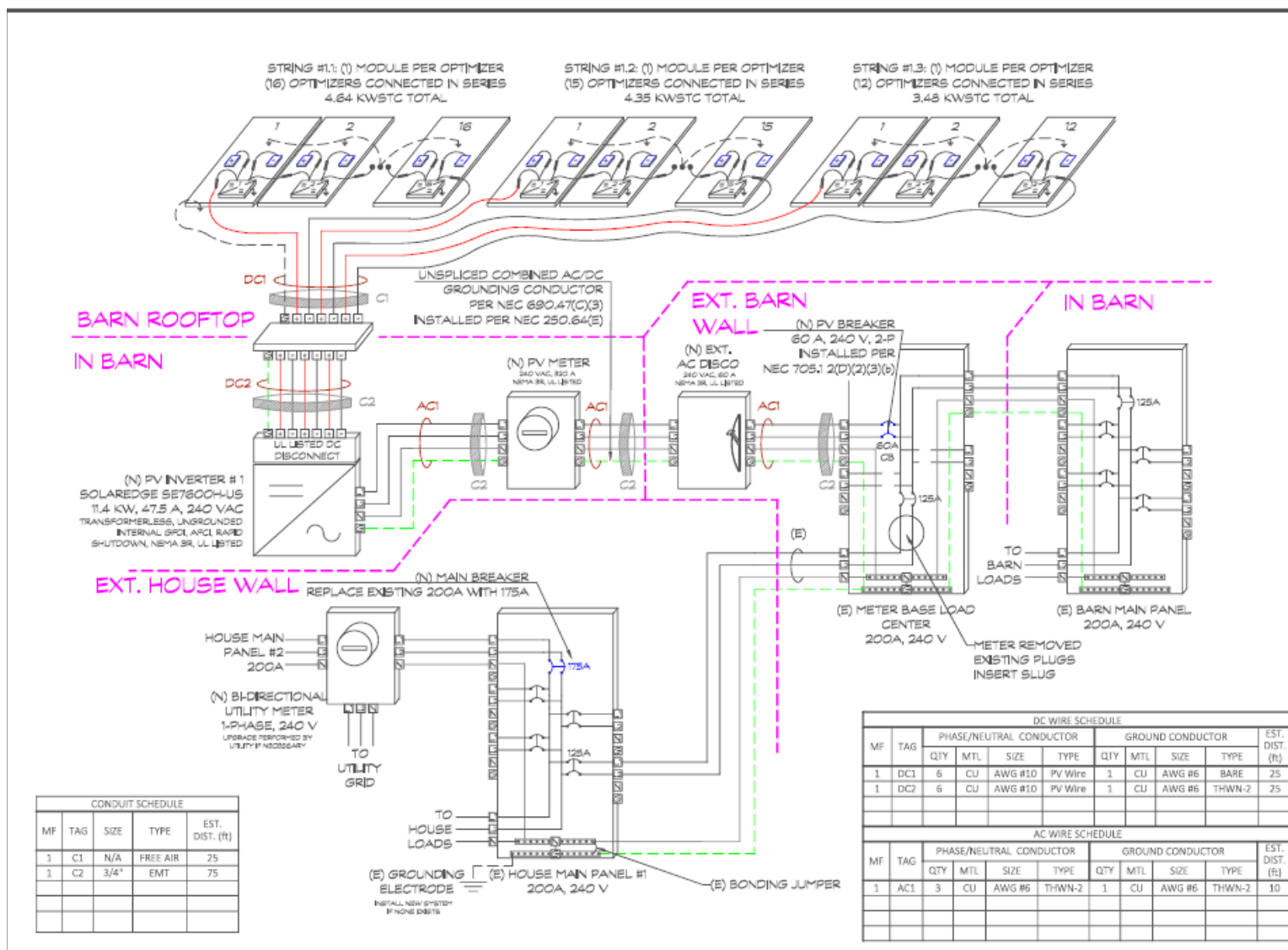
Before Solar Installation:

1. Member contacts BREC about service setup.
2. Member to submit Solar Application along with \$250 application fee. The following items are required to be submitted with the application.
 - a. The system One-Line Diagram (see examples in “Buckeye REC Guide to Solar”).
 - b. A photograph of the meter and disconnect (if applicable).
 - c. Homeowners Declaration page with the following personal liability coverage at a minimum, depending on solar system size.
 - i. At least \$250,000 if < 10kW
 - ii. At least \$500,000 if > 10kW but < 25kW
 - iii. At least \$1,000,000 if > 25kW but < 100kW
 - iv. At least \$5,000,000 if > 100kW
3. Member to submit Solar Agreement.
4. Buckeye REC will issue a Service Order number and will review the application.
5. Buckeye REC will issue a signed agreement and give permission to proceed with solar installation.

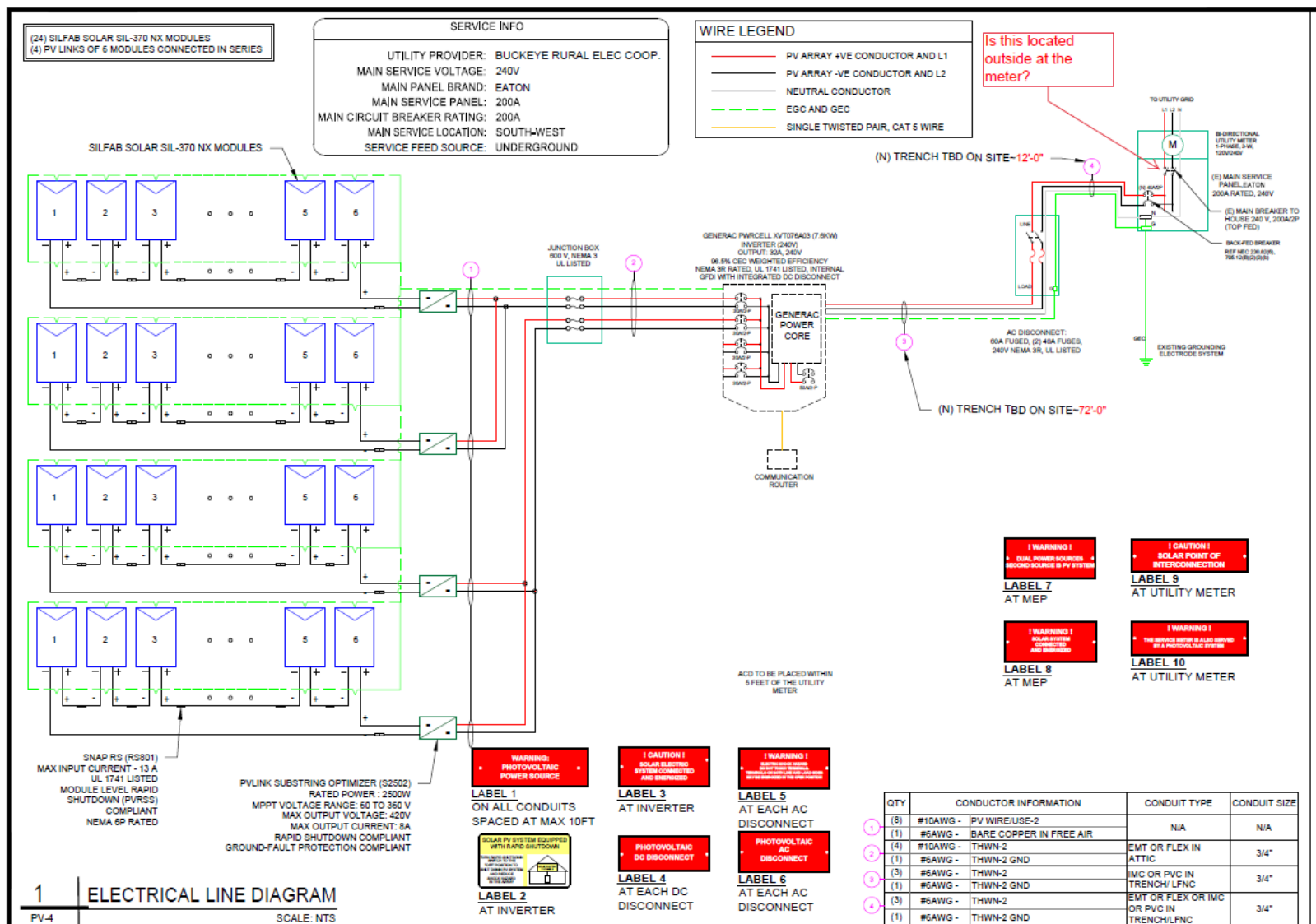
After Completion of the Solar System Installation:

1. Solar installer must submit the following photographs to Buckeye REC.
 - a. Meter base with disconnect with door open to see breaker size.
 - b. Meter with serial number.
 - c. Solar array and inverter types.
2. Buckeye REC will send the Aid to Construction Letter to the member.
3. Member pays ATC Fees.
4. Buckeye REC lineworker exchanges meter.
5. Buckeye REC will send Approval letter to Operate the solar system.

One Line Diagram Example 1



One Line Diagram Example 2



APPLICATION FOR INTERCONNECTION
AND PARALLELL OPERATION WITH THE
COOPERATIVES DISTRIBUTION SYSTEM

Return Completed Application to:

Buckeye Rural Electric Cooperative
4848 State Route 325 South P.O Box 200
Rio Grande, Oh 45674-0200

Customer's Name:_____

Address:_____

Contact Person:_____

Telephone Number:_____

Service Point Address:_____

Information Prepared and Submitted By:_____
(Name and Address)_____

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

GENERATOR

Number of Units:_____

Manufacturer:_____

Type (Synchronous, Induction, or Inverter):_____

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

Kilowatt Rating (95 F at location)_____

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

Power Factor:_____

Voltage Rating:_____

Ampere Rating:_____

Number of Phases:_____

Frequency:_____

If Yes, do you plan to export power?: _____ Yes _____ No

If Yes, maximum amount expected:_____

Expected Energizing and Start-up Date_____

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

Application fee:_____ \$250_____

One-line diagram attached: _____ Yes

Have testing results been supplied to the Cooperative documenting conformance with the
Cooperative's technical requirements: _____ Yes [Note: Requires a Yes for complete
Application.]

Have all necessary government permits and approvals been obtained for the project prior to this
application: _____ Yes [Note: Requires a Yes for an Application to be considered
complete.]

Have the generator manufacturer machine characteristics been supplied to the Company:
_____ Yes [Note: Requires a Yes for complete Application.]

Layout sketch showing lockable, "visible" disconnect device: ____ Yes

DATE: [CUSTOMER NAME]

By: _____
(Signature)

Name: _____

Title: _____

**AGREEMENT FOR INTERCONNECTION AND ELECTRIC SERVICE
FOR RESIDENTIAL SOLAR POWER PRODUCTION FACILITIES
WITH NET BILLING**

This Agreement, made as of the ____ day of _____, 20__, between
_____ (hereinafter called “the Power Company”) and
_____ (hereinafter called the “Consumer”), whose
mailing address is _____, for electric service at _____
situated generally at the intersection of _____ and _____ in
_____, _____ County, Ohio (hereinafter called the “Premises”);

WITNESSETH:

WHEREAS, the Power Company is a not-for-profit corporation organized under the laws of the State of Ohio engaged in the business of selling electric power and energy with its principal place of business in _____ County, Ohio; and

WHEREAS, the Consumer is a residential consumer who owns and operates all land and facilities located on the Premises; and

WHEREAS, the Consumer has or will install on the Premises certain consumer-owned solar photovoltaic electric generating facilities 25 kW or less in the aggregate (the “Electric Generating Facility”) ; and

WHEREAS, the Electric Generating Facility is a certified qualifying cogeneration or small power production facility under the Public Utility Regulatory Policies Act of 1978, as amended, and all governmental regulations lawfully promulgated thereunder (“PURPA”); and

WHEREAS, the output of the Electric Generating Facility is not reasonably anticipated to exceed the annual electric energy requirements of Consumer’s electric consuming facilities located on the Premises, as described herein; and

WHEREAS, the Consumer desires to interconnect the Electric Generating Facility to the Power Company’s electric distribution system and to use the output of the Electric Generating Facility to first meet the requirements of the Consumer’s electric consuming facilities located on the Premises and then transfer and sell to Buckeye Power, Inc. any such output in excess of the requirements of the Consumer’s electric consuming facilities and receive a credit against the Consumer’s monthly bill for electric service under the Net Billing arrangements described in this Agreement, and the Power Company’s Net Billing Rate Schedule, which is attached hereto; and

WHEREAS, the Power Company desires to sell, and the Consumer desires to purchase, electric power and energy to meet the requirements of Consumer's electric consuming facilities not served by the Electric Generating Facility under the terms and conditions hereinafter set forth; and

WHEREAS, a single meter or pair of meters has been or will be installed at the Premises, which meter or meters is/are capable of registering the flow of electricity in each direction from Power Company's electric distribution system to Consumer's electric consuming facilities on the Premises, and from Consumer's Electric Generating Facility to Power Company's electric distribution system, at the point of interconnection ("Net Billing");

NOW, THEREFORE, in consideration of the premises and the mutual covenants herein contained, the parties hereto agree as follows:

1. Subject to the terms and conditions of this Agreement, the Power Company shall sell and deliver to the Consumer, and the Consumer shall purchase and receive, all of the electric power and energy which the Consumer may need at the Premises up to _____ kW, except for any such electric demand and energy which is served by Consumer's Electric Generating Facility.

2. Service hereunder shall be alternating current, _____ phase, _____ cycles, _____ volts.

3. The Consumer shall pay the Power Company for service hereunder at the rate and upon the terms and conditions set forth in the Power Company's Net Billing Rate Schedule, which is attached hereto and made a part of this Agreement as if fully restated herein. The Power Company's Net Billing Rate Schedule will be superseded by any new or amended Net Billing Rate Schedule or any successor rate schedule as approved from time to time by the Board of Trustees of the Power Company. Payment for the service provided hereunder shall be made at the office of the Power Company located in _____ County, Ohio, or at such other place as the Power Company shall hereafter designate in writing.

4. 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, provided however, that such discontinuance of service shall not relieve the Consumer of any of its obligations under this Agreement.

5. The Consumer is or shall become a member of the Power Company and be bound by such rules and regulations as may from time to time be adopted by the Power Company.

6. The Consumer shall not use the electric power and energy furnished hereunder as an auxiliary or supplement to any other source of electric power and energy and shall not sell or transfer to others the electric power and energy purchased hereunder, without permission of the Power Company; provided, however, that Consumer may operate the Electric Generating Facility upon the terms and

conditions and for the purposes set forth in this Agreement and the Power Company's Net Billing Rate Schedule which is attached hereto and made a part of this Agreement as if fully restated herein. The Consumer represents and warrants to the Power Company that the Electric Generating Facility is a certified qualifying cogeneration or small power production facility under PURPA. The Consumer represents and warrants to the Power Company that the output of the Electric Generating Facility is not reasonably anticipated to exceed the annual electric energy requirements of Consumer's electric consuming facilities located on the Premises. For purposes of this Agreement, the Electric Generating Facility's output will be presumed to be "not reasonably anticipated to exceed the annual electric energy requirements of the Consumer's electric consuming facilities located on the Premises" if the Electric Generating Facility annually generates less than one hundred and twenty percent (120%) of the Consumer's annual electric energy requirements. The Consumer's "annual electric energy requirements" shall be the average amount of electricity consumed annually by the Consumer for the electric consuming facilities located on the Premises over the previous three years, using the annual period of June 1 to May 31. If the Power Company does not have the data or cannot calculate the average amount of electricity consumed annually over the previous three years, such as in instances of new construction or vacant properties, the Power Company shall use any available consumption data to estimate the annual electricity consumption for the Consumer's electric consuming facilities located on the Premises and provide the estimation data to the Consumer. If the Electric Generating Facility annually generates one hundred and twenty percent (120%) or more of the Consumer's annual electric energy requirements, determined as set forth above, the Electric Generating Facility's output will be presumed to be "reasonably anticipated to exceed the annual electric energy requirements of the Consumer's electric consuming facilities located on the Premises," and the Power Company may, in its sole discretion, elect to cease providing electric service to the Consumer pursuant to the Power Company's Net Billing Rate Schedule and, instead, elect to provide electric service to the Consumer at the rate and upon the terms and conditions set forth in the Power Company's Back-Up and Supplementary Electric Service Rate Schedule, and require the Consumer to (a) sell the output of the Electric Generating Facility to Buckeye Power, Inc. ("Buckeye") on an hourly basis at Buckeye's purchase rate, as determined by Buckeye in its sole discretion, (b) reimburse the Power Company for the cost of the installation of hourly metering facilities (currently estimated to cost up to \$_____), (c) reimburse Buckeye for the cost of its telemetering facilities (currently estimated to cost up to \$10,000), (d) pay Buckeye a monthly billing and service fee (currently \$100 per month), and (e) terminate this Agreement and enter into a Power Purchase Agreement with Buckeye, an Agreement for Electric Service for Back-Up and Supplementary Electric Service with the Power Company, and an Agreement for Interconnection and Parallel Operation with the

Power Company, to contemplate the elimination of net billing and the purchase of the Electric Generating Facility output by Buckeye on an hourly basis at Buckeye's purchase rate.

7. The Consumer shall use the output of the Electric Generating Facility first to meet the requirements of Consumer's electric consuming facilities located on the Premises. The Power Company shall use a monthly kWh net billing period to measure the Consumer's net production. The net production output shall be measured by determining during each such period the production in kilowatt-hours (kWh) of the Electric Generating Facility in excess of the requirements of the Consumer's electric consumer facilities. Any such output of the Electric Generating Facility in excess of the requirements of Consumer's electric consuming facilities shall be sold to Buckeye Power, Inc. The Power Company shall bill the net electric usage pursuant to the Power Company's applicable Net Billing Rate Schedule, and credit the net electric output at Buckeye's purchase rate, on a dollar for dollar basis. In the event that the Consumer generates net positive kWh output during any such kWh netting period, (a) the Power Company will inform Buckeye Power, Inc. of the existence of such excess net kWh output; (b) Buckeye Power, Inc. will purchase such excess net kWh output at Buckeye Power, Inc.'s purchase rate, as determined by Buckeye Power, Inc. in its sole discretion, and credit Power Company's wholesale power bill for such dollar amount on a monthly basis; (c) the Power Company's load shall not be reduced by the amount of such excess net kWh output purchased by Buckeye Power, Inc. on a monthly basis, and the Power Company's load may need to be increased for Buckeye Power, Inc. wholesale power billing purposes by the amount of such excess net kWh output purchased by Buckeye Power, Inc., if the Consumer's qualifying facility is located behind the meter used by Buckeye Power, Inc. to determine the Power Company's wholesale load; (d) the Power Company shall credit Consumer's monthly power bill with the dollar amount of the billing credits paid by Buckeye Power, Inc. 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 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. The Consumer shall be entitled to all environmental attributes of the Electric Generating Facility during the term of this Agreement. The Consumer shall have the sole and exclusive right to designate the Electric Generating Facility as a renewable resource during the term of this Agreement in order to satisfy any federal, state or local renewable energy requirement, renewable energy procurement requirement, renewable energy portfolio standard, or other renewable energy mandate.

8. Whenever the Power Company's facilities located at the Premises are relocated solely to suit the convenience of the Consumer, the Consumer shall reimburse the Power Company for the entire cost incurred in making such change.

9. (a) The Power Company will use reasonable diligence in furnishing a regular and uninterrupted supply of electric power and energy but does not guarantee uninterrupted service. The Power Company shall not be liable for damages or other losses in case such supply is interrupted, curtailed, reduced, fluctuates, becomes irregular, or fails, or the commencement of service to the Consumer is delayed by reason of an act of God, the public enemy, accidents, labor disputes, orders or acts of civil or military authority, governmental action, loss of power supply, breakdowns or injury to the machinery, transmission or distribution lines or other facilities of the Power Company, repairs, maintenance or any cause beyond the Power Company's control; provided, however, that in no event shall the Power Company be liable for personal injury, wrongful death, property damage or other losses not caused by or due to the gross negligence or willful and wanton misconduct of the Power Company; provided, further, however, that in no event shall the Power Company be liable for consequential damages of any nature whatsoever in case such supply of power and energy should be interrupted, curtailed, reduced, fluctuates, becomes irregular, or fails, or the commencement of service to the Consumer is delayed; and provided further that the failure of the Consumer to receive electric power and energy because of any of the aforesaid conditions shall not relieve the Consumer of its obligation to make payments to the Power Company as provided herein.

(b) The point at which service is delivered by the Power Company to the Consumer, and at which the output of Consumer's Electric Generating Facility is transferred to the Power Company, to be known as the "point of interconnection", shall be the point at which the Consumer's electric consuming facilities located on the Premises are connected to the Power Company's electric distribution system, and the point at which Consumer's Electric Generating Facility is connected to the Power Company's electric distribution system. The Power Company shall not be liable for any loss, injury or damage resulting from the Consumer's use of its facilities or equipment or occasioned by the power and energy furnished by the Power Company beyond the point of interconnection.

(c) The Consumer shall provide and maintain suitable protective devices on its equipment to prevent any loss, injury or damage that might result from any fluctuation or irregularity in the supply of electric power and energy. The Power Company shall not be liable for any loss, injury or damage resulting from any fluctuation or irregularity in the supply of power and energy which could have been prevented by the use of such protective devices.

(d) The Power Company will provide and maintain the necessary lines or service connections, metering and other apparatus which may be required for the proper measurement of and rendition of its service, and for the proper measurement of the output of Consumer's Electric Generating Facility. All such apparatus shall be owned and maintained by the Power Company. A single meter or pair of meters will be installed which shall be 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 the Consumer's Electric Generating Facility to Power Company's electric distribution system, at the point of interconnection.

10. In the event of loss or injury to the property of the Power Company through misuse by, or the negligence of, the Consumer or the employees of the same, the cost of the necessary repairs or replacement thereof shall be paid to the Power Company by the Consumer.

Consumer will be responsible for any person tampering with, interfering with, or breaking the seals or meters or other equipment of the Power Company installed at the Premises. The Consumer hereby agrees that no one except the employees of or persons duly authorized by the Power Company shall be allowed to make any internal or external adjustments of any meter or any other piece of apparatus which shall be the property of the Power Company. The Consumer shall provide the Power Company reasonable access at all times to the Power Company's meters and other facilities of the Power Company located on the Premises.

11. Duly authorized representatives of the Power Company shall be permitted to enter the Premises at all reasonable times in order to carry out the provisions hereof.

12. All present or future federal, state, municipal or other lawful taxes payable by reason of the sale or purchase or Net Billing of the output of the Electric Generating Facility, the production of electrical output from the Electric Generating Facility, or the ownership of the Electric Generating Facility, under this Agreement shall be paid by Consumer. Without limiting the generality of the foregoing, the Consumer shall be solely responsible for: any Ohio kilowatt-hour taxes associated with the production of electricity from the Electric Generating Facility; any Ohio public utility property taxes associated with the Consumer's ownership of the Electric Generating Facility; and any state or federal income taxes associated with the Consumer's receipt of payments or Net Billing by the Power Company or Buckeye under this Agreement. Consumer acknowledges that neither the Power Company nor Buckeye has represented to the Consumer that the Consumer will not be subject to any such kilowatt-hour taxes, public utility property taxes, or state or federal income taxes as a result of the Net Billing arrangements described in this Agreement.

13. Power Company shall purchase and install net billing equipment to meter the Power Company's electric service to the Consumer and the electrical output of the Electric Generating Facility. Net billing 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 Distribution System to Consumer's electric consuming facilities located on the Premises, and from Consumer's Electric Generating Facility to the Power Company Distribution System. If the existing electrical meter or meters in service at the Consumer's Premises is/are not capable of measuring the flow of electricity in each direction, the Power

Company will purchase, install, own, operate, and maintain an approved meter or meters that is/are capable of measuring electricity in each direction. The Consumer will pay the Power Company all expenses involved in either modifying the existing meter(s) or providing a new meter(s) capable of measuring the flow of electricity in each direction. Power Company shall own, operate and maintain the net billing equipment. All costs associated with the purchase, installation, ownership, operation and maintenance of net billing equipment shall be borne by Consumer.

14. Consumer shall promptly provide to the Power Company all relevant information, documents, or data regarding the Consumer's facilities and equipment that have been reasonably requested by the Power Company.

15. This Agreement shall become effective as of the date first above written and shall remain in effect until terminated by either party giving to the other party not less than ninety (90) days prior notice in writing of its intention to terminate.

16. (a) This Agreement shall be binding upon and inure to the benefit of the parties hereto and their respective successors, legal representatives and assigns; provided, however, this Agreement shall not be assigned by the Consumer without the prior written consent of the Power Company, any such assignment by the Consumer being null and void without such consent.

(b) This Agreement shall not be effective unless approved in writing by all governmental agencies from which approval is required.

17. This Agreement shall be governed by and construed in accordance with the laws of the State of Ohio, except for any conflicts of laws provisions.

18. The Consumer shall comply with the attached Metering, Insurance, Indemnity, and Interconnection Standards.

IN WITNESS WHEREOF, the parties have caused this Agreement to be executed by their duly authorized representatives as of the date first written above.

WITNESS:

WITNESS:

By: _____

Name: _____

Title: _____

_____ By: _____

Name: _____

Title: _____

METERING, INSURANCE, INDEMNITY, AND INTERCONNECTION STANDARDS

1. Metering. Metering equipment used in determining the demand and amount of electric power and energy supplied hereunder, and the demand and amount of electric power and energy produced by Consumer's Electric Generating Facility, shall be tested and calibrated, if required, by the Power Company. If any metering equipment shall be found inaccurate, it shall be restored to the extent possible to a 100.0% accurate condition; or new metering equipment to the extent necessary shall be substituted so that, as far as possible, 100.0% accuracy shall always be maintained. The Consumer shall have the right to request that a special meter test be made at any time. In the event a test made at the Consumer's request discloses that the meter tested is registering correctly, or within one percent (1%) above or below 100.0% accuracy at full load, Consumer shall bear the expense of such meter test.

The results of all such tests and calibrations shall be open to examination by the Consumer and a report of every requested test shall be furnished to the Consumer. Any meter tested and found to be not more than one percent (1%) above or below 100.0% accuracy at full load, shall be considered to be accurate in so far as correction of billing is concerned. If as a result of any test, any meter is found to register in excess of one percent (1%) above or below 100.0% accuracy at full load, then the readings of such meter previously taken for billing purposes shall be corrected according to the percentage of inaccuracy so found, but no such correction shall extend beyond the last regular monthly billing period occurring prior to the day on which inaccuracy is discovered by such test, and no correction shall be made for a longer period than that during which it may be determined by mutual agreement of the parties involved that the inaccuracy existed. The Power Company will bear the cost of the meter test if any meter is found to register in excess of one percent (1%) above or below 100.0% accuracy at full load.

For any period that metering equipment is found to have failed wholly, or in part, to register and for which no alternate metering is available, it shall be assumed that the demand established, or electric energy delivered, as the case may be, during said period is the same as that for a period of like operation during which such meter was in service and operating.

The Power Company shall notify the Consumer in advance of the time of any meter test so that a representative of the Consumer may be present.

2. Insurance. –Consumer shall obtain and maintain the following policies of insurance during the term of the Agreement:

(1) Comprehensive or Commercial General Liability insurance with bodily injury and property damage combined single limits of at least \$250,000 per occurrence if the Electric Generating Facility is 10 kW or less, \$1,000,000 per occurrence if the Electric Generating Facility is greater than 10 kW but less than 100 kW, and \$5,000,000 per occurrence if the Electric Generating Facility is 100 kW or greater, covering the Consumer's obligations and liabilities to the Power Company under this Agreement, including under Section 23.

(2) Consumer shall cause its insurers or agents to provide Power Company with certificates of insurance evidencing the policies listed above prior to interconnecting the Electric Generating Facility with the Power Company Distribution System, as well as copies of each annual renewal certificate for such policies, promptly after such renewal certificates are issued. Power Company shall have the right to review the policies listed above at any time during the term of this Agreement, and Consumer shall promptly provide copies of the same to Power Company upon its request. Failure of Power Company to obtain certificates of insurance does not relieve Consumer of the insurance requirements set forth herein. Failure to obtain the insurance coverage required by this Section 2 shall in no way relieve or limit Consumer's obligations and liabilities under other provisions of this Agreement.

(3) If Consumer is a residential customer of the Power Company, the following provisions shall apply:

(a) The insurance coverage requirements of Section 2.1 above may be satisfied by the residential Consumer obtaining and maintaining a Homeowner's Liability insurance policy, or if Homeowner's Liability insurance is not available, Comprehensive or Commercial General Liability insurance, Excess or Umbrella Liability insurance, or any other type of insurance policy that the Power Company deems acceptable, covering the residential Consumer's liabilities and obligations under this Agreement, with bodily injury and property damage combined single limits as set forth in Section 2.1; and

(b) The amounts of insurance required in Section 2.1 may be satisfied by the residential Consumer purchasing primary coverage in the amounts specified or by buying a separate excess Umbrella Liability policy together with lower limit primary underlying coverage. The structure of the coverage is the residential Consumer's option, so long as the total amount of insurance meets Power Company's requirements.

(4) If Consumer is a commercial customer of the Power Company, the Consumer shall cause its insurers to provide Power Company with at least 10 days prior written notice of any cancellation, non-renewal or material change in the insurance policy by endorsing the policy to add the Power Company as a party with an additional interest in the policy with respect to such notice.]

3. Indemnity and Liability. Consumer agrees to fully indemnify, release, and hold Power Company, its members, trustees, officers, managers, employees, agents, representatives, and servants, Power Company's affiliated and associated companies, and their respective members, trustees, shareholders, directors, partners, stakeholders, officers, managers, employees, agents, representatives, and servants, and Power Company's successors and assigns, harmless from and against any and all claims, demands, liabilities, losses, damages, costs and expenses (including attorneys' fees and other costs of defense) of any nature or kind whatsoever, including, but not limited to, claims, demands and/or liabilities for personal injury to (including death of) any person whomever (including payments and awards made to employees or others under any workers' compensation law or under any plan for employees' disability and death benefits) and for damage to any property whatsoever (including Consumer's Electric Generating Facility and the Power Company's distribution system) arising out of or otherwise resulting from the use, ownership, maintenance, or operation of the Electric Generating Facility or the interconnection facilities, regardless of whether such claims, demands or liability are alleged to have been caused by negligence or to have arisen out of Power Company's status as the owner or operator of facilities involved; provided, however, that the foregoing shall not apply to the extent that any such personal injury or property damage is held to have been caused by the gross negligence or intentional wrongdoing of Power Company or its agents or employees. Neither party shall be liable in statute, contract, in tort (including negligence), strict liability, or otherwise to the other party, its agents, representatives, affiliated and associated companies, or assigns, for any incidental or consequential loss or damage whatsoever, including, but not limited to, loss of profits or revenue, resulting from any party's performance or non-performance of an obligation imposed on it by this Agreement.

4. Operation, Maintenance and Control of the Electric Generating Facility. The Consumer shall own, operate, maintain and control the Electric Generating Facility and Consumer's Interconnection Facilities in a safe and reliable manner, in accordance with good utility practice, and in accordance with the provisions of this Agreement, and in accordance with applicable operational and reliability criteria, protocols, and directives, including those of the Power Company. Consumer may operate the Electric Generating Facility in parallel and in synchronization with the electric power and energy provided by Power Company to Consumer pursuant to this Agreement, as an auxiliary or supplement to such electric power and energy.

5. Protection and System Quality. Consumer shall, at its expense, provide, install, own, operate and maintain system protection facilities, including protective and regulating devices, as required by the Power Company and as otherwise required by good utility practice, and applicable operational and reliability criteria, protocols, and directives, in order to protect persons and property and to minimize deleterious effects to the Power Company's distribution system. Any such protective or regulating devices that may be required on Power Company's facilities in connection with the operation of the Electric Generating Facility shall be installed by Power Company at Consumer's expense. Power Company reserves the right to modify or expand its requirements for protective devices in conformance with good utility practice and/or applicable legal and regulatory requirements.

6. Inspection. Power Company shall have the right, but shall have no obligation or responsibility to (a) observe Consumer's tests and inspections of any of Consumer's protective equipment, (b) review the settings of Consumer's protective equipment, and (c) review Consumer's maintenance records relative to the Electric Generating Facility and Consumer's protective equipment. The foregoing rights may be exercised by Power Company from time to time as deemed necessary by the Power Company upon reasonable notice to Consumer. However, the exercise or non-exercise by Power Company of any of the foregoing rights of observation, review or inspection shall be construed neither as an endorsement or confirmation of any aspect, feature, element, or condition of the Electric Generating Facility or Consumer's protective equipment or the operation thereof, nor as a warranty as to the fitness, safety, desirability, or reliability of same.

7. Disconnection. Upon termination of this Agreement, Consumer shall disconnect the Electric Generating Facility from the Power Company's distribution system. Power Company shall have the right to disconnect, or to require the Consumer to disconnect, the Electric Generating Facility immediately and without prior notice if, in the Power Company's sole opinion, an Emergency exists and immediate disconnection is necessary to protect persons or property from injury or damage. Power Company shall have the right to disconnect, or to require the Consumer to disconnect, the Electric Generating Facility with no less than seven days prior notice if, in the Power Company's sole opinion, such disconnection is required in order for the Power Company to conduct maintenance, repairs or replacements of its facilities or the Power Company's distribution system. Consumer shall disconnect the Electric Generating Facility immediately if an emergency exists, as determined by the Power Company in its discretion or as specified herein, and immediate disconnection is necessary to protect persons or property from injury or damage.

8. Emergencies. The Consumer agrees to comply with Power Company's emergency procedures, as applicable, with respect to emergencies, the existence of which shall be determined by the Power Company in its discretion. The Consumer shall provide the Power Company with prompt oral notification an emergency which includes occurrences, circumstances, or situations which may reasonably be expected to detrimentally affect the Power Company's distribution system or is imminently likely to endanger life or property, to the extent the Consumer is aware of the emergency.

9. Modifications. Either party may undertake modifications to its facilities; provided, that Consumer shall not increase the output of the Electric Generating Facility or make other material change or modification to the configuration or operation of the Electric Generating Facility without the prior written consent of Power Company. In the event that the Consumer plans to undertake a modification that reasonably may be expected to impact the Power Company's facilities, the Consumer shall provide the Power Company with sufficient information regarding such modification so that the Power Company can evaluate the potential impact of such modification prior to commencement of the work.

10. Construction. Consumer shall, at its sole expense, design, construct, install, own, operate and maintain the Electric Generating Facility and all equipment on Consumer's side of the point of interconnection needed to interconnect the Electric Generating Facility with the Power Company's

distribution system. The Power Company shall, at Consumer's sole expense, design, construct, install, own, operate and maintain all equipment on the Power Company's side of the point of interconnection needed to interconnect the Electric Generating Facility with the Power Company's distribution system. The Consumer's interconnection facilities and equipment shall satisfy all requirements of applicable safety and engineering codes, including the Power Company's. Consumer shall submit all specifications for Consumer's interconnection facilities and equipment, including system protection facilities, to the Power Company for review at least ninety (90) days prior to interconnecting such interconnection facilities and equipment with the Power Company's distribution system. Power Company's review of Consumer's specifications shall be construed neither as confirming nor as endorsing the design, nor as any warranty as to fitness, safety, durability or reliability of Consumer's interconnection facilities or equipment. Power Company shall not, by reasons of such review or failure to review, be responsible for strength, details of design, adequacy or capacity of Consumer's interconnection facilities or equipment, nor shall Power Company's acceptance be deemed to be an endorsement of any facility or equipment. Consumer agrees to make changes to its interconnection facilities and equipment as may be reasonably required to meet the requirements of the Power Company. In the event it becomes necessary for Power Company to alter, add to, relocate or rearrange its interconnection facilities or to rearrange or relocate existing Power Company-owned facilities which are not interconnection facilities to continue to conduct interconnected operations in accordance with good utility practice, then Consumer shall pay for such work.

Buckeye Rural Electric 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,

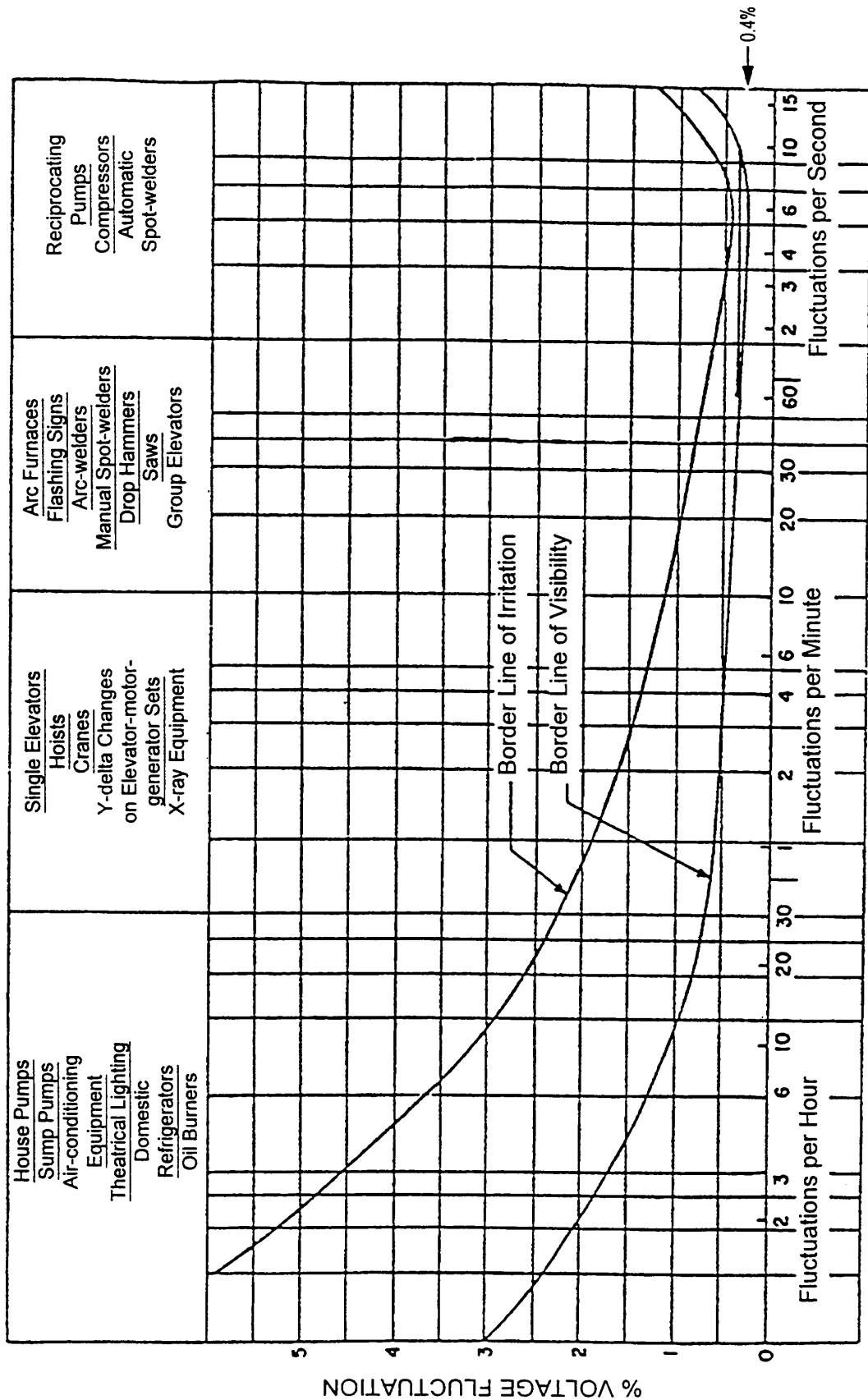
7. Excessive negative sequence voltages,
 8. Separation from supply,
 9. Synchronizing generation, and
 10. Re-synchronizing the Owner's generation after electric restoration of the supply.
- 2.12 Feeder Protective Coordination. In the case of a Cooperative protective function initiating a trip of a 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

