

RESOLUTION NO. ~~06-13022~~

A RESOLUTION ADOPTING INTERCONNECTION STANDARDS AS APPROVED BY THE COMMISSION PURSUANT TO SECTION 111(d)(15) OF THE PUBLIC UTILITY REGULATORY POLICIES ACT, AS AMENDED BY THE ENERGY POLICY ACT OF 2005

**FACTUAL BACKGROUND AND REASONS FOR ACTION.**

The Public Utility Regulatory Policies Act (PURPA) was enacted in 1978 to encourage (1) the conservation of energy supplied by electric utilities, (2) the optimization of the efficiency of use of facilities and resources by electric utilities, and (3) equitable rates to electric consumers (Section 101).

The Energy Policy Act of 2005 (EPA 2005) amended PURPA. Section 1254 of EPA 2005 amended section 111(d) of the PURPA to require utilities to consider adoption of standards for interconnection and whether it is appropriate to offer, upon request, interconnection service to any electric consumer that the electric utility serves.

Section 112(d) of PURPA makes clear that the District is not required to commence consideration or make a determination regarding these standards if the state legislature has implemented the PURPA standard or a comparable standard prior to enactment of EPA 2005. While the state legislature has taken action with regard to interconnection standards (RCW 80.16 as amended by SSB 5101), the District decided to proceed with the PURPA process in order to fully consider public comment.

To initiate consideration of this standard, District staff gave a presentation to the Commission on July 24, 2006. The presentation described the proposed standards and set forth a schedule for public comment and hearing. On August 6, 2006, a legal advertisement notifying customers of an opportunity to submit public comment with regard to this standard appeared in The Wenatchee World. On October 13, 2006, an additional legal advertisement notifying customers of a hearing scheduled for November 13, 2006 appeared in The Wenatchee World. In addition, display advertisements inviting public comment and participation were placed in the paper on August 6, October 13, and October 29, 2006. These advertisements indicated that written public comment was due November 1, 2006 and that interventions for the hearing were due to the hearing's presiding officer by November 3, 2006. No interventions were filed.

On November 13, 2006, the properly noticed public hearing was held. Staff presented a presentation to the Commission identifying staff's recommendation relating to adoption of interconnection standards pursuant to sections 111(d) of PURPA. The Commission has been asked to make a timely determination on adoption of this standard.

With regard to PURPA standard 111(d)(15), staff reported that the District has offered interconnection standards for customer generators up to 10 MW since 2001. In addition, District staff participated in the Washington PUD Association Public Power Ad-hoc Interconnection Standards Committee (PPAISC), which developed detailed interconnection standards for customer generators of up to 25kW. These 25kW or less interconnections standards have been adopted by at least 90 percent of electric utilities in the State of Washington. The District was one of the first to adopt them in January 2006. In addition, District staff recommends standards for interconnections greater than 25kW and up to 300kW which require further staff review and

require imposing additional standards based on a case-by-case review. District staff recommended that the Commission not adopt the interconnection standard set forth in PURPA section 111(d)(15). Instead, staff recommends that the Commission formally adopt existing interconnection standards for customer generators up to 10 MW and detailed interconnection standards for customer generators of up to 300kW.

**ACTION**

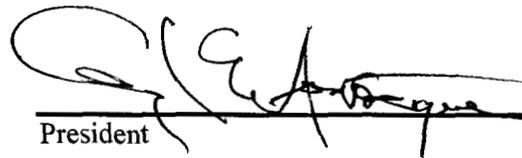
IT IS RESOLVED BY THE COMMISSION OF PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY that:

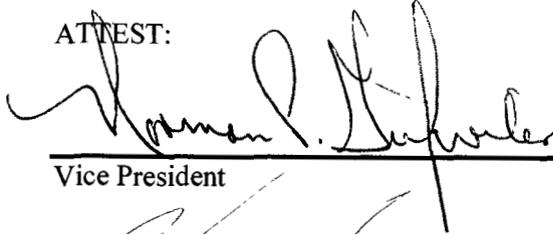
Section 1. Pursuant to Section 1254 of the EPAct 2005, the Board of Commissioners of Chelan County PUD has determined not to adopt PURPA standard 111(d)(15) with regard to interconnection standards. The District hereby adopts interconnection standards to customer generators of up to 10MW and adopts the specific interconnection standards for customer generators of 300kW or less. A copy of these standards are attached and made a part hereof as Exhibit A and B.

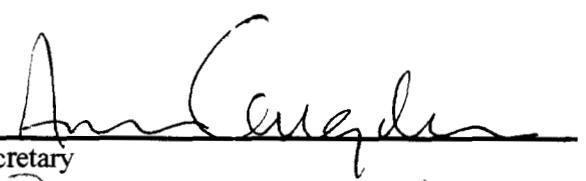
Section 2. The adoption of these interconnection standards is not a major action under the State Environmental Policy Act, and is categorically exempt under the S.E.P.A. guidelines W.A.C., Chapter 197-11-800(15)

Section 3. The General Manager of the District or designee is hereby authorized to amend these standards in the future as necessary to recognize best practices, safety, design issues/updates, and minor legislative or rule changes.

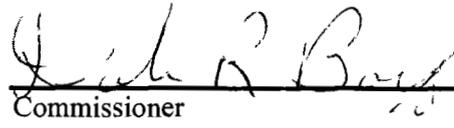
Dated this 18th day of December 2006.

  
\_\_\_\_\_  
President

ATTEST:  
  
\_\_\_\_\_  
Vice President

  
\_\_\_\_\_  
Secretary

  
\_\_\_\_\_  
Commissioner

  
\_\_\_\_\_  
Commissioner

# ENGINEERING NOTE

## Retail Engineering & Drafting

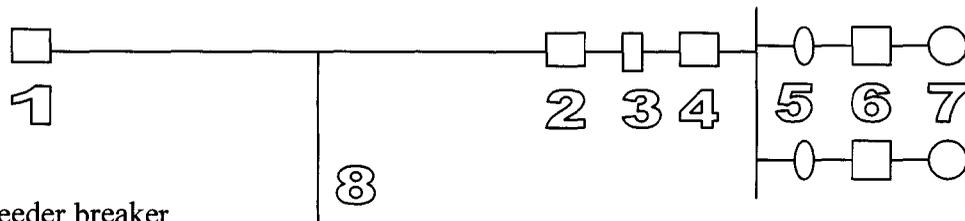
RE: Interconnection Requirements for Customer-Owned Generating Facility Connected to District Distribution System

This Engineering Note is intended to state the minimum requirements for the safe and reliable operation of the Customer-owned generating facility that will be connected and operated in parallel with the District distribution system. **This Engineering Note is also intended to be used in conjunction with District Generating Facility Planning Guidelines for general interconnection requirements.** All requirements stated in this document are specifically written for Customer-owned synchronous generators, but partially applicable to Customer-owned non-synchronous generating facilities. Any questions regarding technical requirements stated in this document should be directed to Retail Engineering & Drafting Group.

**All interconnection costs shall be borne by the Customer.** These costs include all the costs of engineering, inspection, connection, switching, metering, transmission, distribution, safety provisions, and administrative costs incurred by the District directly related to the installation and maintenance of the physical facilities necessary to permit the Customer-owned generating facility operation.

**The District reserves the right to have the Customer purchase certain equipment not readily available from the District Warehouse(s) and all equipment shall meet the District equipment specifications.**

### 0 – 3.5MW Connection



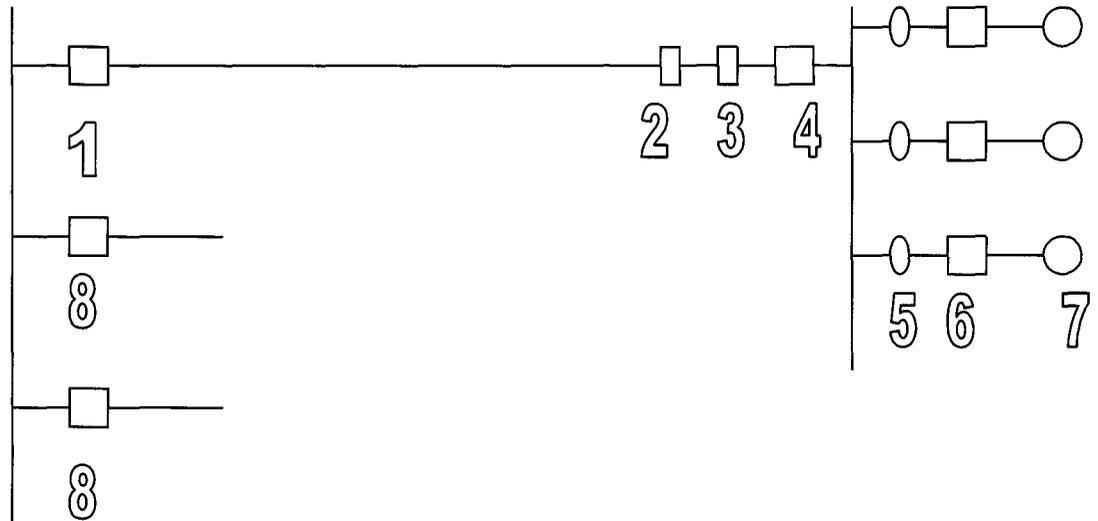
- 1: feeder breaker
- 2: interconnection breaker owned by PUD
- 3: primary meter
- 4: utility tie breaker owned by the Customer
- 5: step-up transformers
- 6: generator breakers

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- 7: generators
- 8: PUD customer load

**3.5 – 10MW Connection**



- 1: breaker dedicated to the Customer's generating facility
- 2: primary meter
- 3: visible disconnect switch owned by PUD
- 4: utility tie breaker owned by the Customer
- 5: step-up transformers
- 6: generator breakers
- 7: generators
- 8: PUD feeder breakers

1. **Compliance** – Installation shall be in compliance with the National Electrical Code, National Electrical Safety Code, North American Electric Reliability Council, Western Systems Coordinating Council, Washington State Safety Standards as applicable, District Electrical Service Requirements as applicable, District Generating Facility Planning Guidelines as applicable, and District Construction Standards as applicable.

The District reserves the right to require the Customer to provide corrections or additions to existing protective devices in the event of modification of government or industry regulations and standards at the Customer's expense.

2. **Scope** - The technical requirements contained herein generally apply to all new or expanded generating facilities, regardless of type or size. The location of the

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generating facility, interconnection, and impacts on the District system or another utility's system determine the specific requirements. The Customer-owned generating facility and its interconnecting facilities must not degrade the safe operation, integrity, and reliability of the District system. The requirements in this document are intended to protect the District facilities and customers, but cannot be relied upon to protect the Customer-owned generating facilities.

3. **System Study** - Customers shall contact the District as early in the planning process as possible for any potential generation project within or adjacent to the District system and/or where the output will enter the District Control Area. The Customer should not make its own assumptions about the final location, voltage, or interconnection requirements. Certain areas within the District system can accept only limited amount of generation without costly system upgrades. The District may have to add or modify its distribution system substantially before connecting a Customer-owned generating facility. An interconnection study must be made to determine the required interconnection facilities and also modifications to accommodate the Customer-owned generating facility.

If the proposed Customer-owned generating facility is materialized, then a thorough distribution study shall be done. It may be necessary to remove certain capacitor banks, to relocate certain capacitor banks, to reconductor a circuit(s) if necessary, to install current limiting fuses (normally a current limiting fuse in series with each overhead transformer fuse), and/or to change certain fuse sizes.

4. **Transient Stability Study** – Required as needed.
5. **Fault Duty Increase and Equipment Ratings** – The distribution circuit 3-phase fault duty may increase due to the Customer-owned generating facility and the single-line-to-ground fault duty may also increase. All existing distribution line apparatus (such as breakers, reclosers, sectionalizers, fuses, switches, etc.) shall be upgraded to handle these fault duty increases as required.
6. **Loading Increase and Equipment Ratings** – The distribution system equipment loading may increase considerably due to the Customer-owned generating facility. All existing distribution system apparatus (such as breakers, power fuses, current transformers, conductors, power transformers, switches, regulators, etc.) shall be upgraded to handle these loading increases as required at the Customer's expense.
7. **Impact to Protective Device Coordination** – The District uses a so-called fuse saving scheme for distribution feeder protection. The fault duty increase as mentioned above will make the fuse saving scheme less reliable because a fuse may see more fault current than before (without the Customer-owned generating facility) and/or than the substation feeder breaker. This is a real concern, but there is no simple fix for this problem. System protection & control engineers

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shall review the existing distribution feeder coordination carefully and make necessary changes as required at the Customer's expense.

8. **Generator Step-up Transformer Connection** – The District requires a delta/wye-grounded transformer with wye-grounded on the high side and delta on the low side. This type of connection will allow the District to continue using the existing overcurrent-sensing protective devices and surge arresters without any major modifications to protective schemes and also minimize hazardous ferroresonance/neutral-shift conditions. Because of the wye-grounded connection on the high side, all step-up transformers are **grounding transformers**. Other types of transformer connections may be allowed on a case-by-case basis.
  
9. **Generator Self-Excitation and Ferroresonance (Also Known as Islanding)** – In general, generators proposed by Customers are capable of continuously operating in an isochronous mode. If an isolated generator is connected to a distribution system having capacitance equal to or greater than its magnetizing reactance requirements, then the generator terminal voltage can be as high as 1.5 to 2.0 per unit. In general, all induction generators are susceptible to this type of ferroresonance, but new research results revealed that synchronous generators are also susceptible. The Customer shall be fully responsible for protecting his/her own facility and District's facilities under this type of islanding conditions. To minimize this type of ferroresonance problems, the District requires a under/over voltage relay and also a under/over frequency relay at the utility tie breaker, in addition to a high-speed utility tie breaker and a direct transfer trip relaying scheme as mentioned elsewhere in this document.  
  
Under islanding conditions, the District existing overcurrent-sensing protective devices may not reliably detect faults because the Customer-owned generator(s) cannot generate sufficient amount of fault currents to faults on the District distribution system. This is another reason why the District requires a high-speed, direct transfer trip relaying scheme.
  
10. **Neutral Shifts** – When the Customer-owned generating facility is connected to the low-voltage side of a delta-grounded wye transformer, the remote end breaker operations initiated by the detection of ground faults on the high-voltage side can cause overvoltages that can affect personnel safety and damage equipment. This type of overvoltage is commonly described as a neutral shift and can increase the voltage on the unfaulted phase to as high as 1.73 per unit. This is one main reason why the District requires the generator step-up transformers with wye-grounded connection on the high-voltage side.
  
11. **Direct Transfer Trip Relaying** – This pilot relaying scheme is required to minimize problems such as poor power quality, slow protective device response

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due to low fault currents, accidental out-of-synchronization, ferroresonance due to generator self-excitation, damages to Customer-owned generator(s), District-owned line apparatus, etc. At the District substation the District will install one SEL-351 distribution relay with the mirrored bit feature and one digital modem if a leased telephone line is used as a communications link (a Pulsa MBT9600 analog modem if an analog radio is used as a transceiver). Since SEL-351 is a three-phase, multi-function relay, the District will install an additional SEL-351 (or equivalent to SEL-351) for redundancy. The Customer-owned generating facility shall also have the same arrangement at the utility tie breaker.

In addition, the District requires either Line Differential or Permissive Over-reaching Transfer Trip relaying scheme along with the Direct Transfer Trip relaying. No additional device is normally required to add one of these proposed schemes.

12. **Under/Over Frequency and Voltage Relays** – To prevent any hazardous operating conditions, the Customer-owned generating facility shall be isolated from the District distribution system for any under-voltage (lower than 80% of nominal voltage) and over-voltage conditions (higher than 110% of nominal voltage) within 2 seconds in the absence of direct transfer trip relaying and other pilot relaying. For extremely high voltages, the over-voltage relay shall operate fast enough (without any intentional delay) to prevent equipment damages. In addition, the Customer-owned generating facility shall be isolated from the District distribution system for any unacceptable over-frequency and under-frequency conditions within a reasonable period of time. The Customer's frequency relay settings shall be reviewed and approved by the District prior to start-up of the Customer-owned generating facility. In addition, the District shall verify the Customer's relay settings by adequate functional testing.
13. **Dedicated Communications Link for Pilot Relaying** – The District prefers a fiber optic communications link, but other types of communications links may be acceptable pending approval by the District. Whichever communications link is used, the signal transmission delay caused by a communications link and all associated communications equipment shall not exceed 15 milliseconds. A leased telephone line may be acceptable as long as the required high-speed (less than 15-millisecond signal transmission delay) is ensured. In general, an analog communications link is too slow to meet our transfer trip relaying requirements. However, an analog communications link may be acceptable if a high-speed Pulsa MBT9600 analog modem is used.
14. **Dedicated Communications Link for SCADA, Telemetry, and/or Automatic Generation Control (AGC)** – A dedicated communications link for SCADA, telemetry, and/or AGC, shall be required and in general a leased telephone line is acceptable to the District. In general, a District-owned local Remote Terminal Unit (RTU) shall be installed at the Customer-owned generating facility to

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perform certain control and monitoring functions as described elsewhere in this document.

15. **Dedicated Voice Communications Link** – For coordination of system protection, control, and communications maintenance activities between the District and the Customer-owned generating facility, a dedicated voice communications link shall be required, in addition to communications links specified elsewhere in this document.
16. **Interconnection Breaker Owned by the District (applicable to 0 – 3.5MW connection only)** – The District requires an interconnection breaker to separate the generating facility from the District distribution system under certain operating conditions. The District will install (or require) a circuit breaker or electronically-controlled pole-mounted (or padmounted) recloser with SCADA control, a set of disconnect switches (or an appropriate switching device such as a padmounted switchgear) on the line side of the recloser, and another set of disconnect switches on the generator side. The disconnect switches shall be equipped with a lockable mechanism for clearance tagging to provide the visible air gap and also to isolate the Customer-owned generating facility from the District distribution system. The electronically-controlled recloser requires two 120-Vac sources (one from the line side and one from the generator side) requiring installation of two small single-phase transformers (installed on the outside of disconnect switch – recloser – disconnect switch section). **The recloser shall not have any synchronizing capability because it is too slow for the synchronizing function.**
17. **Visible Disconnect Switch (applicable to 3.5 – 10MW connection only)** – The visible disconnect shall be equipped with a lockable mechanism for clearance tagging to provide the visible air gap and also to isolate the Customer-owned generating facility from the District distribution system.
18. **Utility Tie Breaker Owned by the Customer** – The District interconnection breaker (or recloser) can detect faults reliably on the generator side, but cannot reliably detect faults on the District distribution system because of the insufficient fault current contribution from the Customer-owned generating facility. Therefore, the Customer-owned utility tie breaker (or recloser) shall reliably detect all faults on the District distribution system and trip without any intentional delay. The automatic isolation shall be done prior to the District feeder breaker (or line recloser) reclosing and within a reasonable period of time, typically less than 2 seconds in the absence of direct transfer trip relaying and other pilot relaying. **In addition to all required relays as mentioned elsewhere in this document, the utility tie breaker should have an automatic/manual synchronizing capability and also be able to handle a recovery voltage of 2 times rated voltage.**

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19. **Mechanical (or Electrical) Interlocking System** – To ensure safety of working personnel, the District requires a mechanical (or electrical) interlocking system between the utility tie breaker and the interconnection breaker (or the dedicated feeder breaker for 3.5 – 10MW connection).
20. **Primary Metering (Revenue Metering)** – The District shall own, furnish, and install the standard bi-directional primary metering in a padmount (or overhead) enclosure to measure the energy delivered by the District to the Customer and the energy received by the District from the Customer.
21. **Starting as Induction Motor (if applicable)** – In general, induction generators start as motors and also synchronous generators may be designed to start as motors. The Customer-owned generator(s) starting as a motor(s) shall meet the motor starting requirements in the District Electrical Service Requirements. The District may require the Customer to provide, at his/her expense, special or additional starting equipment.
22. **Voltage Fluctuation** – Turning the generator on and off may cause undesirable voltage fluctuation. A maximum of 3.5% voltage fluctuation is allowed, but the voltage dip caused by the Customer-owned generating facility shall not exceed the Borderline of Visibility as shown in IEEE Standard 241 and also IEEE Standard 141.
23. **Line Voltage Regulator Bank (applicable to 0 – 3.5MW connection only)** – To minimize any undesirable voltage fluctuation, a future voltage regulator bank (if planned by the District) should be placed carefully so that it may not lock itself up under certain operating conditions.
24. **Power Quality and Reliability** – The interconnection of the Customer-owned generating facility with the District distribution system shall not cause any reduction in the quality and reliability of service provided to other District customers. This includes, but not limited to, the following: There shall be no objectionable generation of abnormal voltages or voltage fluctuations and the harmonic content of the Customer-owned generating facility output must be below that level which would cause undue interference with other customer loads, other utilities, or District equipment.

To minimize all interference, the District requires that the Customer-owned generating facility shall meet the power quality requirements specified in the IEEE Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems, IEEE Std 519-1992. In addition, the Customer-owned generating facility shall meet all requirements elsewhere in this document and the District Electrical Service Requirements.

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25. **SCADA Installation** – To ensure safety of working personnel and prompt response to system abnormalities, the District shall be allowed to know the status of certain breakers (e.g., utility tie breaker, interconnection breaker, and generator breaker(s)) and the real & reactive power flow at the generator breakers and at the District primary meter. A RTU shall be installed at the generating facility and it shall be able to open and close the interconnection breaker remotely.
26. **Synchronization** – The Customer-owned generating facility shall be automatically or manually synchronized with the District distribution system at all times and the Customer shall be responsible for the automatic/manual synchronization. Automatic or manual synchronization shall be supervised by a synchronizing check relay. **If a synchronizing check relay is used to supervise synchronization, then its output contacts shall be rated to interrupt the circuit breaker closing circuit current and the interrupting device shall be capable of trip-free operation.** As mentioned above, synchronization shall be done at the utility tie breaker and also at the generator breaker(s). **Interrupting devices with longer than 5-cycle closing time (such as reclosers) shall not be used for synchronization.**
27. **Operating Limits** – In general, **the Customer-owned generating facility shall not absorb reactive power from the District distribution system.** Prior to start-up of the Customer-owned generating facility, the generator operating limits shall be reviewed and approved by the District
28. **No Automatic Reclosing** – The District feeder breaker control and also 115-kV power circuit breaker control schemes are normally designed to have at least one automatic reclosing in order to minimize unnecessarily prolonged outages. To minimize potentially hazardous operating conditions or equipment damages due to non-synchronized operation caused by automatic reclosing, no automatic reclosing shall be allowed to the utility tie breaker, the interconnection breaker, and generator breaker(s).
29. **Automatic Disconnection and Time-Delayed Automatic Reconnection** – The Customer-owned generating facility shall be designed to automatically disconnect and lockout when the District service is interrupted for any reason. Automatic reconnection to the District distribution system shall be done on Hot-Bus/Hot-Line/Sync-Check at least 5 minutes after the automatic disconnection.
30. **Generating Facility Grounding** – There are additional safety concerns that should be addressed when considering circuit grounding of the Customer-owned generating facility interconnected to the utility electric system. To ensure proper grounding of the Customer-owned generating facility, the Customer shall follow all applicable, established grounding rules of the National Electrical Code, National Electrical Safety Code, Washington State Safety Standards, etc.

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31. **Generating Facility Protection** – The Customer shall be fully responsible for the protection of his/her generators and all of their associated equipment. Protection shall be provided for the Customer-owned equipment failures, faults, and other disturbances on the District system. If a three-phase, multi-functional, microprocessor-based generator protection relay is used, the Customer is required to install one additional relay (backup relay) of the same kind to ensure adequate protection. The Customer shall provide equipment specifications, protection arrangement, and design drawings to the District for review and written approval prior to installation.
32. **Start-Up** – Prior to initial energization of the Customer-owned generating facility, inspection and/or tests shall be jointly performed by both the Customer and the designated District personnel to verify the proper operation of the generator(s) and associated equipment to the District's satisfaction.
33. **District Inspection and Customer Maintenance Records** – The Customer shall maintain his/her generating facility in good working order. The Customer-owned generating facility (generator and associated equipment) may be subject to District inspection upon reasonable notice by the District. The Customer shall assume full responsibility for the routine maintenance of the generating facility and associated protective devices and the keeping of records for such maintenance. These records shall be available to the District for inspection at all times.
34. **Surge Protection** – The Customer shall be fully responsible for the protection of his/her generating facility from transient surges initiated by lightning, switching, or other system disturbances.
35. **Future Modification or Expansion** – Any future modification or expansion of the Customer-owned generating facility shall require an engineering review and approval by the District.
36. **System Emergency** – The District reserves the right to discontinue or interrupt the Customer-owned generation to correct any system emergency condition, outage, required system maintenance, or equipment failure.
37. **Design Standards** – In addition to all requirements as shown above, the Customer-owned generating facility shall meet the requirements specified in the latest IEEE Guide for Interfacing Dispersed Storage and Generation Facilities with Electric Utility Systems, ANSI/IEEE Std 1001, and also the latest Standard for Interconnecting Distributed Resources with Electric Power Systems, IEEE P1547.

# **INTERCONNECTION STANDARDS**

**FOR**

**CUSTOMER-OWNED GENERATING FACILITIES**

**For Up to 300 Kilowatts**

**PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN  
COUNTY**



**CHELAN COUNTY**

**December 18, 2006**

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**Chapter 1 Purpose and Scope.**

- (1) The purpose of this chapter is to establish rules for determining the terms and conditions governing the Interconnection of electric generating facilities with a nameplate generating capacity of not more than 25 kilowatts to the Electric System of Public Utility District No. 1 of Chelan County.
- (2) These rules are intended to be consistent with the requirements of chapter 80.60 RCW, Net Metering of Electricity; to partially comply with Section 1254 of the Energy Policy Act of 2005, Pub. L. No. 109-58 (2005); and to promote the purposes of Substitute Senate Bill 5101, Chapter 300, Laws of 2005 (eff. July 1, 2005).
- (3) This policy is also applicable for Interconnection of a Generating Facility greater than 25 kilowatts and up to 300 kilowatts. Provided, however, that the District will impose additional requirements for such interconnected Generators as deemed necessary by the District in its sole discretion.

**Chapter 2 Application of rules.**

- (1) These rules include various requirements applicable to the Utility, the Applicant and the Generator.
- (2) These rules modify, if necessary, any existing Interconnection rules of the Utility, including but not limited to, rules implementing chapter 80.60 RCW, Net Metering of Electricity.

**Chapter 3 Definitions.**

“Applicant” means any person, corporation, partnership, government agency, or other entity applying to interconnect a Generating Facility to the Utility’s Electric System pursuant to this chapter.

“Application” means the written notice as defined in WAC 480-108-030 provided by the Applicant to the Utility that initiates the Interconnection process.

“Certificate of Completion” means the attached certificate furnished by the Utility and completed by the Applicant or Generator and the electrical inspector having jurisdiction over the installation of the facilities indicating completion of installation and inspection of the Interconnection.

“Electric System” means all electrical wires, equipment, and other facilities owned or provided by the Utility that are used to transmit electricity to customers.

“Generating Facility” means a source of electricity owned by the Applicant or Generator that is located on the Applicant’s side of the Point of Common Coupling, and all facilities

ancillary and appurtenant thereto, including Interconnection facilities, which the Applicant requests to interconnect to the Utility's Electric System.

"Generator" means the entity that owns and/or operates the Generating Facility interconnected to the Utility's Electric System.

"Initial Operation" means the first time the Generating Facility is in parallel operation with the Electric System.

"In-service Date" means the date on which the Generating Facility or system upgrades and any related facilities are complete and ready for service, even if the Generating Facility is not placed in service on or by that date.

"Interconnection" means the physical connection of a Generating Facility to the Electric System so that parallel operation may occur.

"Interconnection Agreement" means the standardized terms and conditions that govern the Interconnection of generating facilities pursuant to these rules. The model Interconnection Agreement may be modified to accommodate terms and conditions specific to individual Interconnections, subject to the conditions set forth in these rules.

"Interconnection Facilities" means the electrical wires, switches and other equipment used to interconnect a Generating Facility to the Electric System.

"Net Metering" means measuring the difference between the electricity supplied by the Utility and the electricity generated by a Generating Facility that is fed back to the Utility over the applicable billing period.

"Network Distribution System (grid or spot)" means electrical service from a distribution system consisting of two or more primary circuits from one or more substations or transmission supply points arranged such that they collectively feed secondary circuits serving one (a spot network) or more (a grid network) Utility customers.

"Parallel Operation" or "Operate in Parallel" means the synchronous operation of a Generating Facility while interconnected with the Utility's Electric System.

"Point of Common Coupling" or "PCC" means the point where the Generating Facility's local electric power system connects to the Utility's Electric System, such as the electric power revenue meter or at the location of the equipment designated to interrupt, separate or disconnect the connection between the Generating Facility and the Utility.

"Utility" means Public Utility District No. 1 of Chelan County that owns and operates the electrical distribution system, or the electrical distribution system itself, onto which the Applicant seeks to interconnect a Generating Facility.

## Chapter 4 Technical standards for Interconnection.

The technical standards listed in this section shall apply to all Generating Facilities to be interconnected to the Utility.

### (1) General Interconnection requirements.

(a) Any Generating Facility desiring to interconnect with the Utility's Electric System or modify an existing Interconnection must meet all minimum technical specifications applicable, in their most current approved version, as set forth in this chapter.

(b) The specifications and requirements in this section are intended to mitigate possible adverse impacts caused by the Generating Facility on Utility equipment and personnel and on other customers of the Utility. They are not intended to address protection of the Generating Facility itself, Generating Facility personnel, or its internal load. It is the responsibility of the Generating Facility to comply with the requirements of all appropriate standards, codes, statutes and authorities to protect its own facilities, personnel, and loads.

(c) The specifications and requirements in this section shall apply generally to the non- Utility-owned electric generation equipment to which this standard and Agreement(s) apply throughout the period encompassing the Generator's installation, testing and commissioning, operation, maintenance, decommissioning and removal of said equipment. The Utility may verify compliance at any time, with reasonable notice.

(d) The Generator shall comply with the requirements in subsections (d)(i), (d)(ii) and (d)(iii). However, at its sole discretion, the Utility may approve alternatives that satisfy the intent of, and/or may excuse compliance with, any specific elements of these requirements.

(i) Code and Standards. Applicant shall conform to all applicable codes and standards for safe and reliable operation. Among these are the National Electric Code (NEC), National Electric Safety Code (NESC), the Institute of Electrical and Electronics Engineers (IEEE), American National Standards Institute (ANSI), and Underwriters Laboratories (UL) standards, and local, state and federal building codes. The Generator shall be responsible to obtain all applicable permit(s) for the equipment installations on its property.

(ii) Safety. All safety and operating procedures for joint use equipment shall be in compliance with the Occupational Safety and Health Administration (OSHA) Standard 29, CFR 1910.269, the NEC, Washington Administrative Code (WAC) rules, the Washington Industrial Safety and Health Administration (WISHLA) Standard, and equipment manufacturer's safety and operating manuals.

(iii) Power Quality. Installations will be in compliance with all applicable standards including IEEE Standard 519-1992 Harmonic Limits.

### (2) Specific Interconnection requirements.

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(a) Applicant shall furnish and install on Applicant's side of the meter, a UL-approved safety disconnect switch which shall be capable of fully disconnecting the Applicant's Generating Facility from the Utility's Electric System. The disconnect switch shall be located adjacent to Utility meters and shall be of the visible break type in a metal enclosure which can be secured by a padlock. The disconnect switch shall be accessible to Utility personnel at all times.

(b) The requirement in subsection (2)(a) above may be waived by the Utility if: (i) Applicant provides Interconnection equipment that Applicant can demonstrate, to the satisfaction of the Utility, performs physical disconnection of the generating equipment supply internally; and (ii) Applicant agrees that its service may be disconnected entirely if generating equipment must be physically disconnected for any reason.

(c) The Utility shall have the right to disconnect the Generating Facility at the disconnect switch under the following circumstances: when necessary to maintain safe electrical operating conditions; if the Generating Facility does not meet required standards; if the Generating Facility at any time adversely affects or endangers any person, the property of any person, the Utility's operation of its Electric System or the quality of the Utility's service to other customers; or failure of the owner of record, as filed with the Utility, to notify the Utility of a sale or transfer of the Generator, interconnecting facilities or the premises on which the Generator is located.

(d) Nominal voltage and phase configuration of Applicant's Generating Facility must be compatible to the Utility system at the Point of Common Coupling.

(e) Applicant must provide evidence that its generation will never result in reverse current flow through the Utility's network protectors. All instances of Interconnection to secondary spot distribution networks shall require review and written pre-approval by the Utility. Interconnection to distribution secondary grid networks is not allowed. Closed transition transfer switches are not allowed in secondary Network Distribution Systems.

(3) Specifications applicable to all inverter-based Interconnections. Any inverter-based Generating Facility desiring to interconnect with the Utility's Electric System or modify an existing Interconnection must meet the technical specifications, in their most current approved version, as set forth below.

(a) IEEE Standard 1547-2003, Standard for Interconnecting Distributed Resources with Electric Power Systems.

(b) UL Standard 1741, Inverters, Converters, and Controllers for Use in Independent Power Systems. Equipment must be UL listed.

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- (c) IEEE Standard 929-2000, IEEE Recommended Practice for Utility Interface of Photovoltaic (PV) Systems.
- (4) Requirements applicable to all non-inverter-based Interconnections. Non-inverter based Interconnection requests may require more detailed review, testing, and approval by the Utility, at Applicant cost, of the equipment proposed to be installed to ensure compliance with applicable technical specifications, in their most current approved version, including:
  - (a) IEEE Standard 1547-2003, Standard for Interconnecting Distributed Resources with Electric Power Systems.
  - (b) ANSI Standard C37.90, IEEE Standard for Relays and Relay Systems Associated with Electric Power Apparatus.
  - (c) Applicants proposing such Interconnection may also be required to submit a power factor mitigation plan for Utility review and approval.

**Chapter 5 Application for Interconnection**

- (1) When an Applicant requests Interconnection from the Utility, the Applicant shall be responsible for conforming to the rules and regulations that are in effect and on file with the commission. The Utility will designate a point of contact and provide a telephone number or website address for this purpose. The Applicant seeking to interconnect a Generating Facility under these rules must fill out and submit a signed Application form. Information must be accurate, complete, and approved by the Utility prior to installing the Generating Facility.
- (2) Application Fees. The Utility requires a non-refundable Interconnection Application fee of \$100.
- (3) Application Prioritization. All generation Interconnection requests pursuant to this chapter will be prioritized by the Utility in the same manner as any new load requests. Preference will not be given to either request type. The Utility will process the Application and provide Interconnection in a time frame consistent with the average of other service connections.
- (4) Application evaluation. All generation Interconnection requests pursuant to this chapter will be reviewed by the Utility for compliance with these rules. If the Utility in its sole discretion finds that the Application does not comply with this chapter, the Utility may reject the Application. If the Utility rejects the Application it shall provide the Applicant with written notification stating its reasons for rejecting the Application.

**Chapter 6 General terms and conditions of Interconnection.**

The general terms and conditions listed in this section shall apply to all generating facilities interconnecting to the Utility.

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- (1) Any electrical Generating Facility with a maximum electrical generating capacity of 25 kW or less must comply with these rules to be eligible to interconnect and operate in parallel with the Utility's Electric System. The rules under this chapter shall apply to all interconnecting generating facilities that are intended to operate in parallel with the Utility's Electric System irrespective of whether the Applicant intends to generate energy to serve all or a part of the Applicant's load; or to sell the output to the Utility or any third party purchaser.
- (2) In order to ensure system safety and reliability of interconnected operations, all interconnected generating facilities shall be constructed and operated by Generator in accordance with this chapter and all other applicable federal, state, and local laws and regulations.
- (3) Prior to Initial Operation, all Generators must submit a completed Certificate of Completion to the Utility; execute the appropriate Interconnection Agreement contained in Attachment C, and any other Agreement(s) required by these rules for the disposition of the Generating Facility's electric power output. The Interconnection Agreement between the Utility and Generator outlines the Interconnection standards, cost allocation and billing Agreements, and on-going maintenance and operation requirements.
- (4) Applicant or Generator shall promptly furnish the Utility with copies of such plans, specifications, records, and other information relating to the Generating Facility or the ownership, operation, use, or maintenance of the Generating Facility, as may be reasonably requested by the Utility from time to time.
- (5) For the purposes of public and working personnel safety, any non-approved generation Interconnections discovered will be immediately disconnected from the Utility system.
- (6) To ensure reliable service to all Utility customers and to minimize possible problems for other customers, the Utility will review the need for a dedicated-to-single-customer distribution transformer. Interconnecting generating facilities under 25 kW may require a separate transformer. If the Utility requires a dedicated distribution transformer, the Applicant or Generator shall pay for all costs of the new transformer and related facilities.
- (7) Metering
  - (a) Net Metering for Solar, Wind, Hydropower and Fuel Cells as set forth in RCW 80.60: the Utility shall install, own and maintain a kilowatt-hour meter, or meters as the installation may determine, capable of registering the bi-directional flow of electricity at the Point of Common Coupling at a level of accuracy that meets all applicable standards, regulations and statutes. The meter(s) may measure such parameters as time of delivery, power factor, voltage and such other parameters as the Utility shall specify. The Applicant shall provide space for

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metering equipment. It will be the Applicant's responsibility to provide the current transformer enclosure (if required), meter socket(s) and junction box after the Applicant has submitted drawings and equipment specifications for the Utility approval. The Utility may approve other generating sources for Net Metering but is not required to do so.

(b) Production Metering: The Utility may require separate metering for production. This meter will record all generation produced and may be billed separately from any Net Metering or customer usage metering. All costs associated with the installation of production metering will be paid by the Applicant.

(8) Common labeling furnished or approved by the Utility and in accordance with NEC requirements must be posted on meter base, disconnects, and transformers informing working personnel that generation is operating at or is located on the premises.

(9) As currently set forth for qualifying generation under RCW 80.60, for solar, wind, hydro or fuel cells no additional insurance will be necessary. For other generating facilities permitted under these standards and rules but not contained within RCW 80.60, additional insurance, limitations of liability and indemnification may be required by the Utility.

(10) Prior to any future modification or expansion of the Generating Facility, the Generator will obtain Utility review and approval. The Utility reserves the right to require the Generator, at the Generator's expense, to provide corrections or additions to existing electrical devices in the event of modification of government or industry regulations and standards.

(11) For the overall safety and protection of the Utility system, RCW 80.60 currently limits Interconnection of generation for Net Metering to 0.1% of the Utility's peak demand during 1996. Additionally, Interconnection of generating facilities to individual distribution feeders will be limited to 10% of the feeder's peak capacity. However, the Utility may, in its sole discretion, allow additional generation Interconnection beyond these stated limits.

(12) It is the responsibility of the Generator to protect its facilities, loads and equipment and comply with the requirements of all appropriate standards, codes, statutes and authorities.

(13) Charges by the Utility to the Applicant or Generator in addition to the Application fee, if any, will be cost-based and applied as appropriate. Such costs may include, but are not limited to, transformers, production meters, and Utility testing, qualification, and approval of non UL 1741 listed equipment. The Generator shall be responsible for any costs associated with any future upgrade or modification to its interconnected system required by modifications in the Utility's Electric System.

(14) This chapter governs the terms and conditions under which the Applicant's Generating Facility will interconnect with, and operate in parallel with, the Utility's

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Electric System. This chapter does not govern the settlement, purchase or delivery of any power generated by Applicant's Generating Facility. The purchase or delivery of power, including Net Metering of electricity pursuant to Chapter 80.60. RCW, and other services that the Applicant may require will be covered by separate Agreement or pursuant to the terms, conditions and rates as may be from time to time approved by the commission. Any such Agreement shall be complete prior to Initial Operation and filed with the Utility.

(15) Generator may disconnect the Generating Facility at any time; provided, that the Generator provide reasonable advance notice to the Utility.

(16) Generator shall notify the Utility prior to the sale or transfer of the Generating Facility, the Interconnection facilities or the premises upon which the facilities are located. The Applicant or Generator shall not assign its rights or obligations under any Agreement entered into pursuant to these rules without the prior written consent of the Utility, which consent shall not be unreasonably withheld.

**Chapter 7 Certificate of Completion.** All generating facilities must obtain an electrical permit and pass electrical inspection before they can be connected or operated in parallel with the Utility's Electric System. Generator shall provide written certification to the Utility that the Generating Facility has been installed and inspected in compliance with the local building and/or electrical codes.

**Chapter 8 Required filings – Exceptions.**

(1) The Utility shall maintain on file for inspection at its place of business, the charges, terms and conditions for Interconnections pursuant to these rules. Such filing includes forms of the following documents and contracts:

- (a) Application for Interconnection
- (b) Certificate of Completion
- (c) Power Purchase and Interconnection Agreements

(2) The Utility may grant such exceptions to these rules as may be appropriate in individual cases.