

318 Ninth Street, PO Box 458, Worthington, MN 56187-0458

Electric Service Rules and Policies

FOREWORD

This handbook has been prepared by Worthington Public Utilities (WPU) as a reference and guide to its regulations, practices and general requirements for the connection of electric service facilities and utilization of equipment. It is provided for use by customers, contractors, consultants and other persons engaged in the planning or construction of buildings and the installation or replacement of equipment connected to and served by the WPU electric distribution system. The requirements stated or implied herein are subject to change at any time without prior notice. By release of this handbook, **Version 1.2017**, we hope to increase the quality and standardization of electric service provided by Worthington Public Utilities. We value any comments and/or corrections you may have pertaining to this handbook. Please direct any comments or questions to Worthington Public Utilities' business office at 507-372-8680.

WPU wishes to serve its Customers promptly and satisfactorily. We will endeavor to cooperate with Customers and their designated representatives to the fullest extent in completing service connections with as little delay and inconvenience as possible. WPU will gladly give special attention to any particularly difficult situation confronting a Customer.

This is not intended to be a comprehensive manual for all wiring details and other lawful requirements. It is, rather, prepared as a guide and supplement to the National Electric Code, the National Electrical Safety Code and any other rules, regulations or ordinances imposed by other authorities having jurisdiction.

The publication of these Electric Service Rules and Policies shall not be construed as relieving the Customer, or his or her contractor, from the responsibility of the proper installation of wiring in accordance with the rules and regulations of any authority having jurisdiction. WPU shall not be deemed under any circumstances to have accepted any responsibility for the condition of the Customer's wiring and equipment.

DECLARATION OF LIMITATIONS

Where WPU determines it is in the best interest of public safety, the Customer, or the efficient operation of the electric systems, WPU hereby reserves the right to make certain determinations that may be contrary to these Electric Service Rules and Policies.

Nothing in these Electric Service Rules and Policies shall be construed to undermine reasonable engineering principles and practices.

LIST OF SECTIONS BY SUBJECT

Page Number

SECTION 1: DEFINITIONS	1
SECTION 2: LIABILITY	3
SECTION 3: ACCEPTANCE OF SERVICE RULES	3
SECTION 4: DEMAND RESPONSE PROGRAM	3
SECTION 5: ACCESS TO ELECTRIC UTILITY FACILITIES	3
SECTION 6: APPLICATION FOR SERVICE	4
SECTION 7: AUXILIARY POWER SUPPLY	5
SECTION 8: BALANCING LOADS	5
SECTION 9: CHARACTER OF SERVICE	6
SECTION 10: COGENERATION EQUIPMENT	7
SECTION 11: ELECTRIC SERVICE OVER 200 AMPS	7
SECTION 12: GENERAL DESIGN GUIDELINES (Commercial & Industrial)	8
SECTION 13: CONSTRUCTION PROCEDURES	8
SECTION 14: CUSTOMER EQUIPMENT	10
SECTION 15: DAMAGE TO WPU-OWNED FACILITIES	10
SECTION 16: EASEMENTS	10
SECTION 17: ELECTRIC UTILITY FACILITY INSTALLATION	11
SECTION 18: FAULT CURRENTS	11
SECTION 19: GOPHER STATE ONE CALL	12
SECTION 20: INTERRUPTION AND TERMINATION OF SERVICE	13
SECTION 21: LOCATION OF PAD-MOUNTED TRANSFORMERS	13
SECTION 22: METERING	16
SECTION 23: ELECTRIC MOTOR INSTALLATIONS	20
SECTION 24: PLANS AND DRAWINGS	20
SECTION 25: POWER FACTOR	21
SECTION 26: PROTECTION OF CUSTOMER-OWNED EQUIPMENT	21
SECTION 27: RATES AND FACILITIES INSTALLATION CHARGES (FIC)	21
SECTION 28: ELECTRIC SERVICE 200 AMPS AND LESS	22
SECTION 29: SPECIAL EQUIPMENT	23
SECTION 30: STREET AND SECURITY LIGHTING	23
SECTION 31: TEMPORARY SERVICE	23
SECTION 32: TREE TRIMMING	24
SECTION 33: WIRING CERTIFICATION	24
APPENDIX A	26
SUMMARY OF WPU AND CUSTOMER RESPONSIBILITIES	26
APPENDIX B	30
NON-DISTRIBUTED GENERATION INTERCONNECTION GUIDELINES	30
APPENDIX C	34
RESOLUTION	34
APPENDIX D	36
STANDARD FOR TRANSFORMER PADS FOR TRANSFORMERS 75 TO 500 KVA.....	36

SECTION 1: DEFINITIONS

Application For Service:	The agreement or contract between WPU and the Customer under which electric service is provided.
Accessible:	Admitting close approach, not guarded by locked doors, elevation or other effective means.
Customer:	Any entity taking delivery of electrical energy from Worthington Public Utilities (WPU) by means of connection to its electric distribution system.
Customer's Service Equipment:	The necessary equipment and accessories located near the point of delivery at a Customer location which constitute the main control and means of disconnecting the supply to that location. This equipment usually consists of a circuit breaker or a switch and fuses.
DRU – Demand Response Unit	The necessary equipment allowing WPU to control load during peak usage times. Equipment consists of a 7” x 8” gray plastic box located on the outside of the home close to the air conditioning unit.
Electrical Contractor:	Any person, firm or corporation engaged in the business of installing, maintaining or altering, by contract or otherwise, electrical equipment for the use of electric energy supplied for light, heat or power in any building or structure which is, or will be, connected to WPU’s electric distribution system.
Electrical Distribution System:	The system, in whole or in part, over which electrical energy is supplied by WPU to its Customers.
Electric Superintendent:	The person with supervisory responsibility for the construction, operation, and maintenance of the electric distribution system.
Facilities:	The conductors, transformers, pedestals, switching cabinets, meters and other associated equipment that comprise the Electric Distribution System.
Facilities Installation Charge (FIC)	The charge made to the Customer by WPU for the cost of the installation of the on-site electric distribution system. (e.g. service wire, primary cable, conduit, meter socket, meter)
Meter Socket and Trough:	The mounting device consisting of jaws, connectors, and enclosure for socket-type meters. The mounting device may be either a single socket or a trough. The socket may have a cast or drawn enclosure. The trough and assembled enclosure may be extended to accommodate more than one mounting unit. This equipment is owned and maintained by WPU.
National Electric Code (N.E.C.)	The latest revision of the National Electric Code of the National Board of Fire Underwriters as approved by the American National Standards Institute.
National Electrical Safety Code (N.E.S.C.)	The latest revision of the National Electrical Safety Code as approved by the Institute of Electrical and Electronics, Inc. and approved by the American National Standards Institute.

Nominal Voltage:	A specific voltage value assigned to a circuit or system for the purpose of convenient designation.
Point of Delivery:	The point where electric energy leaves that part of the electric distribution system owned by Worthington Public Utilities and enters that portion of the electric distribution system owned by the Customer. This is not necessarily the location of WPU's meter.
Power Factor:	The relationship (ratio) between the active power and the volt Amperes in any particular alternating current circuit.
Primary Voltage:	The voltage on the supply side of a transformer.
Secondary Voltage:	The voltage on the load side of a transformer.
Service Entrance:	That point at which the Customer's service equipment connects to WPU's facilities.
Service Location:	The point of attachment of the underground service cables to the Customer's building.
Structure:	An object which is constructed or erected requiring permanent location on land.
Temporary Service:	The installation of a service of a temporary nature, usually for construction purposes, for a period of time not to exceed one (1) year from the date on which the temporary service is installed.
Utilization Equipment:	Any Customer owned equipment, apparatus, appliance or device located on a Customer's premises or used by a Customer.
WPU:	Worthington Public Utilities (WPU).

SECTION 2: LIABILITY

2.1 WPU is not responsible for and will not install, maintain or otherwise service the electrical distribution system beyond the point of delivery except for WPU-owned equipment. WPU shall not be liable to any Customer or to any third party for damage resulting from the Customer’s use of the service or from the presence of WPU-owned equipment on the Customer's premises.

2.2 The Customer is solely responsible for any accidents, fires or failures resulting from the condition and use of the electric distribution system beyond the point of delivery.

SECTION 3: ACCEPTANCE OF SERVICE RULES

3.1 Any person making Application for Service, accepting, or using WPU electrical service by connecting to WPU’s electrical distribution system thereby agrees to conform to and abide by all applicable federal, state and local rules and regulations for the operation of the electrical distribution system.

SECTION 4: DEMAND RESPONSE PROGRAM

4.1 As a condition of receiving electric service, customers shall be automatically enrolled in Worthington Public Utilities (WPU) demand response program. Through the program, non-essential loads hooked to the electric system may be controlled during periods of peak electrical demand. Load selected for control shall be at the discretion of WPU. All costs associated with the installation of demand response equipment shall be borne by WPU.

Customers may opt out of the program by completing the appropriate form at the WPU office. Residential customers with central air conditioning units opting out of the program will incur a “DR Opt Out” charge on their July, August and September utility bills. The charge will be equal to the total of:

$$\begin{aligned} & \text{MRES Summer Demand Charge per kW x 1 kW} \\ & \qquad \qquad \qquad + \\ & \text{Split Rock Transmission Charge per kW x 1 kW} \end{aligned}$$

SECTION 5: ACCESS TO ELECTRIC UTILITY FACILITIES

5.1 Any properly authorized agent of WPU shall have free access to the Customer’s premises at all reasonable hours for the purpose of reading, examining, inspecting, repairing, replacing or removing any element of the electric distribution system owned by WPU.

5.2 No Customer shall build or install any structure such as a deck, porch, patio or addition over or around WPU-owned facilities or otherwise block access to existing WPU-owned distribution system equipment.

5.2.A WPU may relocate WPU-owned distribution system facilities to accommodate a Customer's needs where:

- (i) The Customer makes a written request for the relocation of WPU facilities and agrees to pay all costs associated with such relocation.
- (ii) WPU determines that the requested relocation is technically feasible.

5.2.B Any Customer blocking access to WPU-owned facilities shall be given written notice of such violations and shall be given a specified period of time within which to provide for appropriate corrective action acceptable to WPU.

5.2.C Any violation of this section not corrected within the specified time shall be corrected by WPU and the Customer shall be billed for all costs associated with such corrective action.

5.3 To effect the safe operation of the electric distribution system, WPU hereby reserves the right to remove any trees, bushes, fences or other obstructions located on a Customer's property which block access to WPU-owned facilities.

SECTION 6: APPLICATION FOR SERVICE

6.1 Application for a new, additional, temporary or rehabilitated electric service shall be made to the WPU's business office located at 318 Ninth Street, Worthington, Minnesota.

6.2 All such applications shall contain:

6.2.A A description of the service requirements including the electrical load data and the expected magnitudes of connected and peak load. Additional data in the form of construction drawings and proposed service entrance may also be necessary for WPU to adequately determine the arrangement of service to the Customer.

6.2.B Exact location of premises to be served, including the street address.

6.2.C The approximate date that electric service is required.

6.2.D The name, address and telephone number of the Customer's designated representative who will be responsible for working with WPU's representatives in providing the electric service (e.g. Customer employee, engineer, contractor).

- 6.2.E The name, address and telephone number of the party who will be responsible for costs and usage charges.
- 6.3 WPU must be advised of planned installations as soon as possible so that construction may be completed by the desired date. Some three-phase transformers require as much as a 24-week lead-time.
- 6.4 The applicant agrees to purchase from WPU and pay monthly to WPU for electrical energy or the demand and energy used on the premises described, owned or operated by the applicant in accordance with the rate schedule and rules and regulations established by WPU.
- 6.5 The applicant grants to WPU the right and easement on the premises to construct, operate, repair and maintain electrical distribution material, equipment and service line. The applicant also grants the right to cut and trim trees necessary to keep them clear of all parts of the electrical system.
- 6.6 The applicant agrees to comply with all laws of the State of Minnesota regulating the installation and maintenance of electric wiring and such rules and regulations as may be adopted by the State Board of Electricity. The applicant will comply with, and be bound by, such rules and regulations as may be adopted by WPU.

SECTION 7: AUXILIARY POWER SUPPLY

7.1 Where the Customer provides for an auxiliary power supply, an adequately sized "double-throw disconnecting device" must be provided to open all ungrounded conductors from the normal supply before connection is made to the emergency supply in accordance with the requirements of the latest edition of the National Electric Code.

7.2 Customer auxiliary power supply equipment may be allowed to be "soft loaded" onto and off of the WPU electrical grid with the approval of WPU.

SECTION 8: BALANCING LOADS

8.1 All separate electric loads within a service shall be balanced.

8.2 Where three-phase services are provided, single-phase loads shall be evenly divided between each of the three phases as the voltage permits.

8.3 Where single-phase services are provided, the load shall be evenly divided between the energized conductors.

SECTION 9: CHARACTER OF SERVICE

9.1 Normal Service

9.1.A Service supplied by WPU shall be alternating current at a nominal voltage and at a frequency of 60 HZ.

9.1.B WPU hereby disclaims any liability and does not guarantee to maintain the accuracy of the nominal values under all conditions.

9.2 Standard Classes of Service

9.2.A All Customers shall call WPU before designing electrical service. Not all voltage characteristics are available in all service areas.

9.2.B WPU will provide the following secondary service where the specified voltages are available either from existing facilities or from facilities planned for the requested location.

(i) **Classes of Service**

<u>Phases</u>	<u>Wires</u>	<u>Voltage</u>	<u>Use</u>
1	3	120/240	Lighting and Appliances
1	3	120/208	Lighting and Appliances
3	4	208/120	Light and Power
3	4	480/277	Light and Power

(ii) There are areas within WPU’s service area where nonstandard secondary voltages exist.

9.2.C Three-phase service shall not be provided for loads with an expected peak demand of less than 50 kW.

9.2.D WPU shall not provide 120/208 volt service to any Customer with a service entrance exceeding 2,500 amps.

9.2.E Customers are advised that since the class of service available depends on existing and planned facilities, they should obtain specific characteristics of available service before proceeding with the purchase and installation of any equipment.

9.2.F Information concerning the specific classes of service available may be obtained from WPU.

SECTION 10: COGENERATION EQUIPMENT

10.1 The use of any cogeneration equipment requires a separate written agreement between the Customer and WPU.

10.2 Information concerning the operation of cogeneration facilities is available from WPU's business office.

10.3 See Non-Distributed Generation Interconnection Guidelines (APPENDIX B).

SECTION 11: ELECTRIC SERVICE OVER 200 AMPS

11.1 The Customer shall consult with WPU before selecting any service location.

11.2 The Customer and the applicant for service, if different than Customer, shall be jointly and severally responsible for the payment of the Facilities Installation Charge (FIC), which includes the cost of the construction and installation of the on-site electric primary distribution system.

11.3 Where WPU-owned facilities need to be relocated or upgraded due to any development, re-development, rehabilitation, addition, site modification, increase in load or Customer request, the costs shall be fully reimbursed at the sole expense of the requesting party.

11.4 WPU-Owned Equipment

11.4.A WPU shall furnish and own the transformer or the secondary pedestal, all primary cable and all associated equipment. All primary cable and associated equipment furnished or installed by WPU is the property of WPU (subject to FIC).

11.4.B The meter and associated metering equipment furnished by WPU is the property of WPU. WPU shall furnish and own the meter and current transformers.

11.5 Customer-Owned Equipment

11.5.A The Customer or property owner shall install, maintain and replace as necessary the entrance conduit, entrance wire and the WPU-furnished metering equipment in accordance with the N.E.C. standards for all services over 200 amps.

11.5.B On **services over 1800 amp**, the Customer or property owner shall install a secondary connection pedestal in which the Customer will be responsible for the final

connections. The secondary connection pedestal will also be used as a metering point with the meter mounted on the outside of a cabinet.

11.5.C The Customer or property owner shall be solely responsible for the ownership, installation, maintenance and replacement of all components of the electric distribution system located beyond the Point of Delivery.

11.5.D The Customer or property owner shall install concrete-filled, eight inch (8") steel posts to protect the service transformer and the metering installation where WPU determines that it is required for safety. Upon the Customer's or property owner's written request, WPU may approve other forms of protection.

11.5.E Where applicable, the Customer shall provide the necessary equipment for mounting current transformers (see Section 21).

11.6 All meters shall be located outside of the structure unless prior written authorization approving inside installation is obtained from WPU.

11.7 Meters shall be installed so that the center of the meter is between forty inches (40") and sixty-six inches (66") above the final grade.

11.8 Meters shall be located so that there will be no obstructions for meter reading, meter testing or other maintenance.

SECTION 12: GENERAL DESIGN GUIDELINES (Commercial & Industrial)

12.1 WPU shall provide only one electric service connection to any structure.

12.2 WPU shall provide only one standard class of service to any structure.

12.3 Except as otherwise provided, all new electrical metering and switchgear installations shall be located in one location as close to the transformer as WPU determines to be reasonable.

SECTION 13: CONSTRUCTION PROCEDURES

13.1 The owner, subdivider, builder or developer shall provide WPU with a construction schedule so the electric distribution system can be installed in an orderly and timely manner.

13.2 The ground in which electric service will be located shall be brought to within four inches (4") of final grade and all other underground utilities to be located beneath the electric service shall be installed prior to the installation of the electric distribution system.

13.3 The owner, subdivider, builder or developer shall provide WPU with a clear, unobstructed path across the property as required for the installation of the on-site electric distribution system.

13.4 Prior to the actual construction, the developer or Customer shall provide:

13.4.A Final grades (where electric service will be installed)

13.4.B Staking for all lots located in the subdivision or development

13.4.C Requested easements

13.4.D Payment of the Facility Installation Charge (when required)

Attention: Failure to complete any of the above items may result in construction delays.

13.5 The owner, subdivider, builder or developer shall be responsible for the cost of moving or rebuilding any facilities as a result of their errors, omissions or changes.

13.6 The owner, subdivider, builder or developer shall coordinate the installation of streets so that WPU can install street crossing conduits before the road base is constructed.

13.6.A The owner, subdivider, builder or developer shall provide WPU with no less than thirty (30) days notice to make the necessary street crossing installation(s).

13.6.B Where the owner, subdivider, builder or developer fail to coordinate such street installations with WPU, they shall be jointly and severally responsible for additional costs incurred by WPU as a result of boring, tunneling, street repairs, etc.

13.7 When, in the sole judgment of WPU, difficult installation conditions exist, such as frost, rock, ledge, etc., WPU shall not be bound by any construction schedule which may have been stated, written or otherwise implied. Such installations may also be subject to additional charges as determined by WPU.

13.8 Prior to the start of construction, the owner, subdivider, builder, or developer shall arrange for a site inspection with WPU and any communications access provider (*i.e. telephone and C.A.T.V.*) to determine the suitability of the site. Suitability will be at the sole discretion of WPU.

13.9 The owner, subdivider, builder or developer shall be solely responsible for any additional costs incurred by WPU to remobilize WPU's construction crew if such work is stopped because WPU determines that a portion of the site is not suitable for construction of the electric distribution system.

13.10 WPU shall schedule its work after all necessary easements are granted and the project site is ready as determined by WPU.

SECTION 14: CUSTOMER EQUIPMENT

14.1 The Customer is responsible for selecting and installing motors, apparatus and devices which are suitable for operation with the character of the service available and supplied by WPU.

14.2 WPU hereby reserves the right and authority to gain access to inspect and test any Customer-owned equipment that is connected to WPU's system.

14.3 WPU shall be the sole authority in determining whether any Customer-owned equipment connected to WPU's system is causing a deleterious effect on the quality of service provided by WPU to its Customers.

14.4 WPU hereby reserves the right and authority to require the Customer to install, at Customer's sole expense, any equipment which WPU determines is required to prevent any deleterious effects on the quality of service provided by WPU to its Customers.

SECTION 15: DAMAGE TO WPU-OWNED FACILITIES

15.1 Any person working in the vicinity of WPU-owned electric facilities shall be solely responsible to take whatever precautions are necessary to avoid damaging such facilities.

15.2 Any person causing damage to WPU's equipment or facilities shall be responsible to reimburse WPU for any costs incurred to repair such damage.

15.3 Any person causing damage to WPU's primary system shall be responsible for all costs associated with temporary repairs made to restore service and for all costs related to replacement of the primary circuit from the nearest termination point to termination point. Due to the demand for the highest possible power quality, WPU will not allow permanent splices on the primary system.

SECTION 16: EASEMENTS

16.1 As required, property owners shall dedicate by plat or grant by written agreement, public utility easements to the City of Worthington for WPU's use in the construction, maintenance and replacement of the electric distribution system.

16.2 All required easements shall be dedicated or granted without cost to the City of Worthington or WPU. This shall include any additional or relocated easements, which may be required by WPU due to circumstances or conditions unforeseen prior to the beginning of construction.

16.3 Standard easements shall customarily follow property lines. If such customary easement location is not possible due to field conditions (hills, slopes, obstructions, etc.), required

easements shall be located in the nearest suitable area that will insure the safety of the individuals and equipment involved in the constructing, installing or relocating of WPU facilities.

16.4 Easements shall be shown and recorded on the subdivision plat.

16.5 The only time a request to vacate an easement will be considered is:

16.5.A When the easement in question has no utilities located upon it and no foreseeable need to maintain the easement can be established.

16.5.B The requesting party agrees to pay all associated costs in relocating all established utilities and provide a feasible alternate easement.

16.5.C The final decision on whether or not to vacate an existing easement rests with the Water and Light Commission and the City Council.

16.6 The only time a subterranean easement will be granted is when it is deemed feasible to replace utilities by means of directional boring. This would require sufficient space to operate a directional boring machine on the easement. Subterranean status will only be granted to that portion of the easement that is occupied by a permanent structure. N.E.S.C. has some restrictions on subterranean easements.

SECTION 17: ELECTRIC UTILITY FACILITY INSTALLATION

17.1 All permanent electrical facilities shall be installed underground.

17.2 All new distribution facilities shall be installed so that they are capable of being looped.

17.3 WPU hereby reserves the right to install temporary or emergency facilities in the most economical manner using accepted engineering principles and practices.

17.4 To preserve easements and right of ways, WPU encourages joint trench with communication facilities in as much as feasible. WPU will work with all communication providers in planning and installation of facilities. WPU shall have a FIC for trenching, handling and other labor involved in joint trenching.

17.5 To comply with N.E.S.C. rule 350.F, all above ground metallic power and communications apparatus (pedestals, terminals, apparatus cases, transformer and switch cabinets cases, etc.) shall be separated by a distance of 6 feet or more.

SECTION 18: FAULT CURRENTS

18.1 The Customer's service equipment and other devices shall be adequate to withstand and interrupt the maximum available fault current. There are locations within WPU's service area

that may have a fault current exceeding 10,000 amps, including some single-family residences. Customer should contact WPU to determine maximum existing and future anticipated fault currents.

SECTION 19: GOPHER STATE ONE CALL

19.1 In accordance with State Statute, WPU is connected to the Minnesota Gopher State One Call System.

19.2 All requests for locating underground facilities should be made at least 48 hours in advance of the excavation. The excavation notice may be made by calling the Gopher State One Call at 1-800-252-1166 or 811. Locates may also be submitted on line at www.gopherstateonecall.org. You will be asked to provide the following information:

- 19.2.A Name of the individual calling.
- 19.2.B Precise location of the proposed excavation.
- 19.2.C Name, address and telephone number of the excavator.
- 19.2.D Excavator's field telephone number.
- 19.2.E Type and extent of proposed excavation.
- 19.2.F Any anticipated use of explosives.
- 19.2.G Date and time when excavation is to commence.

19.3 An excavation is defined as any activity that disturbs the soil by use of machine-powered equipment or explosives. Excavation does NOT include:

- 19.3.A Installation of agricultural drainage tile.
- 19.3.B Extraction of minerals.
- 19.3.C Opening of a grave in a cemetery.
- 19.3.D Street maintenance that does not change the original grade or involve the ditch.
- 19.3.E Farm activities that disturb the soil to a depth less than 18 inches.
- 19.3.F Landscaping or gardening to a depth less than 12 inches.

19.4 Any damage to the electric distribution system occurring during excavation must be reported immediately by calling WPU at (507) 372-8680 during regular office hours or (507) 372-8690 after regular hours, weekends and holidays.

SECTION 20: INTERRUPTION AND TERMINATION OF SERVICE

20.1 Planned interruptions of service in the normal course of business will be prearranged with the Customer whenever practical.

20.2 WPU hereby reserves the right to curtail or temporarily interrupt a Customer's service when WPU determines that repairs, replacement or modification of WPU's facilities are required either on or off the Customer's premises.

20.3 WPU hereby reserves the right to interrupt the supply of service to Customers in the case of emergencies or whenever such interruption is required to comply with an order from any jurisdictional authority.

20.4 WPU hereby reserves the right to terminate electrical service or disconnect the Customer from the electric system when WPU or any jurisdictional authority determines that the Customer-owned equipment is unsafe or is causing an unsafe condition.

20.5 WPU may terminate any Customer's service for nonpayment of funds owed to WPU.

20.6 WPU may terminate any Customer's service if WPU determines the Customer has illegally diverted any source of energy or has permitted, approved of, or benefited from such a diversion.

20.7 WPU may terminate any Customer's service if WPU determines that Customer-owned equipment is causing or may cause damage to WPU's equipment or facilities, or that the Customer's continued connection to WPU's system may cause power quality problems for any other WPU Customer.

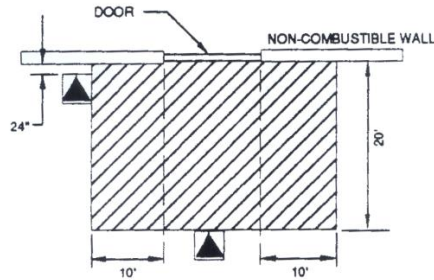
20.8 WPU shall not be liable for any loss or damage to property resulting directly or indirectly from any interruption or termination of electric service for any reason. Customers requiring service reliability and/or stability exceeding WPU's normal service should consider uninterruptible power supplies, isolation transformers, power conditioners, redundant services or other options to provide the level of service required.

SECTION 21: LOCATION OF PAD-MOUNTED TRANSFORMERS

21.1 Non-Combustible Walls (included in this class would be wood-framed brick-veneered buildings, metal-clad steel-framed buildings, asbestos-cement-board-walled metal-framed buildings and masonry buildings).

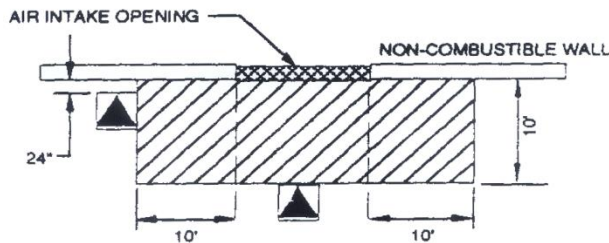
21.1.A Doors:

Pad-mounted oil insulated transformers shall not be located within a zone extending 20' outward and 10' to either side of a building door.



21.1.B Air Intake Openings:

Pad-mounted oil insulated transformers shall not be located within a zone extending 10' outward and 10' to either side of an air intake opening located at the level of the transformer. If the air intake opening is located above the transformer level, the distance from the transformer to the opening shall be a minimum of 25'. The term "level of the transformer" is to be interpreted as within 10" of the ground.



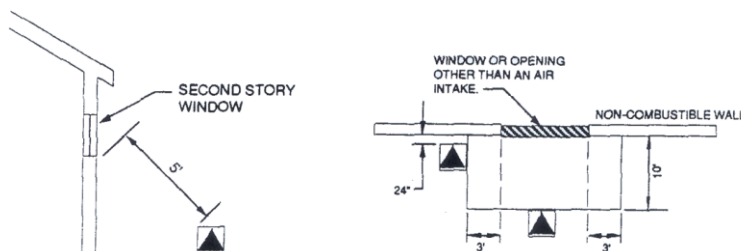
21.1.C Windows Or Openings Other Than Air Intake

First Story:

Pad-mounted oil insulated transformers shall not be located within a zone extending 10' outward and 3' to either side of a building window or opening other than an air intake.

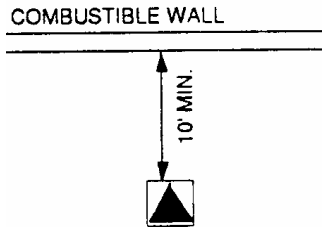
Second Story:

Pad-mounted oil insulated transformers shall not be located less than 5' from any part of a second story window or opening other than an air intake.



21.2 Combustible Walls: (Included in this class would be wood buildings and metal clad buildings with wood frame construction.)

21.2.A. Pad-mounted oil insulated transformers shall be located at a minimum of 10' from the building's wall in addition to the clearance from building doors, windows and other openings set forth for non-combustible walls. The immediate terrain adjacent to the transformer shall be sloped away from the building.



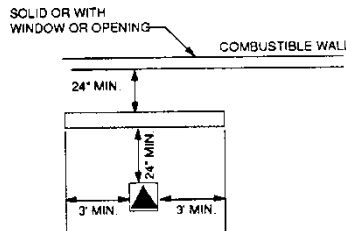
21.3 Barriers: (included in this class are reinforced concrete, brick or concrete block barrier walls.)

21.3.A If the clearance specified above cannot be obtained, a fire resistant barrier shall be constructed in lieu of the separation. The following methods of construction are acceptable:

(i) Non-Combustible Walls: The barrier shall extend to a projection line from the corner of the pad-mount to the furthest corner of the window, door or opening in question. The height of the barrier shall be 1' above the top of the pad-mounted transformer.



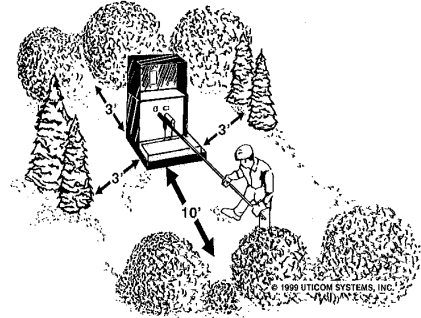
(ii) Combustible Walls: The barrier shall extend 3' beyond each side of the pad-mounted transformer. The height of the barrier shall be 3' above the top of the pad-mounted transformer. If a combustible first floor overhang exists, the 24" specified shall be measured from the edge of the overhang rather than from the building wall.



21.4 Fire Escapes: Pad-mounted oil insulated transformers shall be located such that a minimum clearance of 20' is maintained from fire escapes at all times.

21.5 Decorative combustible enclosures (fence) installed by the Customer around pad-mounted transformers adjacent to a combustible building wall shall not extend more than 24" beyond the transformer towards the combustible wall. A 10' clearance is required in front of the pad-mount transformer doors. Adequate transformer accessibility and ventilation must be provided.

21.6 Minimum clearances around pad-mounted transformers and equipment shall be 10' in front and 36" along the sides and back. Fences, shrubbery and trees may be installed by the customer provided the specified clearances are maintained, the grade is not altered and the underground cables are not endangered.



21.7 On new installations minimum clearances around metallic power equipment and communications apparatus (pedestals, terminals, apparatus cases, transformer cases, etc.) shall be a minimum of 6' as per the NESC (Sec. 35-350-F).

SECTION 22: METERING

22.1 General

22.1.A All electricity furnished by WPU shall be metered unless the Customer has entered into a written agreement with WPU to otherwise account for the Customer's use of energy.

22.1.B Responsibilities for the purchase and installation of metering and related equipment are summarized in Appendix A.

22.1.C Sub-metering of electricity by Customers for the purpose of resale is prohibited.

22.2 Meter Locations

22.2.A Meter location for new, modified or rehabilitated installations will be agreed upon by representatives of the Customer and WPU, subject to final approval by WPU.

22.2.B All meters shall be located outdoors unless special permission has been obtained from WPU.

22.2.C Meters shall be located to facilitate the setting, changing, testing and reading of the meters.

22.2.D All metering equipment shall be located in an area openly accessible to WPU and shall be grouped to minimize the number of metering points.

22.2.E The Customer shall be solely responsible at all times to maintain a clear forty-eight inch (48") work area in front of each meter location as well as a suitable approach to the meter location, as determined by WPU. If meter location is within a fenced in backyard, a gate shall be provided for access.

22.2.F The Customer or property owner shall install concrete-filled, eight inch (8") steel posts to protect the metering installation where meters are located outdoors in paved areas or in any other areas where WPU determines the metering installation is susceptible to damage.

22.3 Meter Testing

22.3.A Any Customer who believes that a meter is failing to properly register the use of electricity may request a meter test by contacting WPU. WPU will install a new meter and the removed meter shall be tested using standard calibration equipment and generally accepted test procedures within a reasonable period of time.

22.3.B Customers who request additional tests of the same meter installation within a twelve-month period may be charged for the additional tests at a fee established by WPU.

22.3.C Whenever any meter is found upon test to have an average error of more than two percent (2%) fast, WPU shall refund to the Customer the overcharge. Whenever any meter is found upon test to have an average error of more than two percent (2%) slow, WPU may charge for electricity consumed but not included in bills previously rendered. The refund or charge for both fast and slow meters shall be based on corrected meter readings for a period equal to one-half of the time elapsed since the last previous test but not to exceed six months, unless it can be established that the error was due to some cause, the date of which can be fixed with reasonable certainty, in which case the refund or charge shall be computed to that date, but in no event for a period longer than one year. (Minnesota Rules, Public Utilities Commission, Utility Customer Service, Chapter 7820.3900)

22.3.D When the average error cannot be determined by test because the meter is not found to register or is found to register intermittently, WPU may charge for an estimated amount of electricity used, which shall be calculated by averaging the amounts registered over corresponding periods in previous years or in the absence of such information, over similar periods of known accurate measurement preceding or subsequent thereto, but in no event shall such charge be for a period longer than one year. (Minnesota Rules, Public Utilities Commission, Utility Customer Service, Chapter 7820.3900)

22.3.E If the recalculated bills indicate that more than \$1 is due an existing Customer or \$2 is due a person no longer a Customer of WPU, the full amount of the

calculated difference between the amount paid and the recalculated amount shall be refunded to the Customer. The refund to an existing Customer may be in cash or as credit on a bill. Credits shall be shown separately and identified. If a refund is due a person no longer a Customer of WPU, a notice shall be mailed to the last known address and WPU, upon demand made within three months thereafter, shall refund the amount due. If the recalculated bills indicate that the amount due the utility exceeds \$10, WPU may bill the Customer for the amount due. The first billing rendered shall be separated from the regular bill and the charges explained in detail. (Minnesota Rules, Public Utilities Commission, Utility Customer Service, Chapter 7820.3900)

22.3.F If a Customer has called to WPU's attention his or her doubts as to the meter's accuracy and WPU has failed within a reasonable time to check it, there shall be no back billing for the period between the date of the Customer's notification and the date the meter was checked. (Minnesota Rules, Public Utilities Commission, Utility Customer Service, Chapter 7820.3900)

22.4 Meter and Equipment Seals

22.4.A WPU shall seal all meters and points of access to unmetered wiring on the Customer's premises.

22.4.B The Customer shall call WPU if it becomes necessary to gain access to any sealed equipment.

22.4.C No unauthorized person shall break any seal, close any by-pass switch, connect, disconnect or tamper with any of WPU's metering equipment.

22.4.D Any person(s) determined to have violated this rule shall be prosecuted to the full extent of the law and shall also be liable for the cost of all energy supplied which has not been billed due to unauthorized use, alteration or tampering with metering equipment.

22.4.E The Customer and the owner of the Customer's premises (if not the same as Customer) shall be jointly and severally liable for the costs of any such unauthorized use of energy.

22.5 Meter Installations

22.5.A General

(i) Single-phase meters up to 240 volts, 200 amperes shall be installed with through-type meter sockets that are provided by WPU (subject to FIC).

(ii) All devices designed to interrupt service or protect against vandalism shall be installed on the load side of the meter(s).

(iii) Where meter damage occurs or is anticipated, outdoor meters shall be protected by a suitable box with hasp and staple for the installation of a padlock.

(iv) Where WPU determines that a protective box is required to protect against possible vandalism or meter tampering, such a protective box shall be installed and maintained by WPU.

22.5.B Meter sockets shall be furnished by WPU, subject to a FIC, and installed by the Customer or customer may furnish a socket as long as it meets the following. All meter sockets will be "ringless" and have a manual bypass.

22.5.C The Customer shall install a WPU-furnished manual bypass meter socket for each of the following single-phase installations:

- (i) All commercial installations; and
- (ii) All residential installations rated at 200 amperes.

22.5.D After meter sockets are installed, the interior of the socket must be protected if exposed to the weather or if the terminals are energized. WPU will furnish and install cover plates for unused meter sockets at the time meters are installed on other loops.

22.5.E Multiple Meter Installations

- (i) WPU shall review and approve all multiple meter service requests prior to the installation of any equipment.
- (ii) Multiple meter bank assemblies shall be designed so that the center of the top meter is no more than sixty-six inches (66") above the floor or the ground and the center of the bottom meter is no less than forty inches (40") above the floor or the ground.
- (iii) Where two or more meters are installed at a location, provisions shall be made so that the specific address or area served by each meter is easily determined.

22.5.F No part of the metering set may be used as a junction box for the Customer's wiring.

22.6 Instrument Transformer Meter Installations

22.6.A The installation of all meters rated over 200 amperes shall include the necessary equipment for mounting current transformers.

22.6.B WPU shall furnish, own and maintain all instrument transformers required to provide electric service.

- (i) The Customer shall provide the necessary equipment for mounting bus bar type current transformers and install a one-inch (1") conduit from the meter socket to its respective exterior instrument transformer enclosure.
- (ii) The meter socket will be located on an outside building wall, between forty-four inches (44") and sixty-six inches (66") above final grade, and in such a position that there will be no obstructions to meter reading, testing or other maintenance.

SECTION 23: ELECTRIC MOTOR INSTALLATIONS

23.1 In an effort to ensure that adequate power quality is maintained on WPU's distribution system the following rules apply to all new connections of motor loads.

All installations of electrical power loads on the utilities' system shall conform to the safety rules as set forth in the National Electrical Code and other such codes or specifications as may be applicable.

23.2 Protective Devices

Customers must provide suitable protective devices for motors and equipment to prevent damage caused by improper or dangerous operation in case of overload, loss of voltage, low voltage, and single-phasing of polyphase motors, reversal of phase-rotation of polyphase motors or the re-establishment of normal service after any of the above. WPU is not responsible for motor or equipment damage caused by any of the above conditions.

23.3 Large Motor Application

All motors in excess of 5 horsepower single-phase and 25 horsepower three-phase shall be installed with soft start. WPU reserves the right to limit the number and size of motors installed on single-phase and three-phase services.

SECTION 24: PLANS AND DRAWINGS

24.1 The owner, subdivider, builder or developer shall provide to WPU complete and accurate drawings and layouts for subdivisions, planned unit developments and any other projects requiring the installation or replacement of WPU electrical facilities.

24.2 The owner, subdivider, builder or developer shall provide WPU with complete architectural drawings for any commercial project for which the City is reviewing a permit application.

24.2.A Such drawings shall include:

- (i) The requested service voltage;
- (ii) The service entrance amp rating;
- (iii) The connected load (in kW) broken down by load type;

- (iv) The electrical switchgear and metering lineup;
- (v) The one-line diagram; and
- (vi) The specifications for the HVAC equipment, etc.

SECTION 25: POWER FACTOR

25.1 In order to improve the efficiency of WPU's electric distribution system, the Customer's utilization equipment shall maintain an average power factor as close to unity as possible.

25.2 Some WPU rate schedules include a demand charge and a penalty for an average power factor that is less than the prescribed limits. For new services, it is suggested the Customer's utilization equipment be designed for operation at a high power factor or with capacitors that are switched on and off with the equipment.

25.3 WPU will calculate the power factor as necessary by installing electronic metering capable of determining power factor.

SECTION 26: PROTECTION OF CUSTOMER-OWNED EQUIPMENT

26.1 WPU does not guarantee the supply of electric service as to quantity or quality. Irregularities and interruptions may occur and WPU hereby disclaims any liability for any damages or lost business incurred by any such irregularities or interruptions.

26.2 The Customer may install circuit protection devices to protect against possible equipment damage at the Customer's sole expense and liability for the purchase, installation, use or misuse of any such devices.

SECTION 27: RATES AND FACILITIES INSTALLATION CHARGES (FIC)

27.1 Electrical rates have been established for various Customer classes.

27.2 A full description of each of the electrical service rates and FIC can be obtained at the WPU business office.

27.3 WPU assess FIC on all new primary and secondary installations that are dedicated services (serves only one customer). If the installation is part of the network (serves more than one customer or "feeds" thought to feed additional customers) a FIC is not assessed. The facility has to be located on the public right of way or on a granted utility easement. WPU typically only charges for material on new installations. In most cases the labor charges can be revenue justified and are not billed to the customer.

SECTION 28: ELECTRIC SERVICE 200 AMPS AND LESS

28.1 WPU shall construct and install all on-site electric distribution systems in new or existing subdivisions or developments.

28.1.A All such distribution systems shall be constructed in conformity with the requirements of the National Electric Safety Code, as adopted by reference in WPU's Electric Service Rules and Policies, in effect or as amended.

28.1.B All services shall be installed underground in accordance with these Rules and Policies.

28.1.C WPU shall provide only one electric service connection to each Customer location.

28.1.D WPU will provide each Customer location with electric service rated at 120/240 volts, single phase, 200 amperes, in accordance with standard service rules for new construction.

28.2 The owner, subdivider, builder, developer and/or Customer shall install, maintain and replace as necessary the entrance conduit and the metering equipment in accordance with the NEC standards.

28.2.A The entrance conduit is required to have a slip sleeve also known as an expansion joint or expansion coupling.

28.2.B Meters shall be located to maintain completely open access at all times for meter reading, meter testing or other maintenance.

28.2.C The center of any meter shall be located between forty inches (40") and sixty-six inches (66") above final grade.

28.2.D The electric meter shall be located at the side or rear of the structure, which is nearest to the point of connection with WPU's system.

- (i) The owner, subdivider, builder, developer, or contractor shall provide a straight, clear, unobstructed path across the property as required for the installation of the on-site electric distribution system.

28.3 The owner, subdivider, builder, developer, and Customer shall be jointly and severally responsible for the payment of the Facilities Installation Charge (FIC).

28.4 Where WPU-owned facilities need to be relocated or upgraded due to any development, re-development, rehabilitation, addition, site modification, increase in load or Customer request, all required work shall be performed by WPU. The associated costs incurred shall be fully reimbursed by the requesting party.

28.5 At the sole discretion of WPU, the owner, subdivider, builder, developer or Customer may be required to pay for required on-site distribution system equipment before WPU orders such equipment.

28.6 The ground in which electric service will be located shall be brought to within four inches (4") of final grade and all other underground utilities to be located beneath the electric service shall be installed prior to the installation of the electric distribution system.

28.7 Where WPU determines it is necessary to relocate an existing electric meter due to meter failure or alterations or additions to an existing dwelling unit, the meter shall be located in conformity to these Service Rules and Policies and the relocation shall be at the expense of the Customer.

SECTION 29: SPECIAL EQUIPMENT

29.1 Where the Customer's service demands include the use of electrical service to operate equipment or devices which create a high demand on the operation of WPU facilities for a relatively short period of time, WPU may determine that the installation of special equipment may be required to maintain satisfactory service. In all such cases, the Customer shall reimburse WPU for costs incurred to purchase special equipment or facilities.

SECTION 30: STREET AND SECURITY LIGHTING

30.1 WPU designs, maintains and upgrades the street lighting systems on all City streets.

30.2 WPU does not install or maintain security, parking lot or alleyway lighting for Customers.

30.3 WPU recognizes the problems of light pollution and light trespass. All new lighting installations will be designed and built with this in mind. Installations will attempt to comply in as much as reasonably possible to International Dark Sky's recommendations.

30.4 All new and replacement street light fixtures will be light-emitting diode (LED) type.

SECTION 31: TEMPORARY SERVICE

31.1 WPU will provide temporary service to any Customer where such service may be provided from WPU's existing electric distribution system. Where a Customer applies for routine temporary service, the Customer shall provide an approved meter socket and maintain suitable equipment for a service entrance. All required service conductors shall be sized in accordance with all applicable codes.

31.2 The Customer shall pay a temporary service connection fee for single-phase temporary service in addition to regular monthly charges at the applicable service rate.

31.3 The Customer shall pay a temporary service connection fee for three-phase, temporary service in addition to regular monthly charges at the applicable service rate.

31.4 Temporary service requests that do not conform to the conditions specified above may be granted at the sole discretion of WPU. The Customer shall reimburse WPU for all costs associated with installing and removing such "non-routine" temporary services.

31.5 Temporary service is intended for limited use only and should not exceed a period of one year.

31.6 Permanent service entrance equipment shall be installed as soon as practicable.

SECTION 32: TREE TRIMMING

32.1 WPU hereby reserves the right to trim or remove any trees which create a hazard as defined by the National Electrical Safety Code.

32.2 Properly authorized agents of WPU shall have access to a Customer's property at all reasonable hours for the purpose of trimming or removing trees.

32.3 WPU hereby reserves the right to trim or remove any trees that obstruct the street lighting system.

SECTION 33: WIRING CERTIFICATION

33.1 Only licensed electrical contractors and resident homeowners are permitted to alter, modify or install wiring devices or appliances in the homes where they reside.

33.2 WPU shall not connect any new or rehabilitated service to the WPU electric system except upon receipt of the completed Contractor or Registered Employer Request for Electrical Inspection Form.

33.3 As required by Minnesota State Statute 326.242, all wiring in mobile home parks must be performed by properly licensed employees of licensed electrical contractors. Owners of manufactured homes, park owners, park employees or other unlicensed persons are not permitted to install wiring for any purpose.

33.4 As required by Minnesota State Statute 326.244, all new or replacement wiring is required to be inspected. This includes connection of new or relocated manufactured homes.

33.5 WPU hereby reserves the right to make a further inspection of service entrance and grounding equipment before making any connection to its electrical system.

33.6 Any inspection by WPU shall not be deemed to be an approval of the adequacy of any wiring or certification that such wiring conforms to the rules, regulations and ordinances of the authorities having jurisdiction.

33.7 WPU hereby reserves the right to require a Certification For Connection By Utility for installations that have been disconnected for one or more years.

APPENDIX A

SUMMARY OF WPU AND CUSTOMER RESPONSIBILITIES FOR PROVIDING, INSTALLING & MAINTAINING ELECTRIC FACILITIES

RESIDENTIAL & COMMERCIAL SERVICE 200 AMPS AND UNDER

WPU Responsibilities:

- Provide and install all primary cable, transformer pads and pad-mounted transformers (subject to FIC)
- Make all primary terminations and connections
- Provide and install secondary cable (subject to FIC)
- Provide meter socket and meter (subject to FIC)
- Make connection to the secondary terminals of the transformer and energize service only after State of Minnesota Electrical Inspector has inspected and approved Customer wiring (subject to FIC)
- Perform all required maintenance on the electric distribution system up to the meter socket

Customer Responsibilities:

- Contact WPU to consult on location of service entrance and complete an Application for Service and other documents as required by WPU
- Provide necessary easements and clear installation path of all obstructions
- Bring area to final grade prior to installation of the electric distribution system (adjustments required after installation due to grade changes will result in additional charges)
- Provide trench compaction after the installation of the on-site electric distribution system
- Provide and maintain all required clearances
- Provide required access to WPU at all reasonable hours
- Provide and install protection posts as required by WPU
- Protect WPU facilities from damage during construction period
- Obtain completed Contractor or Registered Employer Request for Electrical Inspection Form
- Install and maintain meter socket meeting WPU specifications in an approved location (meter socket subject to FIC)
- Provide and install riser conduit with a slip sleeve/expansion joint from service drop to meter socket

MULTIPLE METER INSTALLATIONS (Apartments)

WPU Responsibilities:

- Provide and install all primary cable (maybe subject to FIC)
- Make all primary terminations and connections (maybe subject to FIC)
- Make connection to the secondary terminals of the transformer and energize service only after State of Minnesota Electrical Inspector has inspected and approved Customer wiring (subject to FIC)

Customer Responsibilities:

- Contact WPU to consult on location of multiple meter bank assemblies and complete an Application for Service and other documents as required by WPU
- Provide necessary easements and clear installation path of all obstructions
- Bring area to final grade prior to installation of the electric distribution system (adjustments required after installation due to grade changes will result in additional charges)
- Provide trench compaction after the installation of the on-site electric distribution system
- Provide and maintain all required clearances
- Provide required access to WPU at all reasonable hours
- Provide and install protection posts as required by WPU
- Protect WPU facilities from damage during construction period
- Provide and install multiple meter bank assemblies
- Provide transformer pad
- Provide, install and maintain all secondary cable to interior multiple meter bank assemblies
- Label, tag or otherwise mark each meter socket to identify the specific location served by each meter
- Obtain completed Contractor or Registered Employer Request for Electrical Inspection Form

MOBILE HOME PARKS

WPU Responsibilities:

- Provide and install all primary cable, transformer pads and pad-mounted transformers (subject to FIC)
- Make all primary terminations and connections (maybe subject to FIC)
- Provide, install and maintain all secondary cable to exterior multiple meter bank assemblies or to WPU service disconnects, as applicable (subject to FIC)
- Make connection to the secondary terminals of the transformer and energize service only after State of Minnesota Electrical Inspector has inspected and approved Customer wiring (subject to FIC)

Customer Responsibilities:

- Contact WPU to consult on location of multiple meter bank assemblies and complete an Application for Service and other documents as required by WPU
- Provide necessary easements and clear installation path of all obstructions
- Bring area to final grade prior to installation of the electric distribution system (adjustments required after installation due to grade changes will result in additional charges)
- Provide trench compaction after the installation of the on-site electric distribution system
- Provide and maintain all required clearances
- Provide required access to WPU at all reasonable hours
- Provide and install protection posts as required by WPU
- Provide completed Contractor or Registered Employer Request for Electrical Inspection Form
- For new or relocated mobile homes, obtain wiring approval from State of Minnesota Electrical Inspector prior to requesting service connection from WPU
- Provide, install and maintain meter sockets that conform to NEC requirements for mobile home use

COMMERCIAL & INDUSTRIAL SERVICE OVER 200 AMPS

WPU Responsibilities:

- Provide and install all primary cable and pad-mounted transformers (maybe subject to FIC)
- Make all primary terminations and connections (maybe subject to FIC)
- Provide meter socket, current transformers and meter (subject to FIC)
- Assists with the connection to the secondary terminals of the transformer
- Energize service only after State of Minnesota Electrical Inspector has inspected and approved Customer wiring

Customer Responsibilities:

- Contact WPU to consult on location of service entrance and complete an Application for Service and other documents as required by WPU
- Provide necessary easements and clear installation path of all obstructions
- Bring area to final grade prior to installation of the electric distribution system (adjustments required after installation due to grade changes will result in additional charges)
- Provide trench compaction after the installation of the on-site electric distribution system
- Provide and maintain all required clearances
- Provide required access to WPU at all reasonable hours
- Provide and install protection posts as required by WPU

- Protect WPU facilities from damage during construction period
- Provide and install all secondary cables and conduit from the point of delivery (usually transformer) to the building service entrance
- Provide and install transformer pad (see appendix D)
- Provide and install an exterior current transformer enclosure and a 1” conduit from the current transformer enclosure to the meter socket
- Install WPU-provided meter socket in an approved location
- Obtain completed Contractor or Registered Employer Request for Electrical Inspection Form
- On services over 1800 amp, furnish a secondary connection pedestal which will also be used as a metering point with the meter mounted on the outside of cabinet
- On services over 1800 amp the Customer will be responsible for all secondary connections

APPENDIX B

NON-DISTRIBUTED GENERATION INTERCONNECTION GUIDELINES

WORTHINGTON PUBLIC UTILITIES WORTHINGTON, MINNESOTA

SCOPE AND PURPOSE

This document is intended to describe the requirements of Worthington Public Utilities (WPU) regarding connection to its system of customer-owned distributed generation equipment. The guidelines are intended to develop the minimum requirements for connection of such equipment to the WPU system, and are not intended to be exhaustive. Each installation will be reviewed by WPU staff, and additional requirements may be placed on the installation under special circumstances.

This documents is intended to describe certain equipment that will be necessary in order to insure that the level of service provided to WPU's customers is not degraded by the installation of the proposed distributed generation equipment. It is also intended to ensure that safe operation of both the generation equipment and WPU's existing distribution system are maintained.

Since this is a rapidly developing and changing field, it is expected that these guidelines will be updated periodically to reflect new technologies or industry standards. WPU reserves the right to require compliance with new guidelines should they be issued in the future.

STANDARDS

The requirements developed in this document are intended to comply with the following standards and regulatory bodies.

- Emerging IEEE Standard 1547
- State and Federal Regulatory Agency Requirements
- Requirements of WPU's power suppliers and transmission agents
- National Electric Safety Code (latest version)
- National Electrical Code (latest version) - if applicable
- IEEE Standard 519

CLASSIFICATIONS OF INSTALLATION

Three types of distributed generation connections covered in this document are as follows:

- Open transition
- Closed transition/short-term parallel
- Closed transition/long-term parallel

Open Transition:

An open transition involves the disconnection of the utility from the customer's load prior to transferring the load to the customer's generator. The customer experiences a momentary interruption of power while the transfer is being made. At no time is the customer generator attached to the WPU's distribution system.

Closed Transition/Short-term Parallel:

This arrangement allows a momentary connection of the customer's generator with the WPU's system during the time the customer load is being transferred from the utility to the customer's generation equipment. Once the transfer is made, the WPU system is disconnected from the customer load during the time the generator is operating. The length of time in which the generator and the WPU system are connected is very short. In this arrangement, the customer does not experience an interruption of service while the transition to and from the generator is being made.

Closed Transition/Long-term Parallel:

At this time, WPU does not allow long-term parallel operation of a distributed generation installation.

Protective equipment and interrupting devices vary depending on which of the above operating modes are present.

DISCONNECTING DEVICE

Each generating installation shall have a three phase disconnecting device of suitable voltage and current rating to allow disconnection of the generating facility from WPU's system. The characteristics of this device are dependant on the proposed operating mode of the generation equipment.

Open Transition:

For an open transition installation, a transfer switch or equivalent arrangement utilizing the "break before make" operating characteristics shall be provided. This device shall ensure that the local customer load bus is disconnected from WPU's system prior to closing the connection to the generator.

Closed Transition/Short-time Parallel:

A three-phase device suitable for protective relay operation shall be provided for any installation that involves paralleling of the generation equipment with the WPU system. The required equipment for the utility side device shall be a three-pole circuit breaker suitable for interruption of load and fault current. The device shall be electrically operated such that protective relaying (described below) can initiate disconnection of the generator installation from WPU's system when a fault is sensed on WPU's system.

PROTECTIVE RELAYING

It is essential that the delivery of power from the generating equipment into WPU's system, for however brief a time, be done in a manner to minimize hazards to adjacent property. It is essential that the generating facility be taken off line from WPU's system immediately whenever a fault is detected on WPU's system. Further, it is critical that the tie to WPU's system be separated whenever WPU's system experiences an outage (no "islanding" can be allowed).

The protective devices listed below are intended to protect WPU's system only. Protection of the generation equipment is the responsibility of the generation equipment owner.

Various protective relaying functions are required for any arrangement that involves a closed transition or parallel operation of the generating unit with WPU's system. The following are the

minimum protective functions that must be present on the utility tiebreaker looking out onto WPU's system.

- Phase over-current protection
- Over voltage protection
- Under voltage protection
- Over frequency protection
- Under frequency protection
- Ground fault protection
- Reverse power protection

Many of the above functions can be incorporated into a multi-function electronic relay.

For all installations over 40 kW of nameplate-generated capacity, the relays must be utility grade (not industrial grade). Proposed equipment must be approved by WPU.

AUXILIARY EQUIPMENT

WPU will review the proposed installation, and determine if modifications to its equipment are necessary. If WPU determines that changes to its equipment are required to accommodate the distributed generation equipment, the changes will be made by WPU, with all or part of the cost assessed to the customer. WPU will provide an estimate of the cost prior to proceeding.

COORDINATION WITH WORTHINGTON PUBLIC UTILITIES' SERVICE POLICIES

This document is intended to comply with and be an amplification of Worthington Public Utilities Service Rules and Policies handbook, particularly concerning Section 9, which deals with connection of generating facility to WPU's system. All required submittals, fees, forms, and the like described in that document shall apply.

APPENDIX C

Water & Light Commission

Resolution Establishing Worthington Public Utilities as the Sole Aggregator of Demand Response on Behalf of Retail Customers

RESOLUTION NO. 2009-4

WHEREAS, the Federal Energy Regulatory Commission has issued Order No. 719, 125 FERC ¶ 61,071, 73 Fed. Reg. 64,099 (October 28, 2008); and

WHEREAS, pursuant to Order No. 719, 18 C.F.R. § 35.28(g)(1)(iii) provides: “Each Commission-approved independent system operator and regional transmission organization must permit a qualified aggregator of retail customers to bid demand response on behalf of retail customers directly into the Commission-approved independent system operator’s or regional transmission organization’s organized markets, unless the laws and regulations of the relevant electric retail regulatory authority expressly do not permit a retail customer to participate.”; and

WHEREAS, pursuant to Order No. 719, 18 C.F.R. § 35.28(g)(1)(i)(A) provides: “Every Commission-approved independent system operator or regional transmission organization that operates organized markets based on competitive bidding for energy imbalance, spinning reserves, supplemental reserves, reactive power and voltage control, or regulation and frequency response ancillary services (or its functional equivalent in the Commission-approved independent system operator’s or regional transmission organization’s tariff) must accept bids from demand response resources in these markets for that product on a basis comparable to any other resources, if the demand response resource meets the necessary technical requirements under the tariff, and submits a bid under the Commission-approved independent system operator’s or regional transmission organization’s bidding rules at or below the market-clearing price, unless not permitted by the laws or regulations of the relevant electric retail regulatory authority.”; and

WHEREAS, pursuant to Section 6.04 of the City of Worthington Charter, the Water and Light Commission is empowered to establish rates, fees, rules, regulations and policies governing the provision of electric power to the retail customers served by Worthington Public Utilities; and

WHEREAS, the Water and Light Commission has determined that it would be harmful to the demand response in the City of Worthington and the collective interests of Worthington Public Utilities, as a load-serving entity with an obligation to serve at retail, and Worthington Public Utilities’ retail customers to permit any entity other than Worthington Public Utilities itself, or its authorized designee, to aggregate demand response on behalf of its retail customers; and

WHEREAS, the Water and Light Commission, as the electric retail regulatory authority for Worthington Public Utilities, has determined it to be desirable that the aggregation of demand

response on behalf of retail customers served by Worthington Public Utilities to be bid directly into the organized electric and ancillary services markets administered by the Midwest Independent Transmission System Operator (MISO) (or any successor independent system operator or regional transmission organization to which Worthington Public Utilities or Missouri River Energy Services (MRES) and/or Western Minnesota Municipal Power Agency (WMMPA) is a Participant) be performed by Worthington Public Utilities or its authorized designee;

NOW THEREFORE BE IT RESOLVED by the Water and Light Commission as follows:

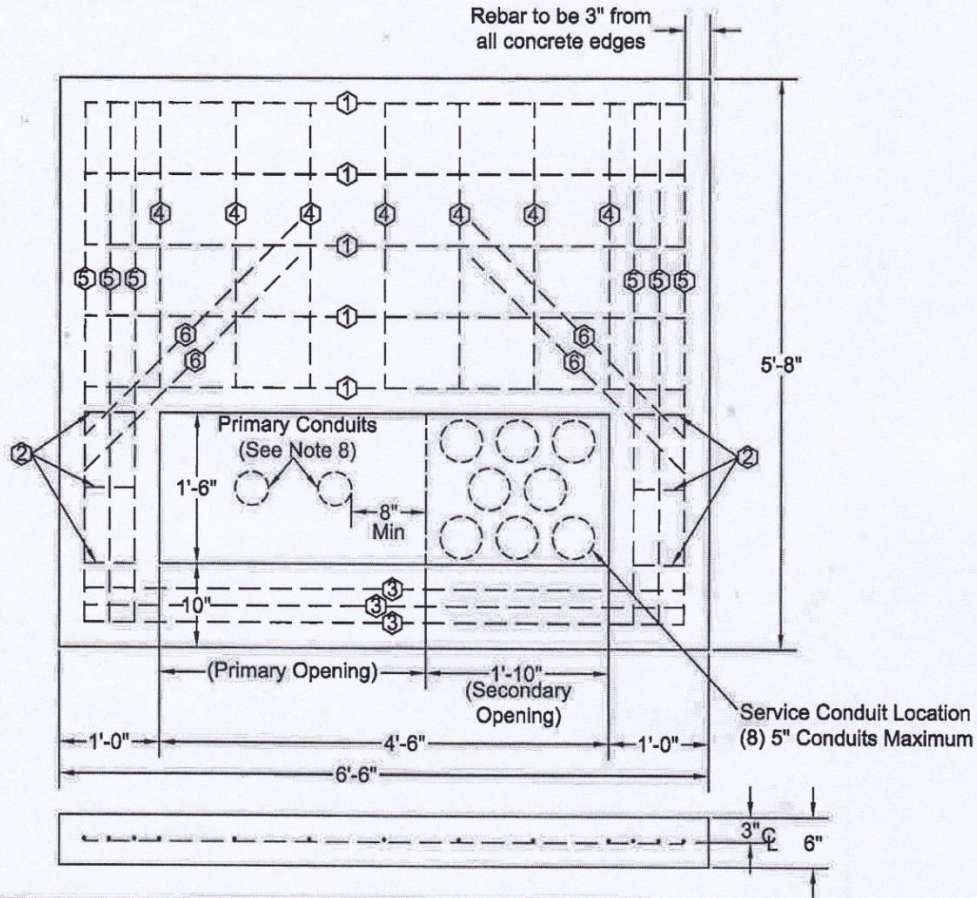
- (i) Worthington Public Utilities or its authorized designee is the sole entity permitted to bid demand response on behalf of retail customers served by Worthington Public Utilities directly into any Commission-approved independent system operator's or regional transmission organization's organized electric markets.
- (ii) Retail customers served by Worthington Public Utilities wishing to bid their demand response into a Commission-approved independent system operator's or regional transmission organization's organized electric markets may do so by participating in the program established by Worthington Public Utilities or its authorized designee. Retail customers are not permitted to participate in the demand response program of any other entity without the express prior authorization of Worthington Public Utilities.
- (iii) Worthington Public Utilities or its authorized designee is the sole entity permitted to bid demand response on behalf of retail customers served by Worthington Public Utilities directly into any Commission-approved independent system operator's or regional transmission organization's organized markets for energy imbalance, spinning reserves, supplemental reserves, reactive power and voltage control, or regulation and frequency response ancillary services (or its functional equivalent in the Commission-approved independent system operator's or regional transmission organization's tariff).
- (iv) Retail customers served by Worthington Public Utilities wishing to bid their demand response into a Commission-approved independent system operator's or regional transmission organization's organized markets for energy imbalance, spinning reserves, supplemental reserves, reactive power and voltage control, or regulation and frequency response ancillary services (or its functional equivalent in the Commission-approved independent system operator's or regional transmission organization's tariff) may do so by participating in the program established by Worthington Public Utilities or its authorized designee. Retail customers are not permitted to participate in the demand response program of any other entity without the express prior authorization of Worthington Public Utilities.

APPENDIX D

STANDARD FOR TRANSFORMER PADS FOR TRANSFORMERS 75 TO 500 KVA

This is the generic standard WPU uses for transformer pads for transformers 75 to 500 KVA. You must verify the actual transformer footprint that will be used by WPU prior to pouring.

THREE PHASE TRANSFORMER CONCRETE PAD 15 kV (75-500 kVA) POURED IN PLACE



REINFORCING STEEL SCHEDULE						
①	②	③	④	⑤	⑥	Approx. Weight
(5) #4 X 6'-0"	(6) #4 X 0'-6"	(3) #4 X 6'-0"	(7) #4 X 2'-10"	(6) #4 X 5'-2"	(4) #4 X 3'-0"	2300 lbs.

NOTES:

1. Concrete shall have a minimum compressive strength of 3000 psi at 28 days. All concrete shall be air entrained (4% to 6% by volume) with a maximum W/C ratio of 0.45.
2. Reinforcing steel shall be furnished in accordance with ASTM A615 Grade 60. Place per schedule within the limits shown. All reinforcing steel shall be uniformly tied to reinforcing steel to prevent displacement during concrete placement.
3. Top surface finish shall be level. Wood float top; do not leave any depressions.
4. Soil compaction under pad (for both pour-in-place and separate standard pads) to be at 95% Standard Proctor.
5. Maximum 2 elbows (conduits), for primary feed and source circuits, will be 4", Schedule 40 PVC 90°, 36" radius.
6. Primary PVC elbow stub-outs must be a minimum of 12" out from pad edge whether from a front or side trench approach feeding the transformer.
7. Pad must be located within 10 feet of driving surface for truck access for placement of transformer.
8. Maximum of 2 conduits, 4" if required.