FOR BOARD ACTION

Agenda Item # 10 **Meeting Date:** 4/26/05

SUBJECT: ELECTRIC SERVICE RULES & REGULATIONS

PREPARED BY: Mike Engle MJE
Supervisor of Distribution Design

ITEM DESCRIPTION:

The Electric service Rules & Regulations are routinely updated every two or three years. The purpose of the document is to inform customers and contractors what is generally available for different installations and to explain the requirements for service installations. A summary of the changes implemented follows:

1. Section 403, Secondary Service Voltages, was revised to remove the 75kVA demand threshold for 208/120 Volt, 3-Phase, Pad-Mounted service. This allows us to better meet the needs of our customers with small 3-Phase requirements.

2. Section 600, Meters, was revised to require by-pass meter sockets on all new services, commercial and residential, starting 1-1-2006. This will allow us to service and maintain meters without a service interruption to the customer. With the proliferation of digital appliances and home computers, service interruptions can be quite an inconvenience for our customers.

3. Exhibit 10, Rock and Winter Installations, was revised to allow us to pass along any surcharge we receive from our joint trench contractor for rock excavation.

4. All other changes were housekeeping type changes to clarify an item or correct grammar.

UTILITY BOARD ACTION REQUESTED:

This is presented to the Board as an informational item.

Walter V. Kirkham 4-21-05
A. General Manager Date

ROCHESTER PUBLIC UTILITIES

SECTION 600

Notice – Effective 1/1/06 - All new or rewired residential or commercial services must have an approved lever operated by-pass meter socket (see Section 613 for approved by-pass meter sockets). After the above date, any new or rewired service without an approved by-pass socket will not be energized!

METERS

This section covers the installation of meters and associated equipment such as current and potential transformers for both overhead and underground services. Further description of RPU requirements for both overhead and underground services is covered in other sections of this booklet. The requirements contained in this section are for services rated 600 volts or less. When services are required at primary voltage (such as 13800 Y/7970 volts), the metering requirements and equipment will be determined on an individual basis.

601 Responsibilities for Providing Metering Equipment

~~RPU supplies and installs, at its own expense, all meters and such accessories as are required for billing purposes. This includes all revenue meters, current and potential transformers, phase-shifting transformers, test switches (required for 3Ø metering where current transformers are used), and color coded meter wiring for a single service. For redundant or second services, see Section 503. Sockets for instrument transformer rated meters must be purchased directly from the RPU Meter Department by the Customer or his representative. It shall be the responsibility of the electrical contractor or the Customer to secure all meter socket bases, or meter centers for multiple meter installations, which are approved by RPU for the intended purpose. (For information on meter sockets and meter centers, see Section 613; for approved meter sockets, see Section 1000 Exhibit 12.) Unless by special permission, RPU will install only one set of metering equipment under each contract or application for one class of service.~~ All metering equipment, with the exception of current transformers and potential transformers, must be purchased and installed by the customer or electrical contractor. All metering equipment installed must be UL listed and labeled and have prior

approval of the RPU metering department. Metering equipment installed without RPU approval will not be energized unless by special permission of the RPU metering department. RPU will energize only one set of metering equipment under each contract or application for one class of service.

602 Location of Meters

Meter locations will be agreed upon by representatives of the Customer and RPU, subject to final approval by the RPU.

602.1 Residential —All new or rewired services must have the meter located ~~outdoors. Upon prior approval by RPU, apartment buildings and condominiums may be excluded from this requirement.~~ outside. Prior written approval from an RPU representative is needed to be excluded from this requirement.

602.2 Multiple Dwellings — Where more than one meter is installed, as on a duplex or apartment complexes, ~~the meters shall be grouped, at a point accessible at all times to each Customer and to RPU personnel.~~ meters are to be located outside and grouped if possible. Exception: Complexes that have 24 meters or more may locate the meters inside as long as they are grouped at one location and accessible at all times to each customer and RPU personnel.

602.3 Industrial and Commercial — Meters for industrial and commercial service shall be located outdoors.

602.4 Height Limits — All meters located outdoors on residential or commercial services, where the meter is mounted on a permanent structure, shall have a height limit of not more than 6 feet and not less than 3 feet from final grade to the center of the meter. A typical metering arrangement is shown in Section 1000, Exhibit 1.

602.5 Mobile Homes — As of April 1, 1998, RPU will individually meter each mobile home located in a mobile home court or addition to a mobile home court. Resale of metered electrical energy by the court owner will not be permitted in these facilities. ~~Individual meter pedestals shall be provided by the Customer or his representative. A typical mobile home metering arrangement is shown in Section 1000, Exhibit 2.~~ Individual meter pedestals, with by-pass sockets, shall be provided by the customer or his representative. Maintenance and

repair of the meter pedestal is the responsibility of the customer. A typical mobile home metering arrangement is shown in Section 1000, Exhibit 2.

602.6 Meter Clearances — Meters shall be situated such that there is not less than three feet of unobstructed space in front and one foot on all sides. Meters shall not be located where they are subject to corrosive fumes, dust, vibration or physical damage. Outdoor meters shall not be located in carports, under porches whether open or enclosed, or along walkways or driveways where they might create a hazard to people or be subject to damage by passing objects.

602.7 Access to Meters — Meter locations shall not be hazardous or cause inconvenience to employees of RPU when installing, maintaining, or reading the meters.

602.8 Residential Apartment Buildings — In all cases where multi-metering panels with stacked meter sockets are used, the maximum height to the center of the top meter shall be not more than 6 feet and the minimum height to the center of the bottom meter shall be not less 2 feet indoors and 3 feet outdoors. Individual apartment disconnects must be connected on the load side of the meter. If the service voltage is 120/208 volts, a fifth terminal located at the 9 o'clock position is required in the socket and must be connected to the service neutral in accordance with the National Electric Code (see Exhibit 12). The house meter socket for apartment buildings requires an approved lever actuated positive bypass mechanism which will provide clamping pressure on the meter blades. Only one meter may be installed under one socket cover in multi-metering panels.

602.9 Commercial Multi-Metering Panels — All commercial multi-metering panels used in shopping centers, spec buildings and multi-commercial tenant buildings shall have a maximum of four meter sockets per vertical stack. In all cases, the maximum height to the center of the top meter shall be 6 feet and the minimum height to the center of the bottom meter shall be 2 feet indoors and 3 feet outdoors. An approved altered manual bypass is required on all meter sockets and each individual unit disconnect shall only be connected to the load side of the meter. Each individual meter socket shall have a barrier to isolate the customer's disconnect switch and wiring from the metering area. Only one meter may be installed under one socket cover. A system neutral is required to

each 5 and 7 terminal meter socket in accordance with the National Electric Code.

603 Grouped Meters

In installations requiring more than one meter, the meters shall be grouped and suitably connected such that a meter serves no more than one Customer. The height limits stated previously also pertain to grouped meters where practicable. If deemed necessary by the space available, the meters may be stacked in an orderly fashion. Any dwelling with more than one Customer living therein must have an individual meter for each dwelling unit. These meters must be easily accessible to all tenants and to personnel of RPU. There shall be an approved type of disconnecting means for each meter which is lockable in some way to prevent reconnection by other than RPU personnel. A typical multiple metering arrangement is shown in Section 1000, Exhibit 3.

604 Meter Identification

If more than one meter is required for a building, each meter socket shall be identified and permanently designated in a suitable manner indicating the particular customer served. Each circuit shall be carefully traced and rechecked by the contractor to ensure against errors in wiring that would result in one customer obtaining service through the meter serving another customer. This is especially important when the wiring is concealed. Electric service shall not be energized if meter sockets are not identified. It will be the contractor's/owner's responsibility to correct any errors due to misidentification of meter sockets. RPU reserves the right to charge the building owner and/or electrical contractor for actual costs incurred by RPU to make corrections.

605 Meter Mounting

605.1 Outdoor meters and meter mounting devices shall be mounted securely on permanent structures such as houses, garages, and other buildings. Where outdoor meters are installed on surfaces that prevent installation of the meter mounting device in an exact vertical plane, a meter board must be installed or the surface modified in such a manner that the meter mounting device can be installed vertically. The preferred meter location is within ten (10) feet of the front end of the building (house or attached garage) on single family dwellings for new customer hook-ups All meter locations for rewired or upgraded services shall be located outdoors with locations agreed upon between customer, contractor, and RPU personnel with final approval by RPU personnel. RPU has the right to refuse to energize service if these requirements have not been met.

605.2 Indoor meters, **where permitted**, shall be mounted in accordance with the preceding requirements of this section and shall be located as close as possible to the point where service enters the building. Indoor metering equipment shall be mounted securely in a vertical plane on permanent structures in a location free from moisture, high temperature, vibration, dust or dirt.

606 Meter Connections

The Customer shall provide the necessary wiring for the meter set with the wiring so arranged that the line (supply) side can be connected to the top terminals of the socket and the load side to the bottom terminals. All conductors shall extend into the meter socket a minimum distance equal to the length of the socket trough. All neutral conductors must be insulated. For underground services, the line side neutral wire is to be identified in accordance with the National Electrical Code. There should be sufficient slack left in the underground cables to make up for any ground shifting due to settling or extreme cold.

607 Wiring Restrictions on Meters and Metering Sets

No Customer wiring is permitted to be connected to the metering, secondary wiring or under the terminals of the meter. No part of the metering set may be used as a junction box for the Customer's wiring.

608 Meter Testing

608.1 Any Customer who believes that a meter is failing to properly register the use of electricity, may request a meter check by contacting the Customer Service Representative. RPU will test the meter using standard calibration equipment and generally accepted test procedures within a reasonable period of time. Customers who request additional meter tests within a twelve (12) month period may be charged for the additional tests at a standard fee.

608.2 Whenever a watthour meter is found upon test to have an average error of more than two percent (2%) from one hundred percent (100%) or a demand meter more than one and one-half percent (1.5%) from one hundred percent (100%), a recalculation of bills for service will be made on the basis that the meter should be one hundred percent (100%) accurate with respect to a working test standard.

608.3 If the period of inaccuracy cannot be determined, it will be assumed that the metering equipment has become inaccurate at a uniform rate since it was installed or last tested unless there is valid

reason to use another method. Recalculation of bills is based on RPU Board Policy for adjustments of customer accounts.

608.4 When the average error cannot be determined by test due to complete failure of all or part of the metering equipment, then an estimate of the quantity of energy consumed based on available data will be used to determine the adjusted bills.

609 Meter Seals

All connections to RPU's service equipment shall be made by RPU personnel only. **Unauthorized connections to or tampering with any RPU meter, associated equipment or meter seals, or indications or evidence thereof subjects the Customer to immediate discontinuance of service, prosecution under the laws of Minnesota, adjustment of prior bills for services rendered, and reimbursement to RPU for all extra expense incurred on the account.** In addition, when the unauthorized connections or tampering involve an inside meter, the Customer shall, at his own expense, relocate all service equipment and metering facilities outside the building.

610 ~~Instrument Transformer Installation~~ Services Requiring Instrument Transformer Installation

~~When the ampacity of the service to a commercial service, single phase or three phase, is greater than 200 amps, it will be necessary for RPU to use instrument transformers in the metering installation. These instrument transformers will be furnished by RPU and installed by the Customer on the line side of the customer service entrance disconnect switch. As of April 1998, instrument transformers will not be installed in padmounted transformer compartments. The location of the instrument transformers will be determined by the RPU Meter Dept. The Customer shall not install any additional disconnect switches or junction boxes on the line side of the instrument transformer location. The Customer must furnish and install a 1-inch metering conduit from the instrument transformer location to a meter location approved by RPU. Conduit runs shall not exceed 25 feet, except by special permission.~~ Single Phase – When any single phase service has a total connected load of 320 amps or greater, it will be necessary for RPU to use instrument transformers in the metering installation.

Three Phase – When any three phase service has a total connected load of 200 amps or greater, it will be necessary for RPU to use instrument transformers in the metering installation. These instrument transformers will be furnished by RPU and installed by the customer on the line side of the customer service entrance disconnect switch. As of April 1998, instrument transformers will not be installed in padmounted transformer compartments. The location of the instrument transformers will be detemined by the RPU meter department. The customer shall not install any additional disconnect switches or junction boxes on the line side of the instrument transformer location. The customer must furnish and install a 1-inch metering conduit from the instrument transformer location to a meter location approved by the RPU metering department. Conduit runs shall not exceed 25 feet , except by special permission.

610.1 Underground Service from Pad Mounted Transformers:

Where service is underground from a pad mounted transformer, instrument transformers are to be mounted ~~in instrument transformer enclosures or secondary connection cabinets.~~ in an approved instrument transformer cabinet. The location of the instrument transformer cabinet must be approved by the RPU metering department.

610.2 Overhead Services:

Where service is provided by overhead service drops, approved outdoor instrument transformer cabinets will be required. Location of transformer cabinets will have final approval by RPU Meter Dept. before installation. (No open air CT's or PT's will be allowed.) Refer to 610.3a for cabinet requirements.

610.3 Indoor Mounted Instrument Transformers:

Instrument transformers installed indoors must have a service size of 1200 amps or greater, be installed inside the customer switch gear in a compartment designated for instrument transformers only and have prior approval from RPU metering personnel. ~~This includes apartment buildings or Customer switchgear cabinets.~~

610.3a Secondary Metering Instrument Transformer Cabinet

Instrument transformer cabinets shall be furnished and installed by the Customer. This includes all services either overhead or underground. All cabinets must be UL listed and labeled, approved by RPU meter personnel and meet all NEC requirements prior to installation. Cabinets must conform to the following:

a. The minimum cabinet size is to be 24 inches wide, 24 inches high, and 10 inches deep.
b. The door must have provisions for locking with a standard padlock.
c. The cabinet must be hinged on the right or left side only.
d. Cabinets shall not be used as junction boxes or service connection cabinets.
e. Only RPU metering transformers may be contained therein.
f. Cabinets must be UL approved and be the correct NEMA class for the area environment in which they are installed.
g. A 1-inch conduit installed between the cabinet and meter socket is required.
h. Cabinet must accept bar-type current transformers on all services 1200 amps or less.

All services that require ~~current~~ instrument transformers to be used will require the Customer or contractor to purchase an instrument rated meter socket from the RPU Meter Department. Contact the RPU metering department to obtain the proper socket and pricing. (See Section 613.1 and 613.2.)

610.3b Primary Metering Equipment - Indoors

When indoor primary metering service is to be installed, the Customer shall furnish a compartment or switchgear cubicle to house the primary current and potential transformers. All current and potential transformers shall be rated for metering accuracy as approved by the RPU Engineering Department.

The metering point shall be located electrically between the Customer's main disconnect and customer lateral circuits.

When practical, RPU may request that the Customer install instrument transformers per RPU specifications. (Call the Customer Service Representative at 507.280.1500 to obtain Engineering assistance.) In such situations, RPU will credit the Customer for installation and material charges up to RPU's normal cost for instrument transformers.

610.3c Primary Metering Equipment - Outdoors

When outdoor primary service is to be installed, RPU may elect to utilize either a pole-mounted or pad-mounted primary metering equipment set. Outdoor primary metering units are furnished and installed by RPU. Sharing of the material and installation costs for primary metering will be determined on a case-by-case basis.

611 Self-Contained Metering for Commercial Installations

In general, RPU will install self-contained meters (meters without instrument transformers) on ~~commercial~~ single phase services where total connected load is 320 amps or less and on three phase services where the total connected load is 200 amps or less. ~~through 200 amp.~~ Where such metering is to be used, the Customer shall provide a lever-operated bypassing socket (see Section 601). Such sockets permit a continuation of service upon removal of the meter for testing or maintenance. If a lever-operated bypass socket is not installed, the service will not be energized.

Commercial self-contained sockets must be rated continuous 200 amperes, minimum. For information on approved meter bypass sockets, see Section 614.1.

612 Master Metering

612.1 All new residential units will be individually metered. Exception: Multi-Unit facilities providing care to elderly or disabled

persons may be master metered in accordance with State Law (§116J.27 Subd.8).

612.2 All new commercial or industrial units will be individually metered. Exceptions:

612.2a Where the construction of a building or installation is such that individual service conductors and disconnects are not required by provisions of applicable building codes.

612.2b Where the building or installation owner demonstrates conclusively that the cost to accommodate individual metering exceeds the long-run cost benefit to the individual occupants.

612.3 Existing master metered buildings or installations will be reviewed if:

612.3a Additional units are added or the nature of existing units is substantially altered, and

612.3b If the occupants of the units are responsible for paying for a portion of the electric power and energy used in these units.

The continuation of master metering in existing buildings or installations will be prohibited unless the owner demonstrates conclusively that the cost to accommodate individual metering exceeds the long-run cost benefit to the individual occupants.

612.4 Individual meters will be installed, owned, maintained, and read by RPU. Submetering by others for the purpose of charging individual occupants based on measured use must be in accordance with statutory requirements. Submetering by others for information purposes or to control the use of electric power for energy is permitted.

613 Approved Bypass Sockets

Meter sockets installed for self-contained meters must be approved by RPU prior to installation. Meter installations made with

unapproved sockets will not be energized. Services energized with unapproved sockets will be subject to disconnection until the correct socket is installed.

613.1 Customer-furnished sockets — All meter sockets for single phase self-contained metering up to 320 amps and for three phase self-contained metering up to 200 amps are to be furnished and installed by the customer/contractor. All sockets ~~400 amp meter sockets are to be used on residential services only and~~ require an approved lever actuated locking jaw by-pass with an insulating track resistant poly carbonate safety shield. ~~positive bypass mechanism which will also provide clamping pressure on the meter blades.~~ Three phase services over 200 amps require instrument rated sockets.

613.2 RPU-furnished sockets — Meter sockets for instrument rated meters must be purchased from RPU and installed by the customer/contractor. Contact RPU to obtain the proper socket and pricing.

~~614 Socket Bypass Required~~

~~All self-contained meter sockets used for new or rewired commercial installations must have an approved lever actuated positive bypass mechanism which will also provide clamping pressure on the meter blades. This requirement includes both single phase and three phase services, at all voltages. The socket is to be rated 200 amps minimum. The house meter for apartment buildings and exit light loops require bypasses. Exceptions are telephone booths, bus stops, billboards, and non-commercial garages. Residential customers requiring uninterruptible service for computers, medical equipment, etc. should install an approved meter bypass socket. Residential services larger than 200 amps shall have installed an approved meter bypass socket.~~

~~614.1~~ 613.3 Approved Bypass Sockets

Currently the Landis and Gyr (HQ), Milbank (HD 200 Series) and Thomas & Betts/Anchor (TB Series) Square D (HD) bypasses are approved. Any other bypass socket must have approval from RPU prior to installation. Meter installation made with unapproved

bypasses will not be energized. Service will be subject to disconnection until the correct socket is installed.

613.4 Exceptions – Telephone booths, bus stops, billboards, and non-commercial garages maybe be excluded from the by-pass socket requirement.

~~615~~614Service at 480 Volts

480 volt, 3 phase, 3 wire and 480 volt, 3 phase, 4 wire delta services will be metered using instrument transformers on both currents and potentials for safety reasons. RPU will supply and install all instrument transformers at no cost to the customer/contractor.

~~616~~615Location of High-Leg in Meter Socket on 240/120 Volt, 3 Phase Services

The conductor with the higher voltage to ground must be connected to the terminal on the right side. The high-leg conductor must be identified as required by the National Electric Code. Meter sockets with the high-leg in the wrong position will not be energized. Incorrectly wired sockets will be subject to disconnection until wiring is corrected.

~~617~~616Removing RPU Seals and Meters

Disconnection of RPU metering equipment and cutting of seals is not allowed without obtaining prior approval.

~~618~~617Customer Generation

Where a customer intends to operate ~~an~~ any type of electric generator, photovoltaic array, wind generator, or similar equipment interconnected with the RPU system, special service and metering requirements must be satisfied. Contact RPU for details prior to interconnecting any generation equipment.

Comment [l2]: Comment was made should we reference the interconnection policy? Not here - when they contact us we give it to them.

~~619~~618Proper Grounding

All metering conduits and sockets must be properly grounded. If PVC conduits are used, grounding conductors must be provided and installed by the customer/contractor in accordance with the National Electric Code. Electric service will not be connected to improperly grounded equipment.

619.1 Neutral for 5 and 7 Terminal Sockets

A system neutral is required to each 5 and 7 terminal socket. Conductor should be sized in accordance with the National Electric Code.

~~620~~619Customer Disconnect Switch

Individual customer disconnect switches should be connected on the load side of the meter. No customer devices, e.g. surge suppressors, load management equipment, etc., may be installed on the line side of the meter.

~~621~~620Special Sockets

All special sockets, such as apartment panels, recessed, mobile home parks, socket and switch, or socket and transfer, must have RPU's approval prior to installation.

~~622~~621RPU-Owned Equipment

Any metering equipment furnished by RPU, such as meters, instrument transformers, relays, totalizers, test switches, etc., remain the property of RPU. If the equipment has to be removed or disconnected for any reason, please call RPU so that the equipment can be picked up.