

This document is intended to serve as Appendix F, Distributed Generation Interconnection Requirements, for those certain COMMERCIAL/INDUSTRIAL PHOTOVOLTAIC GENERATING FACILITY DISTRIBUTION SYSTEM INTERCONNECTION AGREEMENTS, and shall supplement as additional terms and conditions to those certain Grid-Tied Residential Solar Electric Photovoltaic (PV) Applications.



TUCSON ELECTRIC POWER COMPANY

DISTRIBUTED GENERATION INTERCONNECTION REQUIREMENTS ("DGIRs")

Conformed To ACC Docket No. E-00000A-99-0431

Decision No. 69674

June 28, 2007

The Generating Facility must at all times meet the system qualification requirements as set forth in the "Distributed Generation Interconnection Requirements" (DGIRs) as amended from time to time, the terms of which are fully incorporated herein by reference. A complete copy of the "Distributed Generation Interconnection Requirements" conformed to ACC Docket No. E-00000A-99-0431 are located at <https://www.tep.com/customer/construction/esr/> under the "Customer Care" - "Construction Services" tab. Customer acknowledges that it has adequate notice of and access to these online documents, has read the documentation, and waives any objection thereto. Hard copies will be provided upon request.

DG INTERCONNECTION REQUIREMENTS

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OVERVIEW

This Interconnection Document ("Document") specifies Tucson Electric Power Company ("TEP" or "Utility") requirements for safe and effective interconnection of a Distributed Generator ("DG") with a utility radial distribution system. Interconnection requirements as outlined here are for those installations that will be connected to TEP's electric power distribution and/or transmission systems. A Distributed Generator must also comply with Western Systems Coordinating Council ("WSCC"), Arizona Corporation Commission ("ACC"), Arizona Independent Scheduling Administrator ("AZISA"), North American Electric Reliability Council ("NERC"), Federal Energy Regulatory Commission ("FERC") and Regional Transmission Operator ("RTO") requirements as applicable. Facilities that will be connected directly to the transmission system will be reviewed by the Utility on an individual basis.

Neither this Document nor any interconnection agreement provides for nor include transmission service. The availability of transmission service on the transmission system may not be inferred or implied from TEP's execution of any interconnection agreement. Transmission service on the transmission system is available pursuant to the TEP's Open Access Transmission Tariff ("OATT").

For the purpose of simplicity, the term "Customer" will be used here to refer to a TEP customer who installs, owns or operates a distributed generator, cogenerator or small power producer, even though the Customer may not actually be a purchaser of power from the Utility, and includes any independent party or entity that either invests in, owns or operates a distributed generator or generation facility.

The required protective relaying and/or safety devices and requirements specified in this document are for protecting Utility facilities and other Utility customers' equipment from damage or disruptions caused by a fault, malfunction or improper operation of the distributed generating facility. They are also necessary to ensure the safety of Utility workers and the public. The requirements specified herein do not include additional relaying, protective or safety devices as may be required by industry and/or government codes and standards, equipment manufacturer requirements and prudent engineering design and practice to fully protect Customer's generating facility or facilities; those are the sole responsibility of the Customer. In addition to all applicable regulatory, technical, safety, and electrical requirements and codes, Customers will also be subject to contractual and other legal requirements, which will govern over the general provisions in this Document.

Customers and Utility personnel shall use this Document when planning the installation of distributed generation to be connected to or expecting back-up electrical service from TEP. Note that these requirements may not cover all details in specific cases. TEP encourages the Customer to discuss project plans with TEP before designing their facility or purchasing and installing equipment. This Document must be applied in conjunction with applicable utility rate tariffs and electrical service schedules and requirements that pertain to the operation of distributed generation with the utility electrical distribution system.

1. APPLICABILITY

1.1 Applicable Generating Facilities

This Document applies to all Generating Facilities with power ratings of 10 MW or less, operating (or applying to operate) in parallel with an electric public utility distribution system in Arizona. This Document establishes technical and procedural requirements, terms, and conditions that will promote the safe and effective parallel operation of Customer-owned Generating Facilities. This Document includes provisions for interconnecting to a radial or -secondary spot network system. It includes the three distinct types of generators: (a) solid-state or static inverters, (b) induction machines, and (c) synchronous machines.

These Interconnection procedures are limited to 10 MW or less. The total capacity of an individual Customer's Generating Facility may exceed 10 MW; however, no more than 10 MW of a facility's capacity will be interconnected at a single Point of Interconnection as provided for in these procedures. The electric rates and schedules, terms and conditions of service, or other contract provisions governing the electric power sold by an electric public utility to an Arizona retail customer are subject to the jurisdiction of the Arizona Corporation Commission ("ACC"). The ACC also has jurisdiction when the Utility purchases excess power from Customer-owned Qualifying Facilities ("QFs") under 18 C.F.R. §§292.303, 292.306(2004). The Federal Energy Regulatory Commission has jurisdiction over all Interconnections with facilities that are subject to the electric public utility's OATT at the time the interconnection request was made.

1.2 Types of Generating Facilities

Generating Facilities include induction and synchronous electrical generators as well as any type of electrical inverter capable of producing NC power. The Customer may elect to run his Generating Facility in Parallel with the Utility's system (either on a continuous basis or momentarily), or he may run it as a Separate System with non-parallel load transfer between the two independent power systems. A description and the basic requirements for these methods of operation are outlined below.

Parallel System

A Parallel, or interconnected, generator is connected to a bus common with the Utility's system, and a transfer of power between the two systems is a direct result. A consequence of such interconnected operation is that the Customer's Generating Facility becomes an integral part of the distribution system, and it must be considered in the electrical protection and operation of the distribution system.

Parallel Systems include any type of Generating Facility that can electrically parallel with, or potentially backfeed the Utility system. Additionally, any Generating Facility system using a "closed transition" type transfer switch or a multi-breaker transfer scheme, or an electrical inverter that can be configured or programmed to operate in a "Utility interactive mode," may be required to have relays to prevent potential backfeeding to the Utility system, and is classified as a Parallel System. Continuous uninterruptible power supply, units without grid tie capability, and islanding inverter technologies are not considered Parallel Systems provided they are not a potential backfeed source to the Utility.

The Utility has specific interconnection, contractual, and inspection requirements, as outlined in these provisions, that must be complied with and information that needs to be submitted for all interconnected Generating Facilities. These may include protective relaying, metering, special rate schedules, applicable safety devices, and information requirements (as specified in each Utility's Interconnection Manual). There are two sub-types of Parallel Systems, as described below: Momentary Parallel Systems and Islandable Systems. Momentary Parallel Systems have similar requirements as regular Parallel Systems, whereas Islandable Systems are unique.

- **Momentary Parallel System.** A Momentary Parallel System is one that transfers electrical load between the Utility grid and the Customer's Generating Facility by means of a "make- before break" transfer scheme. Momentary Parallel Systems synchronize the Generating Facility with the Utility grid for a period not to exceed ten seconds for the purpose of uninterrupted load transfer.
Momentary Parallel Systems are useful for customers who wish to have greater reliability of electric service without experiencing the momentary outage of service that occurs under a "break-before-make" transfer switch scheme. Additionally, this approach allows the customer to more effectively test the switchgear and generator with load during weekly and monthly testing.
- **Islandable System.** An Islandable System is a Generating Facility interconnected to a bus common with the Utility's system, where the Generating Facility is designed to serve part of the Utility grid that has become or is purposefully separated from the rest of the grid. Currently there are no rules, standards, or protocols governing this type of system operation. As such, an Islandable System as defined herein is not allowed.

Separate System

A Separate System is one in which there is no possibility of electrically connecting or operating the Customer's Generating Facility in parallel with the Utility's system. The Customer's equipment must transfer load between the two power systems in an open transition or non- parallel mode. If the Customer claims a Separate System, the Utility may require verification that the transfer scheme meets the non-parallel requirements.

Separate Systems used to supply part or all of the Customer's load during a Utility power outage must be connected to the Customer's wiring through a double throw, "break-before-make" transfer switch specifically designed and installed for that purpose. The transfer switch must be of a fail-safe design, which, under no circumstances, will allow the Generating Facility to electrically interconnect or parallel with Utility's system. The transfer switch must always disconnect the Customer's load from the Utility's power system prior to connecting it to the Generating Facility. Conversely, the transfer switch must also disconnect the load from the Generating Facility prior to re-connecting it with the Utility's system. These requirements apply to both actual emergency operations as well as any testing of the Generating Facility. All transfer switches and transfer schemes must be listed by a Nationally Recognized Testing Laboratory ("NRTL") for the purpose as used, and also inspected and approved by the jurisdictional electrical inspection agency. Separate Systems that are not connected with the Utility system and do not pose a potential backfeed source are not subject to ACC jurisdiction or the provisions in this Document, short of verifying that the transfer scheme meets the non-parallel requirements.

There is one sub-type of Separate System, as described below: Portable Generators.

- **Portable Generators.** Portable Generators are not designed to be connected to a building's permanent wiring system, and are not to be connected to any such wiring unless a permanent and approved transfer switch is used. Failure to use a transfer switch can result in backfeed into the Utility system. (The generator voltage can backfeed through the Utility transformer and be stepped up to a very high voltage.) This can pose an electrocution hazard to anyone working on the power lines or on Utility equipment. Portable Generators that are not connected with the Utility system and do not pose a potential backfeed source are not subject to ACC jurisdiction or the provisions in this Document short of verifying that the transfer scheme meets the non-parallel requirements.

2. RIGHTS AND RESPONSIBILITIES

2.1 Customer Rights and Responsibilities

A Customer has the right to interconnect a Generating Facility with the electric Utility system. A Customer has the right to expect prompt, reasonable, and professional responses from the Utility at every step of the interconnection process. A Customer has the right to expect reasonable cost estimates, outlines of the proposed work, supporting data, and justification for proposed work before the Utility undertakes any studies or system upgrades to accommodate the Generating Facility.

A Customer has the responsibility of disclosing to the Utility items specified herein on the Generating Facility and its operation. The Customer also has the responsibility of ensuring that:

- the Generating Facility meets all minimum safety and protection requirements outlined in these provisions and the Utility's Interconnection Manual;
- the Generating Facility meets all applicable construction codes, safety codes, electric codes, laws, and requirements of government agencies having jurisdiction;
- all the necessary protection equipment is installed and operated to protect its equipment, Utility personnel, the public, and the Utility system;
- the Generating Facility design, installation, maintenance, and operation reasonably minimizes the likelihood of causing a malfunction or other disturbance, damaging, or otherwise impairing the Utility system;
- the Generating Facility will not adversely affect the quality of service to other customers (but no more or less than the present standard of care observed by regular Utility/consumer connections;
- the Generating Facility will minimally hamper efforts to restore a feeder to service (specifically when a clearance is required);
- the Generating Facility is maintained in accordance with applicable manufacturers' maintenance schedule; and
- the Utility is notified of any emergency or hazardous condition or occurrence with the Customer's Generating Facility, which could affect safe operation of the Utility system. (This notification can be through electronic communication.)
- the Generating Facility will comply with all applicable service schedules and requirements, pricing plans, tariffs, Rules and Regulations, and any other applicable requirements approved by the Arizona Corporation Commission.

The Customer is required to meet the timeframes specified in this Document unless the Utility and Customer mutually agree on other time frames and so long as the project moves forward in a fair and reasonable manner. The Customer is responsible for all Interconnection facilities required to be installed to interconnect the Customer's Generating Facility to the Utility system. These may include connection, transformation, switching, protective relaying, metering and safety equipment, and any other requirements as outlined in these provisions or other special items specified by the Utility. All such interconnection facilities are to be installed by the Customer at its sole expense.

The Customer will own and be responsible for designing, installing, operating and maintaining control and protective devices, in addition to minimum protective relays and devices specified in the Utility's Interconnection Manual, to protect its facilities from abnormal operating conditions such as, but not limited to, electric overloading, abnormal voltages, and fault currents. Such protective devices must promptly disconnect the Generating Facility from the Utility's system in the event of a power outage on the Utility's system. The Customer will also own and be responsible for designing, installing, operating and maintaining interconnection facilities on the Customer's premises as may be required to deliver power from the Customer's Generating Facility to the Utility's system at the Point of Interconnection.

In the event that additional facilities are required to be installed on the Utility's system to accommodate the Customer's generation, the Utility will install such facilities at the Customer's expense. The Utility shall provide notice to the Customer of intent to install such facilities early in the process. The Customer is not responsible for Utility upgrades for other customers unrelated to the Generating Facility installation. All Customers interconnecting a Generating Facility with the Utility system shall (a) sign an Interconnection/Connection Agreement, and all other applicable purchase, supply, and standby agreements, in

accordance with the prevailing Document in effect at that time; and (b) comply with all applicable tariffs, rate schedules and Utility service requirements.

2.2 Utility Rights and Responsibilities

A Utility is obligated to interconnect Generating Facilities, subject to the requirements set forth in these provisions and in each Utility's Interconnection Manual. A Utility has the right to expect prompt, reasonable, and professional responses from the Customer during the interconnection process.

Because a Utility is required to safeguard its system, other consumers, and the general public, a Utility has the right and responsibility to ensure that an interconnected Generating Facility:

- (a) will not present any unreasonable hazards to Utility personnel, other customers, or the public;
- (b) minimizes the possibility of damage to the Utility and other customers' equipment; and
- (c) minimally hampers efforts to restore a feeder to service (specifically when a clearance is required)

The Utility will notify the Customer if there is any evidence that the Customer's Generating Facility operation causes disruption or deterioration of service to other customers served from the Utility system or if such operation causes damage to the Utility system. A Utility is required to meet the time frames specified in this Document unless the Utility and Customer mutually agree on other time frames and so long as the project moves forward in a fair and reasonable manner. A Utility has the responsibility to make its Interconnection Manual, standard Application form(s) and Interconnection Agreement(s) readily available to Customers, and as soon as practical, readily accessible on its website. A Utility has the responsibility to ensure that Customers with Generating Facilities are treated without discrimination. Before the Utility undertakes any studies or system upgrades that will be charged to the Customer, a Utility has the responsibility to provide a detailed cost estimate, outline of the proposed work, supporting data, and justification for the proposed work. A Utility must show good cause why a Customer's Generating Facility that satisfies the requirements of this Document and the Utility's Interconnection Manual should not be approved for interconnected operation.

If facility upgrades are needed to accommodate the Generating Facility, a Utility will reduce the charge of the upgrade to the customer by the amount of benefits, if any, to the grid that are readily quantifiable by the Utility. In addition, a Utility cannot reject an Application on the basis of distribution system conditions that are already deficient, or charge a Customer for facility upgrades that are overdue or soon to be required to ensure compliance with good Utility practice, except that applications can be rejected in instances where reliability or safety would be further compromised by a DG installation. A Utility shall not charge a Generating Facility Customer differently than any other Customer for facility upgrades in accordance with generally applicable Commission-approved tariffs.

2.3 Easements / Rights of Way

Utility Right to Access Utility-Owned Facilities and Equipment. Where an easement or right of way does not exist, but is required to accommodate the interconnection, the Customer must provide to the Utility suitable easements or rights of way, in the Utility's name, on the premises owned, leased, or otherwise controlled by the Customer. If the required easement or right of way is on another's property, the Customer must obtain and provide to the Utility a suitable easement or right of way, in the Utility's name, at the Customer's sole cost and in sufficient time to comply with the Interconnection Agreement requirements. The Utility will use reasonable efforts to utilize existing easements to accommodate the interconnection to the extent possible and will assist the Customer in securing necessary easements at the Customer's expense that do not exist but are necessary to accommodate the interconnection.

2.4 Insurance

The Customer is not required to provide general liability insurance coverage as a condition for Interconnection. Due to the risk of incurring damages, it is recommended that every Interconnection Customer protect itself with insurance or other suitable financial instrument sufficient to meet its construction, operating, and liability responsibilities. At no time shall the Utility require that the Customer negotiate any policy or renewal of any policy covering any liability through a particular insurance provider, agent, solicitor, or broker. The inability of the Utility to require the Customer to provide general liability insurance coverage for operation of the Generating Facility is not a waiver of any rights the Utility may have to pursue remedies at law against the Customer to recover damages.

2.5 Non-Circumvention

A Utility and its affiliates shall not use knowledge of proposed distributed generation projects submitted to it for interconnection or study to initiate competing proposals to the customer that offer either discounted rates in return for not installing the distributed generation, or offer competing distributed generation projects. Customers are not precluded from sharing information in their possession regarding a potential distributed generation project with a Utility or its affiliates, or

from using information regarding a potential distributed generation project to negotiate a discounted rate or other mutually beneficial arrangement with a Utility or its affiliates. The Utility shall be permitted to inform the Customer of existing or pending (awaiting approval by the ACC) rate schedules that may economically benefit or otherwise affect the Customer's project.

2.6 Meter Installations

TEP has metering requirements for a GF that may depend on the pricing plan selected and service requirements of the Customer. The Customer shall contact the Utility, or its ESP or MSP if applicable, for design requirements and installation details.

2.7 Electric Supply / Purchase Agreement

Customers purchasing energy from either TEP or an ESP, utilizing an interconnected DG system, may be required to sign an agreement for backup, supplemental and maintenance power from their energy supplier. Customers operating a parallel generator may also be required to sign an agreement or take service under a tariff with TEP that provides for movement of power over TEP's distribution grid and transmission systems. The Customer may sell power to TEP, other utilities, ESPs, or electric wholesalers. These entities may or may not be obligated to purchase this power and any such sales would be made under the terms and conditions offered by the purchaser. For a Customer who wishes to sell power to others, the customer will be required to:

- (a) Choose the applicable TEP tariff that allows for the movement of power over TEP's distribution grid and transmission systems;
- (b) Sign an agreement with the purchaser of the electric power, and/or
- (c) Become an ESP and sell power to retail customers.
- (d) Follow all applicable criteria/protocols established by NERC, WSCC, the approved RTO, and AZISA regarding the sale of power to others.

All tariffs under the purchase and supply arrangements are subject to change by the Utility and approval of the ACC.

2.8 Interconnections

TEP will not install or maintain any lines or equipment on a Customer's side of the Point of Interconnection, except that TEP may install its meter and/or research equipment. Only TEP authorized employees may make and energize the service connection between the Utility system and the Customer's service entrance conductors. Normally, the interconnection will be arranged to accept only one type of standard service at one Point of Interconnection. If a Customer's generating facility requires a special type of service, or if sales to TEP will be at a different voltage level, the services will only be provided according to additional specific terms that are outlined in the Electric Supply/Purchase Agreement, applicable service schedules, or other terms and conditions governing the service.

3. GENERAL PROCESS AND PROCEDURES FOR ALL LEVELS

3.1 Designation of Contact Persons

Each Utility shall designate a person or persons who will serve as the Utility's contact for all matters related to distributed generation Interconnection, identify to the Commission its distributed generation contact person, and provide convenient access through its internet web site to the names, telephone numbers, mailing addresses and electronic mail addresses for its distributed generation contact person(s). Each customer applying for Interconnection shall designate a contact person or persons, and provide to the Utility the contact's name, telephone number, mailing address, and electronic mail addresses.

3.2 Non-discrimination

All Applications for interconnection and parallel operation of distributed generation shall be processed by the Utility in a non-discriminatory manner.

3.3 Application Submission Requirements

The Utility may require additional documentation to be submitted with the Application. Each Utility's Application form will specify what additional documentation is required. Additional documentation may include an electrical one-line diagram, an electrical three-line diagram, AC and DC control schematics, plant location diagram, and site plan. Upon request, the Utility will provide the Customer with sample diagrams that indicate the preferred level of detail and type of information required for a typical inverter-based system.

3.4 Minor Modifications

It is recognized that certain Applications may require minor modifications to the Generating Facility or the Application while they are being reviewed by the Utility. Such minor modifications to a pending Application shall not require that it be considered incomplete and treated as a new or separate Application.

3.5 Certification

Compliance with codes and standards. In order to qualify as "Certified" for any interconnection procedures, relevant equipment shall comply with the following codes, guides, and standards as applicable, and as specified in this document:

- (a) IEEE 1547 Standard for Interconnecting Distributed Resources with Electric Power Systems (including use of IEEE 1547.1 testing protocols to establish conformity);
- (b) IEEE1547.1 Standard for Conformance Testing Procedures or equipment Interconnecting Distributed Resources with Electric Power Systems;
- (c) UL 1741 Inverters, Converters, and Controllers for Use in Independent Power Systems;
- (d) IEEE Std 929-2000 IEEE Recommended Practice for Utility Interface of Photovoltaic (PV) Systems;
- (e) NFPA 70 (2002), National Electrical Code;
- (f) IEEE Std C37.90.1-1989 (R1994), IEEE Standard Surge Withstand Capability (SWC) Tests for Protective Relays and Relay Systems;
- (g) IEEE Std C37.90.2 (1995), IEEE Standard Withstand Capability of Relay Systems to Radiated Electromagnetic Interference from Transceivers;
- (h) IEEE Std C37.108-1989 (R2002), IEEE Guide for the Protection of Network Transformers;
- (i) IEEE Std C57.12.44-2000, IEEE Standard Requirements for Secondary Network Protectors;
- (j) IEEE Std C62.41.2-2002, IEEE Recommended Practice on Characterization of Surges in Low Voltage (1000V and Less) AC Power Circuits;
- (k) IEEE Std C62.45-1992 (R2002), IEEE Recommended Practice on Surge Testing for Equipment Connected to Low-Voltage (1000V and Less) AC Power Circuits;
- (l) ANSI C84.1-1995 Electric Power Systems and Equipment - Voltage Ratings (60 Hertz);
- (m) IEEE Std 100-2000, IEEE Standard Dictionary of Electrical and Electronic Terms NEMA MG 1-1998, Motors and Small Resources, Revision 3;
- (n) IEEE Std 519-1992, IEEE Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems; and
- (o) NEMA MG 1-2003 (Rev 2004), Motors and Generators, Rev. 1.

Requirements for Certification. Generating Facility equipment proposed for use separately or packaged with other equipment in an Interconnection system shall be considered Certified for interconnected operation if:

- (a) it has been tested in accordance with industry standards for continuous Utility interactive operation in compliance with the appropriate codes and standards referenced above by any Nationally Recognized Testing Laboratory (NRTL) recognized by the U. S. Occupational Safety and Health Administration to test and certify Interconnection equipment pursuant to the relevant codes and standards listed above;
- (b) it has been labeled and is publicly listed by such NRTL at the time of the Interconnection application; and
- (c) such NRTL makes readily available for verification all test standards and procedures it utilized in performing such equipment certification, and, with consumer approval, the test data itself. The NRTL may make such information available on its website and by encouraging such information to be included in the manufacturer's literature accompanying the equipment.

The Customer must verify that the intended use of the equipment falls within the use or uses for which the equipment was tested, labeled, and listed by the NRTL. Certified equipment shall not require further type-test review, testing, or additional equipment to meet the requirements of this Interconnection procedure and the Utility's Interconnection Manual. Nothing herein shall preclude the need for project Interconnection review and approval by the Utility or on-site commissioning testing prior to the Interconnection nor follow-up production testing by the NRTL. If the certified equipment includes only interface components (switchgear, inverters, or other interface devices), then a Customer must show that the Generating Facility is compatible with the interface components and is consistent with the testing and listing specified for this type of Interconnection equipment. Certified equipment does not include equipment provided by the Utility.

3.6 No Additional Requirements

If a Customer's Generating Facility complies with all applicable requirements in this Document and the Utility's Interconnection Manual, a Utility may not require the Customer to install additional controls, or perform or pay for additional tests, in order to obtain approval to interconnect except as mutually agreed to by the parties or required by the Commission. Additional equipment may be installed by the Utility at its own expense.

3.7 **Disconnect from or Reconnect with the Grid Procedure**

A Utility may disconnect a Customer's Generating Facility from the Utility system under the following conditions:

- (a) **Expiration or termination of Interconnection Agreement.** The Interconnection Agreement specifies the effective term and termination rights of the Utility and the Customer. Upon expiration or termination of the Interconnection Agreement with a Customer, in accordance with the terms of the agreement, the Utility may disconnect a Customer's Generating Facility.
- (b) **Non-compliance with technical Interconnection requirements.** A Utility may disconnect a Customer's Generating Facility if the facility is not in compliance with the technical requirements. Normally within two business days from the time the Customer notifies the Utility that the facility has been restored to compliance with the technical requirements, the Utility shall have an inspector verify such compliance. Upon such verification, the Customer in coordination with the Utility may reconnect the facility.
- (c) **System emergency.** A Utility may temporarily disconnect a Customer's Generating Facility without prior written notice in cases where continued Interconnection of the Generating Facility will endanger persons or property. During the forced outage of a Utility system, the Utility shall have the right to temporarily disconnect a Customer's facility to make immediate repairs on the Utility's system. When possible, the Utility shall provide the Customer with reasonable notice and reconnect the Customer as quickly as reasonably practical.
- (d) **Routine maintenance, repairs, and modifications.** A Utility may disconnect a Customer's Generating Facility from the grid with reasonable prior notice of a service interruption for routine maintenance, repairs, and Utility system modifications. The Utility shall allow reconnection of the Customer's Generating Facility as quickly as reasonably possible following any such service interruption.
- (e) **Absence of executed Interconnection Agreement.** In order to interconnect a Customer's Generating Facility to a Utility system, the Customer and the Utility must execute an Interconnection Agreement. The Utility may refuse to connect or may disconnect the Customer's Generating Facility if an executed Interconnection Agreement is not in effect.
- (f) **Locked open disconnect.** In the event authorized TEP personnel lock open the DG Service Disconnect, the Customer shall not remove or tamper with such lock.
- (g) **TEP clearance.** Following the release of a TEP clearance, where it was necessary for the Utility to open the DG Service Disconnect, Utility personnel will normally leave the disconnect in the open position. It will be the Customer's responsibility to close the disconnect after ensuring that all generation sources that could potentially energize the Customer's side of the disconnect are off, or isolated, so as to eliminate any possibility of paralleling the Utility grid with an out-of-sync generator. However, TEP personnel may, without liability, close the DG Service Disconnect provided that (a) Customer requests and agrees to allow TEP to close the disconnect following the release of a TEP clearance, and (b) TEP personnel can verify that the Customer side of the DG Service Disconnect is not energized.
- (h) **Upon termination of the Interconnection Agreement.** The Customer shall be responsible for ensuring that the DG Service Disconnect is immediately opened, and that the electric conductors connecting the Customer's generator(s) to the DG Service Disconnect are physically removed, so as to preclude any possibility of inadvertent interconnected operation in the future. TEP reserves the right to inspect the Customer's facility to verify that the generator is appropriately disconnected.

The Parties shall cooperate with each other to restore the Generating Facility and the Utility system to their normal operating state as soon as reasonably practicable.

Temporary disconnection by Customer. The Customer retains the option to temporarily disconnect its Generating Facility from the Utility's system at any time. Such temporary disconnection shall not be a termination of the Interconnection Agreement unless specified as such.

Agreement survival rights. The Interconnection Agreement between the Utility and the Customer shall continue in effect after disconnection or termination of electric service to the extent necessary to allow or require either party to fulfill rights or obligations that arose under the agreement.

Duration and Termination of the Interconnection Agreement. The Interconnection Agreement shall become effective on the effective date specified in the Agreement and shall remain in effect thereafter unless and until:

- (a) it is terminated by mutual agreement of the parties;
- (b) it is replaced by another Interconnection Agreement with mutual consent of the parties;
- (c) it is terminated by either party pursuant to a breach or default of the Agreement; or
- (d) the Customer terminates its electric Utility service with the Utility and/or vacates or abandons the property on which the Generating Facility is located, or the Generating Facility, without mutual agreement of the parties.

Upon termination of the Interconnection Agreement, the Customer shall be responsible for ensuring that the electrical conductors connecting the Generating Facility to the Utility system are immediately lifted and permanently removed, so as to preclude any possibility of interconnected operation in the future. The Utility reserves the right to inspect the Customer's Generating Facility to verify that it is permanently disconnected.

3.8 **Dispute Resolution**

If a dispute arises between the parties regarding a provision contained in this Document and/or Agreement, or a party's performance of its obligations as stated in this Document and/or Agreement, or any other matter governed by the terms of the Document and/or Agreement, the parties agree that such dispute will be resolved in the manner prescribed in this section.

- (a) **Notification and Response.** Promptly upon the occurrence of the dispute, the aggrieved party will notify the other party in writing (the "Claimant's Statement"), setting forth in sufficient detail the basis for the dispute, the aggrieved party's position, and its proposal for resolution of the dispute. Within ten (10) business days following receipt of the Claimant's Statement, the other party will respond in writing (the "Responsive Statement") setting forth in sufficient detail the respondent's position and its proposal for resolution of the dispute.
- (b) **Good Faith Negotiation.** Within ten (10) business days after the aggrieved party's receipt of the Responsive Statement, the parties will meet and attempt in good faith to expeditiously negotiate a resolution to the dispute. In attendance for each party at that opening session and throughout the dispute resolution procedure described in this section will be a representative or representatives of each party who are authorized to act for the party and resolve this dispute without resort to higher authority.
- (c) **Dispute Resolution by Mediation.** Any dispute(s) arising out of or relating to this Document shall be subject to binding mediation by a mutually acceptable mediator. If no mediator is mutually acceptable, then a mediator shall be appointed by the Arizona Office of the American Arbitration Association, at the request of any party. The costs of mediation shall be borne by the losing party and as prescribed by the mediator.
- (d) **Arizona Corporation Commission.** In the event such dispute is not resolved by mediation, then the parties consent to jurisdiction to resolve any such dispute by the Arizona Corporation Commission of the State of Arizona.

4. SPECIFIC PROCESS AND PROCEDURES FOR EACH LEVEL

4.1 **Summary of Interconnection Levels / Tracks**

Level 1 Super Fast Track: Certified inverter-based facilities that have a power rating of **10 kW or less**, are interconnected on a radial line, and meet screens (e) and (f) in Section 4.2 below. Refer to Section 4.3 for additional details.

Level 2 Fast Track: Generating Facilities that have a power rating of **2 MW or less**, are interconnected on a radial line, and meet screens (a) through (i) in Section 4.2 below. Refer to Section 4.4 for additional details.

Level 3 Study Track: Generating Facilities that have a power rating of **10 MW or less** that do not meet the criteria or screens for other Levels. Interconnection studies may be required. Refer to Section 4.5 for additional details.

Distribution Networks: On an interim basis, certified inverter-based Generating Facilities that have a power rating of **10 kW or less** will be allowed to be interconnected on a secondary spot network system and otherwise as approved by the Utility. Generators will only be interconnected on a trial, pilot basis, at the discretion of the Utility, under the interconnection process set forth in the Utility's Interconnection Manual (See Section 6 herein). This process may be revised upon completion of IEEE 1547.6. Refer to subsection 4.6 for additional details.

4.2 **Screens**

- (a) For Interconnection of a proposed generator to a radial distribution circuit, the aggregated generation, including the proposed generator, on the circuit will not exceed 15 percent of the total circuit annual peak load as most recently measured at the substation or on a line section. In the case of generators certified to UL 1741 and IEEE 1547, a line section is that portion of a distribution system connected to a customer's facility bounded by automatic sectionalizing devices, or the end of the distribution line. For non-certified generators, a line section is that portion of a distribution system connected to a customer's facility bounded by automatic sectionalizing devices, a fused lateral, or the end of the distribution line. The aggregated generation, including the proposed generator, must also be less than 50 percent of the minimum daytime feeder or line section load, where these data are available, unless the minimum load is zero.
- (b) The proposed generator, and new motors associated with the proposed generator, in aggregation with other generation on the distribution circuit, will not contribute more than 10 percent to the distribution circuit's maximum fault current at any point on the Utility's distribution system, including normal contingency conditions that may occur due to reconfiguration of the feeder or the distribution substation.
- (c) The proposed generator, in aggregate with other generation on the distribution circuit, will not cause any distribution protective devices and equipment (including but not limited to substation breakers, fuse cutouts, and line reclosers), or customer equipment on the system, to exceed 90 percent of the short circuit interrupting capability; nor is the Interconnection proposed for a circuit that already exceeds 90 percent of the short circuit interrupting capability.
- (d) The proposed generator is interconnected to the Utility as shown in the table below:

Primary distribution line configuration	Interconnection to primary distribution line
Three-phase, three wire	If a three-phase or single phase generator, Interconnection must be phase-to-phase
Three-phase, four wire	If a three-phase (effectively grounded) or single-phase generator, Interconnection must be line-to-neutral

- (e) If the proposed generator is to be interconnected on single-phase shared secondary, the aggregate generation capacity on the shared secondary, including the proposed generator, cannot exceed 10 kW, and the proposed generator must be listed to UL 1741.
- (f) If the proposed generator is single-phase and is to be interconnected on a transformer center tap neutral of a 240 volt service, its addition will not create an imbalance between the two sides of the 240 volt service of more than 20 percent of nameplate rating of the service transformer.
- (g) The proposed generator, in aggregate with other generation interconnected to the distribution low voltage side of the substation transformer feeding the distribution circuit where the generator proposes to interconnect, will not exceed 10 MW in an area where there are known or posted transient stability limitations to generating units located in the general electrical vicinity (e.g., 3 or 4 transmission voltage level busses from the Point of Interconnection).
- (h) The proposed generator's Point of Interconnection will not be on a transmission line.
- (i) The generator cannot exceed the capacity of the customer's existing electrical service.

4.3 Level I Super Fast Track Process

The Level 1 Process is available to Customers interconnecting either a single certified static inverter, with a continuous output power nameplate rating of **10 kW or less**, or multiple certified static inverters with a combined continuous power nameplate rating of 10 kW or less (screen "e") to the Utility's distribution system. The inverter(s) must be UL 1741 listed, and certified to meet the shutdown protective functions (under/over voltage, under/over frequency and anti- islanding) specified in IEEE 929 (screen "f"). The Generating Facility must also meet all applicable codes and standards, as well as comply with the Utility Interconnection and contractual requirements. Nothing in this process precludes the Customer and Utility from mutually agreeing to different timeframes or other procedures for the approval of interconnected operation of a Generating Facility, so long as the project moves along in a fair and reasonable manner. Nothing in this process precludes the Customer from starting construction prior to contacting the Utility; however, the Customer accepts the risk of potentially needing to modify or substantially change the installation.

The Level I Process steps are as follows:

- (a) **Customer Submits Application.** The Customer completes the Interconnection Application and submits it to the Utility along with all required supplemental information which shall be noted on the Application form. The Customer may submit a pre-executed Interconnection Agreement together with the Interconnection Application, if permitted by the Utility. No initial application fee or processing fee will be charged.
- (b) **Application is Received and is Complete or Incomplete.** The Utility notifies the Customer within five (5) business days of receipt of the Application as to whether it is complete or incomplete
 - (i) If the Application is incomplete, the Utility will specify what information or material is necessary to complete the Application.
 - (ii) The Customer has thirty (30) business days after receipt of such notification to submit the required information or materials (or request an extension), or the Application may be considered withdrawn.
- (c) **Utility Reviews Application.** Within ten (10) business days following the receipt of a complete Interconnection Application, the Utility reviews the proposed Interconnection and notifies the Customer of one of the following determinations:
 - (i) The proposed Generating Facility design appears to meet all Interconnection requirements and the Interconnection Application is approved as submitted. An Interconnection Agreement (if not already pre-executed) will be prepared by the Utility and forwarded to the Customer for review and signature in accordance with Step (d) below; or
 - (ii) The proposed Generating Facility design has failed to meet one or more of the Interconnection requirements, and the Interconnection Application is denied. The Utility provides an explanation of the reason(s) for the denial (in writing, if requested by the Customer), and specifies what additional information and/or modifications to the Customer's Generating Facility or Utility system are required in order to obtain approval of the proposed design.

If the Application is denied, the Customer notifies the Utility within twenty (20) business days whether or not it wishes to proceed with the project. If the Customer does not wish to proceed with the project, or the Utility is not notified within the specified time frame, the Application may be considered withdrawn. If the Customer wishes to

proceed with the project, then a new Application shall be submitted to the Utility for review and processing (Step (a) above is re-initiated), along with any additional information and/or modifications to the Customer's Generating Facility. Alternatively, the Customer may request processing under Level 2 or Level 3 and shall provide any additional information requested by the Utility and necessary to process the request under Levels 2 or 3.

- (d) **Interconnection Agreement.** If the Generating Facility meets all of the applicable interconnection requirements and the Application is approved, then:

- (j) Within five (5) business days after the notice of Application approval, or following receipt of any "as built" or final diagrams from the Customer, the Utility sends to the Customer the appropriate Interconnection Agreement for review and signature. (This step may be omitted if the Utility has received a pre-executed Interconnection Agreement).
- (ii) The Customer reviews, signs, and returns the Interconnection Agreement to the Utility.
- (iii) The Customer then completes installation of the Generating Facility within 180 days after execution of the Interconnection Agreement, unless an extension is mutually agreed to by the parties, which extension shall not be unreasonably withheld. The Utility has the right to terminate any Agreements, and the Interconnection Application may be considered withdrawn, in the event that this timeframe is exceeded without extension.

- (e) **Inspection and Testing.** The Customer will give the Utility at least five (5) business days notice to schedule the Utility site inspection and inverter shutdown testing. The Utility may schedule metering replacement, if necessary, and labeling of Utility equipment to occur at the same time. There will be no charge for one initial site inspection by the Utility. The Utility performs the site inspection as arranged and verifies that the Generating Facility, as best as can be determined, is in compliance with all applicable interconnection and safety requirements. At a minimum, it is suggested that the Utility shall verify the following:

- (i) An electrical permit and/or clearance has been issued by the authority having jurisdiction, if required;
- (ii) All Generating Facility equipment is properly labeled;
- (iii) Generating Facility system layout is in accordance with the plant location and site plan(s) submitted to the Utility;
- (iv) Inverter nameplate ratings are consistent with the information submitted to the Utility;
- (v) Utility has unrestricted 24-hour access to the Disconnect Switch (if required), and the switch meets all applicable requirements;
- (vi) The inverter shuts down as required upon simulated loss of Utility voltage; and
- (vii) The Generating Facility is wired, as best as can be determined, in accordance with the electrical diagrams submitted to the Utility.

The Utility will normally before or at the time of the site inspection:

- (i) Install appropriate metering if required;
- (ii) Label all Utility equipment; and
- (iii) Ensure that the Generating Facility is properly incorporated onto Utility operating maps and identified as a backfeed source.

The Utility does not have the right to fail a site inspection in the event that any of the above three requirements (metering, Utility equipment labeling, and the identification of the Generating Facility on the operating maps) are not in place at the time of the Site Inspection. The Utility does have the right to fail any Generating Facility that does not meet the applicable Interconnection requirements, is not installed substantially in accordance with the documentation submitted to the Utility, or as a result of any safety or protection violation.

- (f) **Notification.** Immediately following completion of the site inspection (and upon receipt of all final applicable signed interconnection documents), the Utility shall determine whether or not the Generating Facility meets all applicable requirements, and notify the Customer that:

- (i) The Generating Facility is approved for parallel operation with the Utility's distribution system per the agreed terms and conditions. Within one (1) business day, following such oral notification, the Utility shall provide the Customer with such notice in writing; or
- (ii) The Generating Facility has failed to meet one or more of the applicable requirements or a safety or protection violation has been identified, and the Generating Facility is not approved for parallel operation. The Utility must provide the reason(s) (in writing, if requested by the Customer) for not approving parallel operation. Furthermore, the Utility has the right to take any reasonable steps (including locking open the Disconnect Switch) to prevent the Generating Facility from parallel operation. Operation of a generator in parallel without Utility approval may result in immediate termination of electric service to the Customer.

- (g) **Corrections (if necessary).** In the event that the Generating Facility does not pass the initial Utility site inspection:

- (i) The Customer must correct any outstanding issues and schedule a re-inspection. The Utility shall re-inspect upon five (5) business days notice from the Customer to verify that the deficiencies have been remedied. A fee not exceeding one hundred dollars (\$100) may be assessed for each re-inspection conducted by the Utility. Within one (1) business day following any site re-inspection, where the Utility approves parallel operation of the Generating

Facility, the Utility will provide written notification to the Customer that the Generation Facility is approved for parallel operation.

(ii) If updated diagrams are required to reflect "as-built" conditions, the Customer must submit these to the Utility for review and approval within ten (10) business days following the site inspection. The Utility will process and mail an amendment to the Interconnection Agreement within five (5) business days after receipt and acceptance of the revised diagrams for Customer review and signature.

4.4 Level 2 Fast Track Process

The Level 2 Process is available to Customers interconnecting a Generating Facility with a continuous output power nameplate rating of **2 MW or less** to the Utility's distribution system. In order to qualify for Level 2, the Generating Facility must meet screens (a) through (i) in Section 4.2 above. The Generating Facility must also meet all applicable codes and standards, as well as comply with the Utility Interconnection and contractual requirements. Nothing in this process precludes the Customer and Utility from mutually agreeing to different timeframes or other procedures for the approval of interconnected operation of a Generating Facility, so long as the project moves along in a fair and reasonable manner. Also, nothing in this process precludes the Customer from starting construction prior to contacting the Utility; however, in such case the Customer accepts the risk of potentially needing to modify or substantially change the installation.

The Level 2 Process steps are as follows:

- (a) **Prior to applying.** The Customer is encouraged to contact and work closely with the Utility at the conceptual stages of the design to discuss the proposed design, installation, and operation.
A preliminary electrical one-line diagram would be very helpful at this stage. This step will ensure that proposed projects proceed in a smooth and timely manner, and that the Utility and Customer understand whether any special considerations, protective equipment, system modifications, or studies may be required. Upon the Customer's request, the Utility shall meet with the Customer prior to submission of an Application.
- (b) **Customer Submits Application.** The Customer completes the standard Interconnection Application and submits it to the Utility along with all required supplemental information which shall be noted on the Application form. A Utility may charge an application fee, if a tariff containing such a fee is approved by the Commission.
- (c) **Application is Received and is Complete or Incomplete.** The Utility notifies the Customer within five (5) business days of receipt of the Application as to whether it is complete or incomplete.
 - (i) If the Application is incomplete, the Utility will specify what information or material is necessary to complete the Application.
 - (ii) The Customer has thirty (30) business days after receipt of such notification to submit the required information or materials (or request an extension), or the Application may be considered withdrawn.
- (d) **Utility Reviews Application.** Within fifteen (15) business days following the receipt of a complete Interconnection Application, the Utility reviews the proposed Interconnection and notifies the Customer of one of the following determinations:
 - (i) The proposed Generating Facility design appears to meet all Interconnection requirements and the Interconnection Application is approved as submitted. An Interconnection Agreement will be prepared by the Utility and forwarded to the Customer for review and signature in accordance with Step (e) below; or
 - (ii) The proposed Generating Facility has failed to meet one or more of the screens, but the initial review indicates that Additional Review may enable the Utility to determine that the Customer's Generating Facility can be interconnected consistent with safety, reliability, and power quality. In such case, the Utility shall offer to perform Additional Review (typically about 3 hours of study) to determine whether minor modifications to the electric distribution system (for example, changing meters, fuses, or relay settings) would enable the Interconnection to be made consistent with safety, reliability and power quality. The Utility shall provide to the Customer a non-binding, good faith estimate of the costs of such Additional Review, and/or such minor modifications. The Utility shall undertake the Additional Review or minor modifications only after the Customer consents to pay for the review and/or modifications. Such Additional Review shall take place within 20 business days after the Customer has submitted payment for the estimated costs; or
 - (iii) The proposed Generating Facility design has failed to meet one or more of the Interconnection requirements, and the Interconnection Application is denied. The Utility provides an explanation of the reason(s) for the denial (in writing, if requested by the Customer), and specifies what additional information and/or modifications to the Customer's Generating Facility or Utility system are required in order to obtain approval of the proposed design.

If the Application is denied, the Customer notifies the Utility within twenty (20) business days whether or not it wishes to proceed with the project. If the Customer does not wish to proceed with the project, or the Utility is not notified within the specified time frame, the Application may be considered withdrawn. If the Customer wishes to proceed with the project, then a new Application shall be submitted to the Utility for review and processing (Step (a) above is re-

initiated), along with any additional information and/or modifications to the Customer's Generating Facility. Alternatively, the Customer may request processing under Level 3 and shall provide any additional information requested by the Utility and necessary to process the request under Level 3.

- (e) **Interconnection Agreement.** If the Generating Facility meets all of the applicable Interconnection requirements and the Application is approved, then:
- (i) Within normally not more than ten (10) business days after the notice of Application approval, or following receipt of any "as built" or final diagrams from the Customer, the Utility sends to the Customer the appropriate Interconnection Agreement for review and signature.
 - (ii) The Customer reviews, signs, and returns the Interconnection Agreement to the Utility.
- The Customer then completes installation of the Generating Facility within 180 days after execution of the Interconnection Agreement, unless an installation schedule has been submitted with an alternative in-service date, or the parties have mutually agreed to an extension. The Utility has the right to terminate any Agreements, and the Interconnection Application may be considered withdrawn, in the event that this timeframe is exceeded without extension.
- (f) **Inspection and Testing.** The Customer will contact the Utility to schedule the Utility site inspection and witness of the testing of the protective devices. The Utility site inspection and witness of the testing of the protective devices will normally occur within ten (10) business days of request from the Customer. The Utility may schedule metering replacement, if necessary, and labeling of Utility equipment to occur at the same time. A Utility may charge for the initial site inspection, if a tariff containing such a fee is approved by the Commission.

The Utility performs the site inspection as arranged and verifies that the Generating Facility, as best as can be determined, is in compliance with all applicable interconnection and safety requirements. At a minimum, it is suggested that the Utility shall verify the following:

- (i) has been issued An electrical permit and/or clearance by the authority having jurisdiction, if required;
- (ii) All Generating Facility equipment is properly labeled;
- (iii) Generating Facility system layout is in accordance with the plant location and site plan(s) submitted to the Utility;
- (iv) Generator nameplate ratings are consistent with the information submitted to the Utility;
- (v) Utility has unrestricted 24-hour access to the Disconnect Switch (if required), and the switch meets all applicable requirements;
- (vi) The Utility will witness the required protective relay calibration and functional tests. (The Utility may accept a certified test report in lieu of witnessing the tests); and
- (vii) The Generating Facility is wired, as best as can be determined, in accordance with the electrical diagrams submitted to the Utility.

The Utility will normally, before or at the time of the site inspection:

- (i) Install appropriate metering if required;
- (ii) Label all Utility equipment; and
- (iii) Ensure that the Generating Facility is properly incorporated onto Utility operating maps and identified as a backfeed source.

The Utility does not have the right to fail a site inspection in the event that any of the above three requirements (metering, Utility equipment labeling, and the identification of the Generating Facility on the operating maps) are not in place at the time of the site inspection. The Utility does have the right to fail any Generating Facility that does not meet the applicable Interconnection requirements, is not installed substantially in accordance with the documentation submitted to the Utility, or as a result of any safety or protection violation.

- (h) **Notification.** Immediately following completion of the site inspection (and upon receipt of all final applicable signed Interconnection documents) the Utility shall determine whether or not the Generating Facility meets all applicable requirements. The Utility shall provide the Customer oral notification within twenty-four (24) hours and written notification within three (3) business days that:
- (i) The Generating Facility is approved for parallel operation with the Utility's distribution system per the agreed terms and conditions; or
 - (ii) The Generating Facility has failed to meet one or more of the applicable requirements or a safety or protection violation has been identified, and the Generating Facility is not approved for parallel operation. The Utility must provide the reason(s) (in writing, if requested by the Customer) for not approving parallel operation. Furthermore, the Utility has the right to take any reasonable steps (including locking open the Disconnect Switch) to prevent the Generating Facility from parallel operation. Operation of a generator in parallel without Utility approval may result in immediate termination of electric service to the Customer.
- (i) **Corrections (if necessary).** In the event that the Generating Facility does not pass each Utility site inspection:
- (i) The Customer must correct any outstanding issues and schedule a re-inspection. The Utility shall re-inspect upon ten (10) business days notice from the Customer to verify that the deficiencies have been remedied. A Utility may

charge a fee for a re- inspection, if a tariff containing such a fee is approved by the Commission. Following any site re-inspection where the Utility approves parallel operation of the Generation Facility, the Utility will provide to the Customer such oral notification within twenty- four (24) hours and such written notification within three (3) business days that the Generation Facility is approved for parallel operation.

- (i) If updated diagrams are required to reflect "as-built" conditions, the Customer must submit these to the Utility for review and approval within ten (10) business days following the site inspection. The Utility will process and mail an amendment to the Interconnection Agreement within five (5) business days after acceptance of the revised diagrams for Customer review and signature.

Customer Timeframes. The Utility timeframes contained herein do not include the time for the Customer to execute agreements or submit needed documentation. If at any point in the Level 2 Fast Track process, the Customer does not submit requested materials necessary to process the interconnection Application, or submit applicable executable agreements within thirty (30) business days, or request an extension, the Application may be considered withdrawn.

Fees for Level 2 Additional Review. A Utility may charge a fee for an Additional Review, if a tariff containing the hourly rate for Additional Review is approved by the Commission. The Utility shall provide a non-binding good faith estimate of the fee for such additional review. The Customer must submit a deposit for the estimated fee before the Additional Review will be initiated. In addition, costs for Utility facilities and/or equipment modifications necessary to accommodate the Customer's generator interconnection will be the responsibility of the Customer.

4.5 Level 3 Study Track Process

Level 3, also called the Study Track, is the interconnection procedure to be used for all Generating Facilities that do not meet the screening requirements for Level 1 Super Fast Track or Level 2 Fast Track. It is an in-depth engineering review of whatever aspects of generator performance and/or grid interaction the Utility deems necessary to study. More details are available in each Utility's Interconnection Manual (Included in this document). For generators that are certified, no review of the generator's protection equipment is required, although the Utility may study the interface between the Generating Facility and the Utility. The Generating Facility is required to meet applicable local electric codes and standards, as well as comply with all terms and conditions of the Utility's Interconnection Manual and Interconnection Agreement. Nothing in these procedures shall preclude the Customer and Utility from mutually agreeing to different timeframes or other procedures for the approval of interconnected operation of a Generating Facility, so long as the project moves along in a fair and reasonable manner.

The Level 3 Study Track interconnection process is as follows:

- (a) **Prior to applying.** The Customer is encouraged to contact and work closely with the Utility at the conceptual stages of the design to discuss the proposed design, installation, and operation. A preliminary electrical one-line diagram would be very helpful at this stage. This step will ensure that proposed projects proceed in a smooth and timely manner, and that the Utility and the Customer understand whether any special considerations, protective equipment, system modifications, or studies may be required. Upon the Customer's request, the Utility shall meet with the Customer prior to submission of an Application. TEP approvals given pursuant to the review and approval process and the Interconnection Agreement shall not be construed as any warranty or representation to Customer or any third party regarding the safety, durability, reliability, performance or fitness of Customer's generation and service facilities, its control or protective device or the design, construction, installation or operation thereof.
- (b) **Customer Submits Application.** The Customer completes the Interconnection Application and submits it to the Utility along with all required supplemental information (which shall be noted on the Application form). A Utility may charge an application fee, if a tariff containing such a fee is approved by the Commission.
- (c) **Application is Received and is Complete or Incomplete.** The Utility notifies the Customer in normally not more than ten (10) business days of receipt of the Application (or transfer from Level 1 or 2) as to whether it is complete or incomplete.
 - (i) If the Application is incomplete, the Utility will specify what information or material is necessary to complete the Application.
 - (ii) The Customer has normally not more than thirty (30) business days after receipt of such notification to submit the missing information or materials (unless other mutually agreeable arrangements are made); otherwise the Application may be considered withdrawn.
 - (iii) Once the Customer submits any missing information, the Utility has normally not more than another ten (10) business days to determine if the Application is complete or incomplete and notify the Customer.
- (d) **Utility Reviews Application.** Normally within ten (10) business days following the receipt of a complete Interconnection Application, the Utility reviews the proposed interconnection and notifies the Customer of one of the following determinations:
 - (i) The Generating Facility design as submitted appears to meet all of the applicable Interconnection requirements and no further studies, special protective requirements, or system modifications are required. An Interconnection

Agreement will be prepared by the Utility and forwarded to the Customer for review and signature in accordance with Step (j) below; or

- (ii) The Generating Facility cannot be interconnected without further information, data, engineering studies, and/or modifications to the Utility system or Generating Facility. In this case, the Interconnection proceeds according to the following meeting and study process, as deemed necessary by the Utility. All itemized costs and timelines for the studies are to be disclosed and agreed upon by the Utility and Customer prior to the start of each one. In addition, all studies are to be made available to the Customer directly after their completion.
- (e) **Scoping Meeting.** This is a high-level, initial review meeting between the Utility and the Customer, where the Customer describes the proposed Generating Facility design and the Utility talks about system conditions at the proposed Point of Interconnection. This meeting can also allow the Utility and Customer to discuss which of the following study elements are needed. The Utility and the Customer will bring to the meeting personnel, including system engineers and other resources as may be reasonably required to accomplish the purpose of the meeting. This meeting shall be held in normally not more than ten (10) business days after an Application is deemed complete unless other mutual agreements are made.
- (f) **Acknowledgement Letter.** The Utility will provide an Acknowledgement Letter following the Scoping Meeting upon request from the Customer. The letter will describe the project scope and include a good faith cost estimate by the Utility. If requested, the Acknowledgement Letter will be sent out normally within 10 business days following the Scoping Meeting.
- (g) **Interconnection Feasibility Study.** If requested by the Customer, the Utility shall undertake an Interconnection Feasibility Study. The Utility shall provide the Customer, as soon as possible, but in normally not more than ten (10) business days after the Scoping Meeting, an Interconnection Feasibility Study Agreement including an outline of the scope of the study and a non-binding, good faith, detailed estimate of the materials and labor costs to perform the study. Once the interconnecting Customer executes the Interconnection Feasibility Study Agreement, provides all requested Customer information necessary to complete the Study, and pays pursuant to the good faith estimate contained therein, the Utility will conduct the Interconnection Feasibility Study. The Feasibility Study will be completed in normally not more than twenty (20) business days, unless other mutually agreeable terms are made.

The Interconnection Feasibility Study provides a preliminary review of the potential impacts on the distribution system that will result from the proposed Interconnection. The Interconnection Feasibility Study will review short circuit currents including contribution from the proposed generator as well as coordination of and potential overloading of distribution circuit protection devices. This study principally benefits the Customer by providing initial details and ideas on the complexity and likely costs to interconnect prior to commitment of costly engineering review. The Interconnection Feasibility Study may also be used to focus or eliminate some or all of the more intensive System Impact study.

- (h) **System Impact Study.** If deemed necessary by either party, the Utility shall undertake a System Impact Study. The Utility shall provide the Customer as soon as possible, but in normally not more than fifteen (15) business days after completing the previous study or meeting, a System Impact Study Agreement including an outline of the scope of the study and a non-binding, good faith, detailed estimate of the materials and labor costs to perform the study. Once the Customer executes the System Impact Study Agreement, provides all requested Customer information necessary to complete the Study, and pays any required deposit pursuant to the good faith estimate contained therein, the Utility will conduct the Impact Study. The System Impact Study will be completed in normally not more than thirty (30) business days, unless other mutually agreeable terms are made.

The System Impact Study is a full engineering review of all aspects of the generator's impact on the Utility system, including power flow, Utility system protective device coordination, generator protection schemes (if not certified), stability, voltage collapse, frequency impacts, and short circuit duty. The System Impact Study reveals all areas where the Utility system would need to be upgraded to allow the generator to be built and interconnected as designed. It may include discussions with the Customer about potential alterations to generator design, including downsizing to limit grid impacts. If the Utility determines, in accordance with Good Utility Practice, that the Utility electric system modifications required to accommodate the proposed Interconnection are not substantial, the System Impact Study shall identify the scope and detailed cost of the modifications. If the Utility determines, in accordance with Good Utility Practice, that the system modifications to the Utility electric system are substantial, a Facilities Study shall be performed. Each Utility shall include in its Interconnection Manual a description of the various elements of a System Impact Study it would typically undertake pursuant to this Section including:

- (i) Load Flow Study;
- (ii) Short-Circuit Study;
- (iii) Circuit Protection and Coordination Study;
- (iv) Impact on System Operation;

- (iv) Stability Study (and the conditions that would justify including this element in the Impact Study); and
- (vi) Voltage Collapse Study (and the conditions that would justify including this element in the Impact Study).
- (i) **Facilities Study.** If deemed necessary by the Utility, the Utility shall undertake a Facilities Study. The Utility shall provide the Customer as soon as possible, but in normally not more than five (5) business days after completing the previous study or meeting, a Facilities Study Agreement including an outline of the scope of the study and a non-binding, good faith, detailed estimate of the materials and labor cost to perform the study. Once the interconnecting Customer executes the Facilities Study Agreement, provides all requested Customer information necessary to complete the Study, and pays pursuant to the good faith estimate contained therein, the Utility will conduct the Facilities Study. The Facilities Study will be completed in normally not more than thirty (30) business days, unless other mutually agreeable terms are made. The Facilities Study is a comprehensive analysis of the actual construction needed to take place based on the outcome of the Impact Study. It delineates the detailed costs of construction and milestones. construction may include new circuit breakers, relocation of reclosers, new construction of Utility grid extensions, reconductoring lines, new transformers, protection requirements and interaction. Where no Utility construction is required there would be no Facilities Study.
- (j) **Interconnection Agreement.** If the Generating Facility meets all of the applicable Interconnection requirements, all items identified in any Meeting or Study have been resolved and agreed to (if applicable), and the Utility has received the final design drawings, then:
 - (i) The Utility shall send to the Customer in normally not more than ten (10) business days an executable Interconnection Agreement, which shall include as an exhibit the cost for any required Utility system modifications.
 - (ii) The Customer reviews, signs, and returns the signed Interconnection Agreement and any balance due for Interconnection studies or required deposit for facilities.
 - (iii) Following TEP's approval of the Customer's proposed interconnection, the Customer cannot remove, alter or otherwise modify or change the equipment specifications, including, without limitation, the operational plans, control and protective devices or settings, and the generating facility system design, type, size or configuration. If the Customer desires to make such changes or modifications, the Customer must revise and resubmit to TEP plans describing the changes or modifications for approval by TEP. No change or modification may be made without the prior written approval of TEP.
 - (iv) The Customer then completes installation of the Generating Facility and the Utility completes any Utility system modifications, according to the milestones set forth in the Interconnection Agreement. The Utility shall employ best reasonable efforts to complete such system upgrades in the shortest time reasonably practical.
- (k) **Inspection and Testing.** The Customer will contact the Utility to schedule the Utility site inspection and witness of the testing of the protective devices. The Utility site inspection and witness of the testing of the protective devices will normally occur within ten (10) business days of notice from the Customer. The Utility may schedule metering replacement, if necessary, and labeling of Utility equipment to occur at the same time. The Utility performs the site inspection as arranged and verifies that the Generating Facility, as best as can be determined, is in compliance with all applicable Interconnection and code requirements. At a minimum, it is suggested that the Utility verify the following:
 - (i) An electrical permit and/or clearance has been issued by the authority having jurisdiction, if required;
 - (ii) All Generating Facility equipment is properly labeled;
 - (iii) Generating Facility system layout is in accordance with the plant location and site planes) submitted to the Utility;
 - (iv) Generator nameplate ratings are consistent with the information submitted to the Utility;
 - (v) The Utility has unrestricted access to the Disconnect Switch (if required), and the switch meets all requirements;
 - (vi) The Utility will witness the required protective relay calibration and functional tests. Calibration shall include on-site testing of trip set points and timing characteristics of the protective functions as required herein. Functional testing, witnessed by TEP personnel, must demonstrate that each protective relay or device function as required herein, upon a (simulated) out-of-tolerance input signal, will trip the generator breaker. Functional testing shall also include a simulated loss of control power to demonstrate that the generator breaker or contactor will open. A trip timing test (simulated loss of voltage) will suffice for static inverters rated 50kW or less. Customer shall supply TEP with a copy of calibration and functional tests (if required).
 - (vii) The Customer shall have all protective devices tested at the time of installation, prior to initial interconnection, and at intervals not to exceed four years. The Customer shall (i) notify the Utility as to when such tests are to be performed at least fifteen (15) working days prior to such tests and allow TEP personnel to witness the testing, and (ii) provide TEP with a certified copy of the test results.
 - (viii) The Generating Facility is wired, as best as can be determined, in accordance with the electrical diagrams submitted to the Utility.

The Utility will normally, before or at the time of the site inspection:

 - (i) Install all appropriate metering, if required;

- (ii) Label all Utility equipment; and
- (iii) Ensure that Generating Facility is properly incorporated onto Utility operating maps and identified as a backfeed source.

The Utility shall not have the right to fail a site inspection in the event that any of the above three requirements (metering, Utility equipment labeling, and the identification of the Generating Facility on the operating maps) are not in place at the time of the site inspection. The Utility does have the right to fail any Generating Facility that does not meet the applicable Interconnection requirements, is not installed substantially in accordance with the documentation submitted to the Utility, or as a result of any safety or protection violation.

- (1) **Notification.** Immediately following completion of the site inspection (and upon receipt of all final applicable signed Interconnection documents) the Utility shall determine whether or not the Generating Facility meets all applicable requirements. The Utility shall provide the Customer oral notification normally within twenty-four (24) hours and written notification normally within three (3) business days that:
 - (i) The Generating Facility is approved for parallel operation with the Utility's distribution system per the Interconnection Agreement. The Utility shall provide the Customer with such notification in writing in normally not more than three (3) business day following the Utility inspection under (k) above; or
 - (ii) The Generating Facility has failed to meet one or more of the applicable requirements or a safety violation has been identified, and the Generating Facility is not approved for parallel operation. The Utility shall provide the reason(s) (in writing, if requested by the Customer) for not approving parallel operation. Furthermore, the Utility has the right to disconnect and lock out the Generating Facility to prevent the Generating Facility from parallel operation, and the Customer must reschedule the site inspection with the Utility. The Customer may not operate in parallel until it receives written approval from the Utility, and violation of this condition may result in immediate termination of electric service to the Customer.
- (m) **Correction (if necessary).** In the event that the Generating Facility does not pass the initial Utility site inspection:
 - (i) The Customer must correct the deficiencies identified by the Utility and schedule a re-inspection. The Utility shall re-inspect normally not more than ten (10) business days notice from the Customer to verify that the deficiencies have been remedied. Following any site re-inspection where the Utility approves parallel operation of the Generation Facility, the Utility will provide to the Customer such oral notification normally within twenty-four (24) hours and such written notification normally within three (3) business days that the Generation Facility is approved for parallel operation.
 - (ii) If updated documentation is required to reflect "as-built" conditions, the Customer must submit these to the Utility for review and approval within ten (10) business days following the site inspection. The Utility may charge a fee, if a tariff containing such a fee is approved by the Commission. The Utility will process and mail an amendment to the Interconnection Agreement normally not more than five (5) business days after receipt and acceptance of the revised diagrams for Customer review and signature.

Customer Timeframes. The Utility timeframes contained herein do not include the time for the Customer to execute agreements or submit needed documentation. If at any point in the Level 3 Study Track process, the Customer does not submit requested materials necessary to process the Interconnection Application, or submit applicable executable agreements in normally not more than thirty (30) business days, or request an extension, the Application may be considered withdrawn.

Fees for Level 3 Interconnection. A Utility may charge a fee for an engineering review, if a tariff containing the hourly rate for engineering review is approved by the Commission. The Utility shall provide a non-binding good faith estimate of the fee for such engineering review. The Customer must submit a deposit for the estimated fee before the engineering review will be initiated. In addition, costs for Utility facilities and/or equipment modifications necessary to accommodate the Customer's generator interconnection will be the responsibility of the Customer. The Customer may not be charged for the review of a certified generator's protection equipment. The Utility may charge a fee for an initial inspection or for a re-inspection, if a tariff containing such a fee is approved by the Commission.

4.6 Interconnection to Secondary Spot Network Systems (Not applicable for TEP)

The requirements for interconnecting generating facilities to Secondary Spot Network Systems are different than those for Interconnection to radial distribution systems. In the Secondary Spot Network System, there are technical requirements to be considered particularly with the design and operational aspects of network protectors that are not required on radial systems. Currently, Arizona Public Service ("APS") is the only Utility in Arizona that has Secondary Spot Networks. As such, APS has developed the following interim criteria for interconnecting a small amount of inverter-based customer generation to a Secondary Spot Network System. Because the maximum level of generation that could be interconnected to a Secondary Spot Network System is unknown at this time, this "Pilot" effort should be viewed as a trial basis only. APS reserves the right to suspend it at any time. APS has initiated this Pilot effort in a proactive attempt to include distributed generation in the State of Arizona on Secondary Spot Network Systems.

The Pilot criteria require that the generation meet all of the following conditions simultaneously:

- (a) Inverter based units must be less than 10 kW;
- (b) Units must be "Certified" as prescribed in this Document, and must meet current IEEE 1547 and UL 1741 standards; and
- (c) Must be less than or equal to 10% of the interconnecting customer's verifiable minimum load during the operation of the inverter. (For photovoltaics, the minimum load refers to the daytime minimum.)

APS reserves the right to suspend, change, modify, or add to the above conditions based on the results from future test reports or guidelines as they become available. Once the 1547.6 standards are completed, APS (and any other Arizona Utilities who have since added Secondary Spot Networks) will review the Pilot criteria for possible modification to include guidelines for Interconnection to the Secondary Spot Network Systems. The process for interconnecting to a Secondary Spot Network System will be determined by the Utility.

5. UTILITY REPORTING REQUIREMENTS

Interconnection Manual. Each Utility shall file an Interconnection Manual for approval with the Commission no later than ninety (90) calendar days after adoption of this document. Each Interconnection Manual shall contain procedural and technical requirements necessary to interconnect a Generating Facility to each Utility's respective distribution system but shall not be inconsistent with this Document. An updated Interconnection Manual shall be provided to the Commission upon any substantive revision by the Utility and shall become effective within sixty (60) days unless otherwise acted upon by the Commission. **(TEP's Interconnection Manual is part of this document.)**

Documentation of projects. Each electric Utility shall maintain records concerning Applications received for Interconnection and parallel operation of distributed generation. Such records will include the date each Application is received, documents generated in the course of processing each Application, correspondence regarding each Application, the final disposition of each Application, and the date on which the Application was approved (if approved).

Annual Interconnection report to the Commission. By March 30 of each year, every Utility shall file with the Commission a distributed generation Interconnection report for the preceding calendar year that lists the new Generating Facilities interconnected with the system since the previous year's report, any distributed generation facilities no longer interconnected with the Utility's system since the previous report, and the capacity of each facility. The annual report shall include, for the reporting period, a summary of the number of complete Applications received, the number of complete Applications approved, the number of complete Applications denied by level, and the reasons for denial. The annual report shall also include a list of special contracts, approved by the Commission during the reporting period, that provide discounted rates to customers as an alternative to self-generation.

6. INTERCONNECTION TECHNICAL MANUAL

The requirements and specifications outlined in this section are applicable to distributed generation interconnected for parallel operation with the Utility distribution system, unless otherwise specified. The protection and safety devices and other requirements specified in the following sections are intended to provide protection for the Utility system, Utility workers, other Utility customers and the general public. They are not imposed to provide protection for the Customer's generation equipment or personnel; this is the sole responsibility of the Customer.

With respect to the above protection objectives, it is necessary to disconnect the parallel generator when trouble occurs. This is to:

- (a) ensure if a fault on the Utility system persists, the fault current supplied by the Customer's generator is interrupted;
- (b) prevent the possibility of reclosing into an out-of-synch isolated system composed of the Utility distribution system, or a section thereof, and the Customer's generator; and
- (c) prevent reclosing into the Customer's generation system that may be out of synchronization or stalled.

The protection requirements are minimal for smaller installations, but increase as the size of the Customer's generation increases. Small installations usually ensure that, for any fault on the Utility system, Utility protective devices will operate and normally isolate the generation with a large amount of load, causing under-voltage automatic shutdown of the generator. For larger installations the probability of isolated operation is higher since the available generation may be sufficient to carry the entire load, or part thereof, of the local Utility circuit. In instances where the Utility system arrangement is such that it is

possible that the generators will not always be isolated with comparatively large amounts of load, additional protection (including a transfer trip scheme) and generator shutdown schemes are required.

TEP applies automatic reclosing to overhead distribution and transmission circuits. When the Utility source breaker trips, the Customer must ensure that his generator is disconnected from the Utility circuit prior to automatic reclosure. TEP applies instantaneous reclosing at the substation, in which the distribution circuit can be re-energized in less than 20 cycles (333 msec) after a protective relay trip. In order to assure reliable service to other TEP customers, the Customer's generator shall be disconnected from the Utility's system within 5 cycles (83.3 msec) of a Utility initiated protective relay trip. Inability of the Customer's equipment to meet these time constraints may require the Customer to install a transfer trip scheme. In addition, automatic reclosing out-of-synch with the Customer's generator may cause severe damage to Customer equipment and could also pose a serious hazard to Customer or Utility personnel. In a few cases there are in-line reclosers away from the substation. In these situations transfer trip is not possible. Additional review by TEP is required in these cases.

6.1 Design Considerations and Definition of Classes

Protection requirements are influenced by the size and characteristics of the parallel generator along with the nature and operational characteristics of the associated Utility system. Therefore, similar units connected to different lines could have different protection requirements based on varying load conditions, as well as on the specific Utility feeder and transformer characteristics.

- (a) **Synchronous Units.** Synchronous generators are generally capable of supplying sustained current for faults on TEP's system. These units can also supply isolated Utility load providing the load is within the units' output capability, and must be prevented from energizing a de-energized Utility line. The Utility will specify the maximum allowable protective relay time settings for a particular proposed distributed generator installation. The Customer is responsible for ensuring generator separation prior to Utility circuit re-energization to prevent out-of-sync paralleling.
- (b) **Induction Units.** Induction generators are basically induction motors that are mechanically driven above synchronous speed to produce electric power. These units do not have a separate excitation system and, as such, require that their output terminals be energized with AC voltage and supplied with reactive power to develop the magnetic flux. Induction generators are therefore normally not capable of supplying sustained fault current into faults on the Utility system. Such units are generally not capable of supplying isolated load when separated from the Utility system; however, it is possible for an induction generator to become self-excited if a sufficient amount of capacitance exists at its output terminals. Under conditions of self-excitation, an induction generator will be capable of supplying isolated load, providing the load is within the units' output capability. In most cases when self-excitation occurs it will be accompanied by a sudden increase in terminal voltage. The Utility and its other customers must be protected from out-of-synch closing and over-voltages that can occur whenever an induction generator becomes self-excited. Induction units shall therefore be designed to automatically separate from the Utility system upon loss of Utility voltage and prior to reclosing of the Utility feeder.
- (c) **Static Inverters.** Static inverters convert DC power to AC by means of electronic switching. Switching can be controlled by the AC voltage of the Utility's supply system (line-commutated) or by internal electronic circuitry (forced-commutated). Line-commutated inverters are generally not capable of operating independently of the Utility's AC supply system and, as such, cannot supply fault current or isolated loads under normal conditions. Forced-commutated, or self-commutated, inverters are capable of supplying fault current and load independently of the AC supply system. Any forced-commutated inverter that is to be interconnected with the Utility must be specifically designed for that purpose, i.e. it must be designed to accommodate parallel interfacing and operation. Static inverters must be designed to automatically separate from the Utility system upon loss of Utility voltage and prior to reclosing of the Utility feeder.
- (d) **Definition of Generator Size Classes.** The following generator size classifications are used in determining specific minimum protective requirements for distributed generation facilities. Specified ratings are for each connection to the Utility system. Customers must satisfy, in addition to the general requirements specified in this document, the minimum relaying requirements given in this document for each generator class.
 - (i) Class I 50 kW or less, single or three phase
 - (ii) Class II 51 kW to 300 kW, three phase
 - (iii) Class III 301 kW to 5,000 kW, three phase
 - (iv) Class IV over 5,000 kW, three phase

6.2 General Technical Requirements

- (a) Customer is responsible for obtaining and maintaining all required permits.
- (b) Multiple generator connections on the same Utility service are permitted; however, a DG Service Disconnect for the facility will be required (normally located at the service entrance section).
- (c) In the event that a generator, or aggregate of generators, are of sufficient size to carry the entire (minimum) load of the TEP distribution feeder, or if a generator size and physical location on a feeder is such that it could support an isolated (islanded) section of the feeder, then a transfer trip scheme shall be required at the Customer's expense. If a transfer trip

is required, a communication channel and telemetry shall also be required, at the Customer's expense, to facilitate proper parallel operation.. The transfer trip channel may be leased telephone, power line carrier, pilot wire, microwave or other TEP approved medium. The transfer trip equipment will be configured to trip the Customer's generator for loss of the channel signal.

- (d) For synchronous generators, the Customer shall ensure that any potential open points such as breakers, fused disconnect switches, etc, located between the generator breaker and Utility service are appropriately equipped with either (1) keyed or other suitable mechanical interlocks to prevent them from being inadvertently opened when the generator breaker is closed, or (2) contacts that will instantaneously trip the generator breaker if any such switch were opened while the generator breaker was closed. The intent of the above is to prevent the opening and subsequent (inadvertent) re-closing of such a breaker or switch onto an un-synchronized generator.
- (e) Customer shall ensure that the design and installation of electric meter(s) is such that the meter(s) are located on the Utility-side of the generator breaker on a normally energized bus.
- (f) The Customer is responsible for the design, installation, operation and maintenance of all equipment on the Customer's side of the Point of Interconnection. It is required that the Customer submit specifications and detailed plans as specified in the Application and Equipment Information Form (see Appendix) for the installation to the Utility for review. Review by the Utility does not indicate acceptance or approval by the Utility or other authorities.
- (g) All photovoltaic generators 5kW or less are exempted from this document.

6.3 DG Service Disconnect

The Customer shall install and maintain a DG Service Disconnect in order to isolate all ungrounded conductors of the Customer's generating facility from the Utility system. The DG Service Disconnect will normally be required to be installed at the Customer's electrical service entrance section; however it may be located in the immediate vicinity of the generator, subject to Utility approval. The DG Service Disconnect must be rated for the voltage and current requirements of the generation facility, and must meet all applicable UL, ANSI and IEEE standards. The DG Service Disconnect shall meet the requirements of the National Electric Code ("NEC"), and shall be properly grounded.

In cases where the DG Service Disconnect is a load break switch, the switch blades, jaws and the air-gap between them shall all be clearly visible when the switch is in the "open" position. It is not acceptable to have any of the "visible open" components obscured by the switch case or an arc-shield, etc. Only switches specifically designed to provide a true "visible open" are acceptable. Such switch shall be installed in a place so as to provide easy and unrestricted accessibility to Utility personnel on a 24-hour basis. The Utility shall have the right to lock open the switch without notice to the Customer when interconnected operation of the Customer's generating facility with the Utility system could adversely affect the Utility system or endanger life or property, or upon termination of the Interconnect Agreement. For multi-phase systems, the switch shall be gang-operated. In cases where the DG Service Disconnect will be installed on a line at a voltage above 500V, TEP may require the customer to install a rack-out breaker, along with a racking tool and grounding device, in lieu of a load break switch. In these cases, the Utility will work with the Customer to determine the best option and ensure that the safety requirements are met.

6.4 Dedicated Transformer

Customer generators with a combined total rating of over 10 kW, as measured at the service entrance, may be required to be isolated from other customers fed off the same Utility transformer by a dedicated power transformer connecting to the Utility distribution feeder. The primary purpose of the dedicated transformer is to ensure that (a) the generator cannot become isolated at the secondary voltage level with a small amount of other-customer load, and (b) the generator does not contribute any significant fault current to other customers' electrical systems. Dedicated transformers also help to confine any voltage fluctuation or harmonics produced by the generator to the Customer's own system. The Utility will specify the transformer winding connections and impedance.

6.5 Power Quality

Customer shall ensure that the electrical characteristics of its load and generating equipment will maintain the serving Utility's normal power quality requirements. Any deviation from sine wave form or unusual short interval fluctuations in power demand or production shall not be such as to result in impairment of service to other customers or in interference with operation of computer, telephone, television or other communication systems or facilities. Those power quality items will generally include the following:

- (a) Current Imbalance
- (b) Harmonics
- (c) Voltage Flicker
- (d) Power Factor

Exhibit 1 lists, for general informational purposes, TEP's Power Quality requirements which may be updated from time to time. The Customer should verify actual requirements before designing/installing GF.

6.6 Voltage Requirements

Customer generating equipment must deliver at the Point of Interconnection, 60 Hertz, either single or three-phase power at one standard Utility voltage as may be selected by the Customer subject to availability at the premises.

6.7 Telemetry

For generators Class III or greater, Customer shall provide to TEP, at Customer's cost, MW and MVAR transducer output quantities for the purpose of control area system load calculations.

6.8 WSCC/NERC Requirements

Customer shall comply with WSCC/NERC generator testing criteria, including but not limited to, the applicable criteria regarding the installation and operation of Power System Stabilizers ("PSS") and Automatic Voltage Regulators ("AVR").

6.9 Labeling Requirements

- (a) **General Requirements.** The Customer shall conform to the NEC for labeling of generation equipment, switches, breakers, etc. TEP will assume the responsibility for labeling any Utility owned equipment.
- (b) **DG Service Disconnect.** The Customer shall label the DG Service Disconnect by means of a permanently attached placard with clearly visible and permanent letters 1" high. In addition, the Utility may need to attach its own label to the DG Service Disconnect.
- (c) **Service Entrance.** A sign shall be placed at the service entrance indicating type and location of onsite emergency power sources, legally required standby power sources, and onsite optional standby power sources, as defined by the NEC. The NEC also requires a permanent directory, denoting all electrical power sources on or in the premises, shall be installed at each service equipment location and at locations of all electric power production sources capable of being interconnected. Installations with large numbers of power production sources shall be permitted to be designated by groups.

6.10 Protective Requirements

- (a) **General Requirements**
 - (i) The Customer shall be solely responsible for properly protecting and synchronizing his generator(s) with TEP's system. The Customer is solely responsible for the protection of their equipment from automatic reclosing by the Utility.
 - (ii) Devices with definite level and timing characteristics (e.g., micro-processor type relays) will be necessary to meet the requirements established herein.
 - (iii) Generator classes II and above (>50 kW), must utilize discreet relays, separate and independent voltage and frequency relays and associated trip paths to the generator breaker (automatic interrupting device). This is to ensure a redundant trip function in the event of a single relay failure or out-of-tolerance condition.
 - The instantaneous/time overcurrent functions can be integrated into a single ground overcurrent relay.
 - The over/under voltage functions can be integrated into a single o/u voltage relay.
 - The over/under frequency functions can be integrated into a single o/u frequency relay.
- Protective relays or microprocessor based devices may be used provided that the require functionality described herein is demonstrated. For generating equipment that is capable of sustained operation above its normal current rating, phase overcurrent tripping shall be required to trip the unit should it exceed this rating.
- (iv) For generator protection schemes that utilize microprocessor based, multi-function relays, one of the following requirements must be met:
 - Protective relay failure will not only alarm but will also trip the generator breaker/contactors.
 - If relay failure alarms, but does not trip the generator breaker, then additional relaying which meets the requirements stated herein for each class must be provided.
 - (v) With the addition of generation at a Customer site, the ground fault current magnitude might increase to the level where the grounding grid is insufficient to protect personnel from step or touch potentials. Therefore, the Customer is required to ensure the adequacy of the Customer's grounding grid to keep the step and touch potentials at a safe level in the vicinity of equipment accessible by Utility personnel or the general public.
 - (vi) The Customer shall ensure that the GF protective relaying and controls are adequately protected from electrical surges that may result from lightning, Utility switching or electrical faults.
 - (vii) Addition of the Customer's GF may require additional control, metering and protective devices at TEP's facilities. The Customer will be responsible for all labor and material costs associated with their installation.

- (viii) Exhibit 2 lists for general informational purposes TEP's relay settings which may be updated from time to time. The Customer should verify with TEP prior to designing/installing a GF.

(b) **Generator Class Protective Requirements**

TEP shall require the following as minimum acceptable protection:

- (i) **Class I** (Single or Three Phase: **50 kW or less**)
 - The minimum protection required is an under-voltage contactor.
 - For all synchronous generators and forced commutated inverters, either a manual or automatic synchronizing scheme is required.
- (ii) **Class II** (Three Phase: **51-300 kW**)
 - Protection for overvoltage, undervoltage, overfrequency, and underfrequency is required.
 - For all synchronous generators and forced commutated inverters, either a manual or automatic synchronizing scheme is required
 - Phase time and instantaneous overcurrent relays are required.
 - A ground time and instantaneous overcurrent relay is required. For installations interconnected to the Utility through a transformer with connections that will not supply current to a ground fault on the Utility system, a special ground fault detection scheme shall be necessary. The Utility will notify Customer of any such requirements after a preliminary review of the Customer's proposed installation.
 - Other equipment such as supervisory control and alarms, telemetering, transfer trip and associated communications channel may be required in some instances, including but not limited to the following situations: (a) the generator, or an aggregate of generators is large relative to the minimum load on a feeder or sectionalized portion of the feeder, (b) the GF is involved in power transactions requiring the grid, or (c) the GF is remotely controlled by, or dispatched by the Utility. The Utility will notify Customer of any communications requirements after a preliminary review of the proposed installation.
 - Overload tripping shall be required for any generator capable of sustained operation above its normal current rating
- (iii) **Class III** (Three Phase: **301-5,000 kW**)
 - For this class of installation, Utility grade protection devices and equipment will be required.
 - Protection for overvoltage, undervoltage, overfrequency, and underfrequency is required.
 - For all synchronous generators and forced commutated inverters, either a manual or automatic synchronizing scheme is required.
 - A ground time and instantaneous overcurrent relay is required. For installations interconnected to the Utility through a transformer with connections that will not supply current to a ground fault on the Utility system, a special ground fault detection scheme shall be necessary. The Utility will notify Customer of any such requirements after a preliminary review of the Customer's proposed installation.
 - Voltage-controlled/restrained time overcurrent relays may be required.
 - A phase sequence voltage relay is required.
 - Other equipment such as supervisory control and alarms, telemetering, transfer trip and associated communications channel may be required in some instances, including but not limited to the following situations: (a) the generator, or an aggregate of generators is large relative to the minimum load on a feeder or sectionalized portion of the feeder, (b) the GF is involved in power transactions requiring the grid, or (c) the GF is remotely controlled by, or dispatched by the Utility. The Utility will notify Customer of any communications requirements after a preliminary review of the proposed installation.
 - Overload tripping shall be required for any generator capable of sustained operation above its normal current rating
- (iv) **Class IV** (Three Phase: **Greater than 5,000 kW**)
 - For this class of installation, Utility-grade protective devices and equipment will be required.
 - Protection for overvoltage, undervoltage, overfrequency, and underfrequency is required.
 - For all synchronous generators and forced commutated inverters, either a manual or automatic synchronizing scheme is required.
 - A ground time and instantaneous overcurrent relay is required. For installations interconnected to the Utility through a transformer with connections that will not supply current to a ground fault on the Utility system, a special ground fault detection scheme shall be necessary. The Utility will notify Customer of any such requirements after a preliminary review of the Customer's proposed installation.
 - Voltage-controlled/restrained time overcurrent relay
 - Negative sequence time overcurrent relay

- Overexcitation relay
- Loss of excitation relay
- Phase sequence voltage relay.
- Other equipment such as supervisory control and alarms, telemetering, transfer trip and associated communications channel may be required in some instances, including but not limited to the following situations: (1) the generator, or an aggregate of generators is large relative to the minimum load on a feeder or sectionalized portion of the feeder, (2) the GF is involved in power transactions requiring the grid, or (3) the GF is remotely controlled by, or dispatched by the Utility. The Utility will notify Customer of any communications requirements after a preliminary review of the proposed installation.
- Overload tripping shall be required for any generator capable of sustained operation above its normal current rating.

7. DEFINITIONS

“ANSI”: American National Standards Institute. See www.ansi.org.

“Application”: The standard form for applying to interconnect a Generating Facility with the Utility system.

“Arizona Corporation Commission” (“ACC” or “Commission”): The regulatory agency of the state of Arizona having jurisdiction over public service corporations operating in Arizona.

“Backfeed”: To energize a section of a Utility electric system that is supplied from a source other than its normal source.

“Business Day”: Monday through Friday, excluding Federal and Arizona State Holidays.

“Certified Equipment”: Specific generating and protective equipment system or systems that have been certified as meeting the requirements in [Section 3.4](#) relating to testing, operation, safety, and reliability by an entity approved by the Commission.

“Clearance Point”: A clearance point is the physical location on a piece of line or equipment that is to be de-energized from all known sources of power and tagged. Further, that piece of line or equipment shall remain in the condition stated until released by the person having the clearance.

“Cogeneration Facility”: Any facility that sequentially produces electricity, steam or forms of useful energy (e.g., heat) from the same fuel source and which are used for industrial, commercial, heating, or cooling purposes.

“Customer”: An electric consumer that generates electricity on the consumer's side of the Utility meter.

“Disconnect Switch”: A device that the Customer may be required to install and maintain that is a visible open, manual, gang operated, load break disconnect device, capable of being locked in a “visible open” position by a standard Utility padlock that will completely isolate the Customer's Generating Facility from the Utility grid. “Visible open” has the same definition as used in the National Electric Code. If the voltage is over 500 volts, it has to be capable of being grounded on the Utility side.

“Distributed Generation” (“DG”): Any type of Customer electrical generator, static inverter, or Generating Facility interconnected with the distribution system that either (a) has the capability of being operated in electrical parallel with the Utility's distribution system, or (b) can feed a customer load that can also be fed by the Utility's electrical system. A distributed generator is often referred to as a “Generating Facility” in this Document.

“Distribution System”: The infrastructure constructed, maintained, and operated by an electric Utility to deliver electric service to retail customers.

“Electric Supply or Purchase Agreement”: An agreement, together with appendices, signed between the Utility and the Customer covering the terms and conditions under which electrical power is supplied to and/or purchased from the Utility.

“ESP” (“Electric Service Provider”): A company supplying, marketing or brokering at retail any competitive services pursuant to a Certificate of Convenience and Necessity.

“Equipment Package”: A group of components connecting an electric generator with a Utility distribution system, and includes all interface equipment including switchgear, inverters, or other interface devices. An equipment package may include an integrated generator or electric source.

“Fault Current”: The level of current that can flow if a short circuit is applied to a voltage source.

“Generating Facility”: All or part of the Customer's electrical generator(s) or inverter(s) together with all protective, safety, and associated equipment necessary to produce electric power at the Customer's facility. A Generating Facility also includes any Qualifying Facility (“QF”).

“Good Utility Practice”: Any of the practices, methods, and acts engaged in or approved by a significant portion of the electric industry during the relevant time period, or any of the practices, methods, and acts which, in the exercise of reasonable judgment in light of the facts known at the time the decision was made, could have been expected to accomplish the desired result at a reasonable cost consistent with good business practices, reliability, safety, and expedition. Good Utility Practice is not intended to be limited to the optimum practice, method, or act to the exclusion of all others, but rather to be acceptable practices, methods, or acts generally accepted in the region.

“Hold For Orders”: The method used as an aid in protection of personnel working on or near energized equipment, whereby automatic or remote re-closing of a line is disabled. When a hold tag (see [Exhibit 3](#)) is in effect, if the circuit trips open, it will

not be re-closed until the system operator receives a release from the person to whom the hold was issued. As it relates to distributed generation, circuits with hold tags shall have all potential sources of backfeed removed by opening, locking and tagging the appropriate disconnect switch.

“IEEE”: The Institute of Electrical and Electronic Engineers. See www.ieee.org.

Interconnection Agreement: An agreement, together with appendices, signed between the Utility and the Customer, covering the terms and conditions governing the Interconnection and operation of the Generating Facility with the Utility.

“Interconnection”: The physical connection of Customer's Generating Facility to the Utility system.

“Interconnection Manual”: A separate document developed and maintained by each Utility, made available on each Utility's website, and approved by the Commission, containing detailed technical, safety, and protection requirements necessary to interconnect a Generating Facility to each Utility's respective distribution system. The Interconnection Manual shall be consistent with this Document. The Interconnection Manual for TEP is in Section 6 of this Document.

“Interconnection Study”: A study or studies that may be undertaken by a Utility (or a Utility designated third party) in response to its receipt of a completed Application for Interconnection and parallel operation with the Utility system. Interconnection studies may include, but are not limited to, Interconnection Feasibility Studies, System Impact Studies, and Facilities Studies.

“Island”: A condition in which a portion of a Utility electric power system is energized solely by one or more local electric power systems throughout the associated Point of Interconnection while that portion of the Utility electric power system is electrically separated from the rest of the Utility electric power system. Islands can either be intentional (planned) or unintentional (unplanned).

“Islandable System”: A Generating Facility interconnected to a bus common with the Utility's system, where the Generating Facility is designed to serve part of the Utility grid that has become or is purposefully separated from the rest of the grid.

“Metering Service”: All functions related to measuring electricity consumption.

“Minimum Protective Devices, Relays, and Interconnection Requirements”: The minimum required protective relaying and/or safety devices or requirements specified in this Document, are for the purpose of protecting only the Utility and its other customer facilities from damage or disruptions caused by a fault, malfunction, or improper operation of the Customer's Generating Facility. Minimum Protective Relaying and Interconnection Requirements do not include relaying, protective, or safety devices as may be required by industry and/or government codes and standards, equipment manufacturing and prudent engineering design and practice to fully protect the Customer's Generating Facility; those are the sole responsibility of the Customer.

“MSP” (“Meter Service Provider”): An entity providing Metering Service, as that term is defined herein.

“NEMA”: National Electrical Manufacturers Association. See www.nema.org.

“NFPA”: National Fire Protection Association. See www.nfpa.org.

“Parallel System”: The operation of a Generating Facility that is electrically interconnected to a bus common with the Utility's electric distribution system, either on a momentary or continuous basis.

“Point of Interconnection”: The physical location where the Utility's service conductors are connected to the Customer's service conductors to allow parallel operation of the Customer's Generating Facility with the Utility's electric distribution system.

“Primary Network”: An AC power distribution system that uses two or more dedicated primary voltage feeders, connected in parallel, to simultaneously supply power to one customer. The system includes automatic protective devices intended to isolate faulted primary feeders, while maintaining uninterrupted service to the customer served from the other primary feeder circuit(s).

“Qualifying Facility” (“QF”): Any cogeneration or small power production facility that meets the criteria for size, fuel use, efficiency, and ownership as promulgated in 18 CFR, Chapter I, Part 292, Subpart B of the Federal Energy Regulatory Commission's Regulations.

“Radial Line”: A distribution line that originates from a substation and is normally not connected to another substation or another circuit sharing the common supply of electric power.

“Relay”: An electric device that is designed to interpret input conditions in a prescribed manner and after specified conditions are met to respond to cause contact operation or similar abrupt change in associated electric control circuits.

“Secondary Spot Network System”: An AC power distribution system in which a Customer is simultaneously served from three-phase, four-wire low-voltage (typically 480V) circuits supplied by two or more network transformers whose low-voltage terminals are connected to the low voltage circuits through network protectors. This is not applicable to TEP.

“Separate System”: The operation of a Generating Facility that has no possibility of operating in parallel with the Utility's system.

“Small Power Production Facility”: A facility that uses primarily biomass, waste or renewable resources, including wind, solar, and water to produce electric power.

“Transfer Trip Scheme”: A form of remote trip in which a communication channel is used to transmit a trip signal from the relay location to a remote location.

“Transmission System”: Utility-owned high-voltage lines (69 kVa or higher) and associated equipment for the movement or transfer of electric energy between power plants and the distribution system.

“UL”: Underwriters Laboratories Inc. See www.ul.com.

“Utility”: An electric distribution company that constructs, operates, and maintains the electrical distribution system for the receipt and/or delivery of power. TEP is the Utility in this Document.

“Utility Grade Relays”: Relays specifically designed to protect and control electric power apparatus, tested in accordance with the following ANSI/IEEE standards:

- (a) ANSI/IEEE C37.90-1989 (R1994), IEEE Standard for Relays and Relay Systems Associated with Electric Power Apparatus.
- (b) ANSI/IEEE C37.9.01-1989 (R1994), IEEE Standard Surge Withstand (SWC) Tests for Protective Relays and Relay Systems.
- (c) ANSI/IEEE C37.90.2-1995, IEEE Standard Withstand Capability of Relay Systems to Radiated Electromagnetic Interference from Transceivers.

EXHIBIT 1
TUCSON ELECTRIC POWER COMPANY
POWER QUALITY CHARACTERISTICS

SETTING TYPE	TEP
Power Factor [1]	No greater than 0.85 for Class II units and above
Phase Current Imbalance	[3]
Voltage Characteristics	ANSI C84.1
Sine Wave Form	IEEE 519
Harmonics [2]	Voltage: 5% THD, with no single harmonic greater than 3% of the fundamental, IEEE Std. 519-1992, Sect. 10.3 Current: See Table 10.3 of IEEE Std. 519-1992, Sect. 10
Voltage Flicker	IEEE 519, Sect. 10.5[3]

Notes:

- [1] This power factor provides for spinning VAR support and minimizes the impact of many small generators on TEP's system voltage stability.
- [2] Harmonics limits shall be met for all generation levels from 10 – 100% of each generator's nameplate kVA or kW rating.
- [3] Customer to consult with TEP.

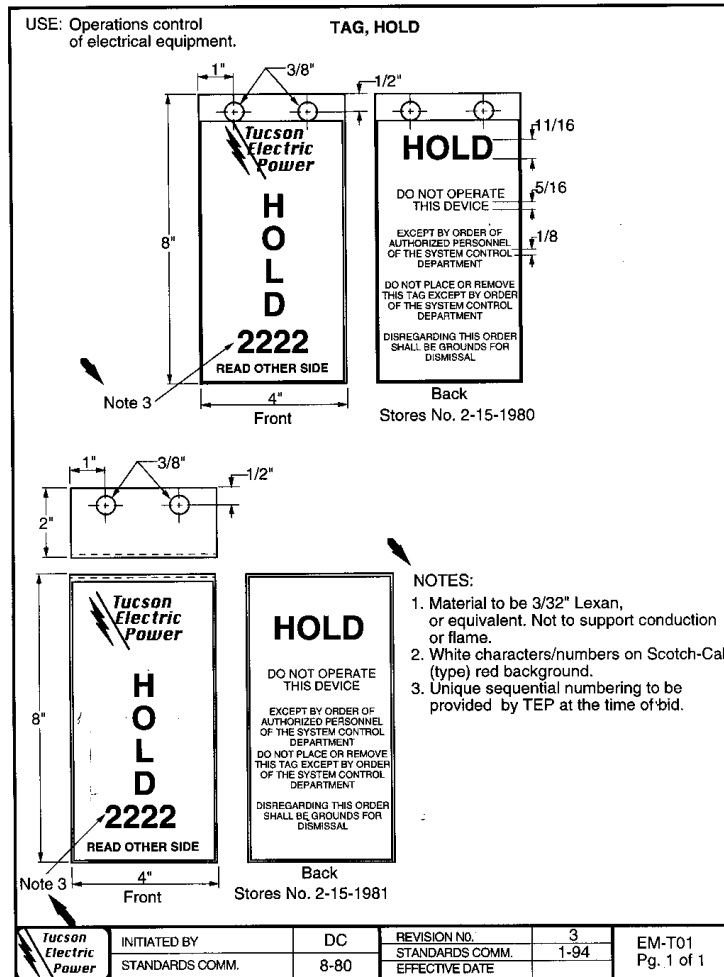
EXHIBIT 2
TUCSON ELECTRIC POWER COMPANY
RELAY SETTINGS
AND RE-CLOSING PRACTICES

SETTING TYPE	TEP
Over-frequency Time delay [1]	61.1 Hz 0.1 Seconds
Under-frequency Time delay [2]	58.9 Hz 0.1 Seconds
Over-voltage Time Delay	105% 0 Seconds
Under-voltage Time Delay	95% 0 Seconds
Re-closing, first shot [3]	Instantaneous
Re-closing, second shot [3]	15 to 30 Seconds [4]
Re-closing, third shot [3]	165 Seconds

Notes:

- [1] Guidelines do not specify a setting or time delay; they state “trip the circuit breaker when the frequency varies from the nominal 60 Hz.”
- [2] If generator is considered a WSCC generator, the under-frequency setting might be different to comply with WSCC guidelines.
- [3] Times are for typical overhead/residential type feeders (not necessarily line reclosers), and are the time delay from the trip to the next reclosure. Actual number of re-close shots on a particular feeder may vary.
- [4] Varies based on type of reclosing utilized.

EXHIBIT 3
TUCSON ELECTRIC POWER COMPANY
HOLD



APPENDIX A
TUCSON ELECTRIC POWER COMPANY



APPLICATION AND EQUIPMENT INFORMATION FORM – ROUND ROTOR

SITE AND CUSTOMER INFORMATION

(Complete all items)

Customer Name _____ Telephone _____

Company Name (if applicable) _____

Mailing Address _____

Generating Facility Address _____

Project Contact _____ Telephone _____

Utility Account Number _____ Electric Meter No. _____

ESP (if different from serving Utility) _____

MSP (if different from serving Utility) _____

Completed By _____ Telephone _____

PROPOSED OPERATION

(Answer all questions)

- A. Does the Generation Facility plan on being a net exporter of energy into the Utility grid? (Yes or No) _____. If “Yes”, explain the proposed operation and estimated power to be exported, and also provide name of proposed purchaser of this power:

- B. If the Generating Facility will be used only for on-site power, will it be operated as a peak-shaving unit during Utility peak load conditions, or as a base-loaded unit operating 24 hrs a day?

GENERATOR INFORMATION

(Complete for each rotating generator only)

- A. Manufacturer _____
- B. Type (Synchronous, Induction, D.C.) _____
- C. Nameplate rating
Voltage _____ kW _____
Power Factor _____ Frequency _____
Model No. _____ Single or Three Phase _____
- D. Type of Excitation System (Self or Separate) _____
- E. Generator Electrical Characteristics (on the machine base, for Class II and above)
Synchronous Reactance ($X'd$) _____
Transient Reactance ($X'd$) _____
Subtransient Reactance ($X''d$) _____
Zero sequence reactance (X_0) _____
Negative sequence reactance (X_2) _____

PRIME MOVER

(Complete for rotating machinery only)

- A. Manufacturer _____
- B. Manufacturer's Reference Number _____
- C. Energy Source (Natural Gas, Steam, etc.) _____

INTERFACE EQUIPMENT

(Complete for each rotating generator only)

- A. Synchronizer for Synchronous Generator:
Manufacturer _____
Manufacturer's Model Number _____
Automatic or Manual Synchronizer _____
- B. Inverter for DC generator:
Manufacturer _____
Manufacturer's Model Number _____
Line or Self Commutated Inverter _____

SUPPLEMENTARY INFORMATION – Round rotor

(Information below to be submitted for all projects. All diagrams are to be professionally and neatly drawn. Generally, free hand drawn or illegible diagrams will not be accepted by Utility).

- A. Electrical One-Line Diagram:
Provide 5 sets, including any and all revisions or changes as they are made. Diagram(s) must also include project name and address, show generator size and all protective relaying and control equipment, as well as electric service entrance and Utility meter.
- B. Electrical Three-Line Diagram:
Provide 5 sets, including any and all revisions or changes as they are made. Diagram(s) must also include project name and address, show generator size and all protective relaying and control equipment, as well as electric service entrance and Utility meter, and include all neutral and ground conductors and connections.
- C. AC & DC Control Schematics:
Provide 5 sets, including any and all revisions or changes as they are made, for all projects comprising rotating machinery. Diagrams must show the detailed wiring of all protective relays and control functions, and include control power source and wiring.
- D. Detailed Map:
Provide 5 sets of detailed maps, including any and all revisions or changes as they are made. Maps should show major cross streets and proposed plant location, and include the street address.
- E. Site Plan:
Provide 5 sets of site plans, including any and all revisions as they are made, showing the arrangement of the major equipment, including the electric service entrance section and Utility meter, location of generator and interface equipment, and location of the Disconnect Switch. Include the street address, and location of the any lock-boxes, etc.
- F. Testing Company:
Provide the name of the company that will do the protective relay bench testing and the trip circuit functional tests and the anticipated start up date.
- G. Point of Contact
If the interconnection and start-up process is to be coordinated through a party or individual other than the Customer, provide the name, company, address and phone number of that individual or party with whom the Utility is to coordinate the interconnection.

APPENDIX B
TUCSON ELECTRIC POWER COMPANY



**PV INTERCONNECTION APPLICATION
(GREATER THAN 20 kWac)**

Customer Information

Business Name: _____
Mailing Address: _____
City: _____, **AZ** **Zip Code:** _____
Street Address: (if different from above) _____
Phone Number: _____
E-mail Address: _____

Solar - PV Equipment Information

Module Manufacturer: _____ **Nameplate DC Rating:** _____ **Watts**
Module Model Number: _____ **Quantity of Modules:** _____
Module Warranty: _____ **years**
Inverter Manufacturer: _____ **Inverter Model Number:** _____
Inverter conforms to UL1741 for grid connected: _____ **Yes** _____ **No**
Inverter Warranty: _____ **years**

Project Information

Will system be grid connected: _____ **Yes** _____ **No** **Is there a battery system:** _____ **Yes** _____ **No**
Utilities Contact for system interconnection: _____ **Customer** _____ **Installer**
Has a City/County Permit been secured: _____ **Yes** _____ **No**
Does this installation meet all TEP Interconnection Requirements: _____ **Yes** _____ **No**
Estimated Installation Date: _____
System Cost: _____

Installer Information

Company Name: _____
Installer's Name: _____
Business Address: _____

Arizona Registrar of Contractors (AZROC) License Information

AZROC License Number: _____ **Class:** _____ **Expiration Date:** _____
Contractor's License: _____ **Class:** _____ **Expiration Date:** _____
Completed By: _____
TEP Customer Signature: _____

SUPPLEMENTARY INFORMATION – Photovoltaic

(Information below to be submitted for all projects. All diagrams are to be professionally and neatly drawn. Generally, free hand drawn or illegible diagrams will not be accepted by Utility).

- A. **Electrical One-Line Diagram:**
Provide 3 sets, including any and all revisions or changes as they are made. Diagram(s) must also include project name and address, show generator size and all protective relaying and control equipment, as well as electric service entrance and Utility meter.
- B. **Electrical Three-Line Diagram:**
Provide 3 sets, including any and all revisions or changes as they are made. Diagram(s) must also include project name and address, show generator size and all protective relaying and control equipment, as well as electric service entrance and Utility meter, and include all neutral and ground conductors and connections.
- C. **Detailed Map:**
Provide 3 sets of detailed maps, including any and all revisions or changes as they are made. Maps should show major cross streets and proposed plant location, and include the street address.
- D. **Site Plan:**
Provide 3 sets of site plans, including any and all revisions as they are made, showing the arrangement of the major equipment, including the electric service entrance section and Utility meter, location of generator and interface equipment, and location of the Disconnect Switch. Include the street address, and location of the any lock-boxes, etc.
- E. **Point of Contact**
If the interconnection and start-up process is to be coordinated through a party or individual other than the Customer, provide the name, company, address and phone number of that individual or party with whom the Utility is to coordinate the interconnection.