



# Cuivre River Electric Cooperative

A Touchstone Energy® Cooperative 

***For more information contact: Engineering Department (636) 695-4904***

## **RURAL RESIDENTIAL SERVICE INSTALLATION GUIDE Form # UG40**

Cuivre River Electric Cooperative can provide many alternatives for receiving electric service at your rural home or building. A rural service is defined by the Cooperative to be any service outside of a platted development or a service within a development with a lot size equal to or greater than 3 acres. For un-platted properties, there are several alternatives for making electric service available to a location depending on the nature of the property and the needs of the consumer. These alternatives are described below. If your home or building is remote to an electric line, please see **Section VI. Other Service Related Items**. For the majority of new member, the immediate concerns are with sizing the service and having that service installed. These concerns can be discussed with our Service Planning Technician during your appointment or by contacting them by phone or email. The following is a brief overview of the topics that may be involved with establishing your new electric service. The topics begin with the installation of the service and related conduit to the home or building. These sections are critical in order for you to obtain your service in a timely fashion and without incurring addition cost. The sections following will provide you with further information and support from you discussions with our service Planning Technician.

### **I. Service Installation- Rural Services and Lot Size $\geq$ 3 Acre**

The consumer is responsible for establishing a continuous conduit from the transformer to the home or building. It is normally cost efficient for the consumer, or an entity contracted by the consumer, to dig this trench and install the conduit especially if you are also installing water lines. You can request the Cooperative to fully install your service. It will be installed when your meter base and main panel have been installed and wired and you are ready to received electric service. The cost for this service should be discussed with the Service Planning Technician.

The trench must be 36" deep along the entire length. If solid rock is encountered, **it will need to be removed** in order to install the conduit at the prescribed depth.

If the service is from an overhead line (a pole), the conduit will need to be extend to the base of the pole terminating with a 24" radius conduit elbow and a short section of conduit placed but not glued in the elbow in order to extend the conduit above grade. This section should not be glued as it will be replaced by the Cooperative's wire installation crew. Two sections of ten foot (10') conduit must be left at the base of the pole in order to make of the riser that extends the service wire up the pole to the transformer.

If the service is from underground facilities, the Cooperative will have a conduit stub out from the base of the transformer. The consumer will connect his conduit to this stub and extend the continuous conduit to the meter base on the home or building. See future details in the Conduit Installation section. When planning the route for the underground service, it is advantageous to think about the future. Relatively inexpensive options incorporated now can save hundreds of dollars in the future. If there is any possibility that a deck, swimming pool, retaining wall, or outbuilding will be installed at some point in the future, be mindful to route your service around these things. If that is not practical, install the service wire conduit at a depth that will avoid interference with future construction. Also, it is wise to consider the location of trees on your property. Cutting a significant quantity of large roots with the initial trenching will be harmful to a tree. Stay at least ten feet away from any large type tree species to avoid the roots entangling the conduit system and damaging the conduit in the event of the tree toppling. The next thing to consider is the final grade of your yard. You want to make sure the conduit is buried deep enough so that you maintain 30 inches of soil on top of the conduit when you have completed your final grading. The electric service and related conduit system may be installed with a water line, consumer wire, or other utilities. If you use the trench for these other purposes you will need to open the trench with a backhoe having at least a 18 inch wide bucket. Other facilities must have one foot of horizontal separation from the electric line, Electric on one side of the trench, all other on the other side.

## **II. Conduit Installation**

Conduit is always required on secondary services in order to protect the wire and aid in service wire installation and potential future replacement. It is strongly recommended for the consumer to install the conduit at the time the trench is opened. This negates the risk of the trench caving in before the conduit is installed thus causing the expense of re-trenching. The consumer is required to supply the conduit. Because the larger radius conduit elbow are not readily available, the Cooperative will have 24" radius elbows and a slip joint available for purchase at its offices. Any additional material will be billed at the Cooperative's cost plus tax and a handling charge.

The required conduit size is 2 ½ inch, Schedule 40, gray electrical grade for 4/0 and 350 MCM service wires.

The conduit will lie at the bottom of a trench with a minimum depth of 36 inches from the bottom of the trench to finished grade. Conduit lengths must be coupled together utilizing PVC cement.

A conduit run can have no more than 360 degrees of bends or turns. This is a physical limitation on the ability to pull wire through the conduit. A straight run of conduit will start with 180 degrees of bends which includes the 90 degree elbow at the transformer and another at the meter base. The consumer is therefore limited to two additional 90 degree turns or a summation of lesser turns equaling 180 degrees by utilizing elbows or long sweeping turns made by bending the conduit in an arcing trench. All elbows installed in the conduit run must have a **no less than a 24 inch radius**. The use of the small 12 inch elbows that are more readily available will likely cause your conduit installation to be rejected as our crews may be unable to push the stiff secondary wire through the tight elbow.

**A minimum 36 inch elbow will be required at all locations if the total degree of turn exceeds 270 degrees or the service length is greater than 250 feet.**

A pull line is required to be installed in the conduit run for all installation greater than 150 feet in length or have 3 or more elbows installed. The pull line must have a tensile strength greater than 200 pounds and must be capable of pulling in a heavier pull rope or steel cable which may be required to install the service wires.

The pull line can be easily installed after the conduit system is laid by utilizing a plastic grocery bag and a leaf blower or the blower side of a shop vacuum. If you are not able to install a pole line in the conduit, it is very likely that we also will not be able to install the wire in the conduit.

The Cooperative will test the depth of the conduit when they arrive to install the service wires. If the depth is not adequate or the crew is unable to install the service wires because the conduit was not installed correctly, the **consumer will be billed a service charge of \$250.00** and will be required to correct the deficiency before the service installation is rescheduled.

### III. Temporary Construction Service

Temporary metered service can be supplied by the Cooperative if requested. Temporary services can be set up to supply construction power from either the overhead or underground power lines. The service point for overhead facilities will be within 20 feet of the pole and for underground, within five feet of the right side of the pad mounted transformer or secondary pedestal. The service must be safely designed meeting all required codes. All circuits must be protected with

Ground fault Interrupter receptacles or circuit breakers (GFI's). A diagram for an overhead temporary service is included with this guide.

Temporary service may be established at the permanent meter base location if ground conditions and building construction will allow the installation of the permanent meter base and service wires.

Some communities require inspections for temporary services. Please check with your local planning and zoning officials or our engineering department.

#### **IV. Service Size**

Please consult with you electrician or review the National Electrical Code in order to determine the appropriate sized service for your needs. The typical service sizes for a home or outbuilding are; 100, 200, or 320 Amp. The minimum sized meter base approved by the Cooperative is 200 Amp. The member is responsible for purchasing and installing a meter base approved by the Cooperative. The Cooperative will maintain the current carrying internal elements of the meter bases for their serviceable life. **Only meter bases approved by the Cooperative may be used by the member.**

#### **V. Metering**

##### **Meter Bases**

The size and type of meter base that is required is determined by the main panel(s) size or service size. For a basic service for a home or building a 200 amp meter base will be adequate for a service rated 200 amp or lower. If more circuits are required a 320 amp base will allow for (2) 200 amp panels. If an out building or a detached garage service is anticipated, a 200 or 320 amp base with a breaker panel may be applicable. The Cooperative approves of and maintains Milbank meter bases which are available at most electric supply stores. A catalog of approved meter bases is available upon request.

The following is condensed listing of meter base types:

- 200 Amp Basic (overhead or underground service)
- 200 Amp w/main & 8 position breaker panel (well, outbuilding...)
- 200 Amp meter pedestal w/ main & 4 position breaker panel (A/C, yard light...)
- 320 Amp
- 320 Amp w/(2) 200 Amp mains
- 320 Amp w/(2) 200 Amp mains & 12 position breaker panel
- 20 Amp meter base for CT metering (600 amp service)

Residential services 600 Amp and greater will require current metering transformers (CT's). These CT's supplied by the Cooperative can be placed in an outdoor rated metering cabinet (24" x 24" x 10" minimum size) supplied and mounted by the consumer on the outside wall of the building (see metering catalog for specific size and type). The 20 amp meter base must be mounted by the consumer adjacent to the metering cabinet. The Cooperative will make service available at an approved secondary pedestal or pull box located within 10 feet of the transformer. The consumer will be responsible for supplying and installing the pedestal, trench, conduit, and conductors from the pedestal to the main panel at the structure. The Cooperative will provide all metering wiring and connections.

If the transformer is dedicated to the service, the metering CT(s) may be installed in the secondary bay of the transformer. A metering pedestal must then be installed adjacent to the transformer. The Service planning Technician will provide you with more detailed instruction for this type of installation.

### **Meter Base on a Building**

Meter bases mounted on a building must be securely attached to stringers between structural elements or firmly attached to structural walls such as concrete or block. Meter bases must be attached with screws, nailing will not be acceptable. Anchoring to siding or wall boards is also not acceptable. Weak attachments will create problems in the future when the base pulls away from the building. Meter bases will be inspected and given a pull test by the serviceman before meters will be set.

The soil below the trench at the meter base location must be thoroughly compact or jetted with water prior to cable installation. This will prevent the conduit from settling which will cause damage to the meter base. **The consumer will be responsible for obtaining an electrician to reattach any meter base to the home and for any damages that occur to the meter base as a result of cable or conduit settling.** A fully collapsed slip joint section of conduit with at least 12 inches of travel must be installed for all meter bases attached to a building. It is further recommended to install a heavy grade conduit hanger below the slip joint which is firmly attached to the building foundation.

Meter bases attached to a home or building must be located within 15 feet of the corner of the structure nearest to the transformer supplying service. If the nearest point is a garage or other area in which you do not want to install the main panel, a service disconnect at the meter base may be required in order to extend the entrance wire to the main panel. The National Electric Code requires over current protection and a service disconnecting means on the outside of the building or inside the building at the nearest point of entrance of the service conductors. Alternative meter base locations may be allowed with the approval of the Cuivre River Electric Service Planning Technician if an attached garage is the part of the building which is nearest to the transformer. There will be no allowance for

wrapping the meter base location around the corner of a building. The meter base must be along the one of the two walls closest to the transformer.

The maximum height for the meter base on a structure is 6 feet at the top of the meter base and the minimum is 2 feet from finished grade to the bottom of the base. The knockout located on the left or right side of the bottom of the meter base is reserved for use by the Cooperative for the service wire that will extend from the transformer. The consumer wires going into the house or structure from the meter base are to be terminated on the bottom lugs of the meter base (See Drawing B). After the meter base has been inspected, if required by the city or county, Cuivre River Electric will terminate its wire on the top lugs of the meter base and set the meter.

Cuivre River will have a ground rod installed at the transformer location to ground CREC equipment. The consumer is required to provide and install a ground rod, a minimum of 5/8" x 8' copper clad, at the location where the service enters the home or building. The rod must be driven to below grade level and connected with an approved clamp utilizing not less than a #6 AWG Solid copper wire.

**The consumer is responsible for supplying and installing the meter base and all electric facilities beyond that point.** This including installing and wiring the main distribution panel and the service entrance wire (SE) from the bottom lugs of the meter base to the main lugs of the distribution panel.

Note: You will need to contact the following Planning and Zoning Commissions to have your meter base inspected. They will place a sticker on your meter base when it passes inspection.

<i>St. Charles Planning &amp; Zoning</i>	<i>636-949-7345</i>	<i>St. Charles City</i>	<i>636-949-3222</i>
<i>Warren Co. Planning &amp; Zoning</i>	<i>636-456-3044</i>	<i>St. Peters</i>	<i>636-477-6600</i>
<i>Lincoln County</i>	<i>Not required</i>	<i>O'Fallon</i>	<i>636-240-2000</i>
<i>Warrenton</i>	<i>636-456-3535</i>	<i>Wentzville</i>	<i>636-327-5101</i>
<i>Troy</i>	<i>636-528-4712</i>	<i>Lake Saint Louis</i>	<i>636-625-1200</i>
		<i>Flint Hill</i>	<i>636-561-3737</i>

### ***Meter Pedestals***

A meter pedestal can be a manufactured meter base and pedestal assembly or a field assembled meter base and service disconnect that is attached to an embedded posts. Mounting posts must be new treated 6 x 6 lumber or concrete embedded slotted metal channel (Uni-Strut). These can be utilized when the Cooperative's main service is overhead or underground. It can be used as an alternative to a meter pole, or when it's not possible or convenient to attach the meter base to a structure such as the case with a mobile home. The pedestal will include a service disconnecting main circuit breaker and may include provisions to add additional circuit breakers for providing service to an out buildings or a yard light. A diagram of a field assembled meter pedestal can be found in the back of this pamphlet. The Cooperative will maintain the metering section of the meter pedestal. All other components will be maintained by the consumer including the main and secondary breakers and the replacement of the entire meter pedestal unit should it become damaged or non-usable.

Meter pedestals must be located within 10 feet of the transformer or transformer pole or a location pre-approved by the engineering department. The consumer is responsible for installing the service conduit from the transformer pole or pad mounted transformer to the meter pedestal. Please refer to the Service Installation section for details on this installation.

### **Meter Poles**

The consumer is responsible for obtaining and assembling the materials needed for constructing a meter loop, a drawing of which is included in this guide. The Cooperative will attach the fully assembled meter loop to the pole and will make the source connections at the top of the pole. See attached drawing "A".

The following wire sizes are required for the various service sizes:

- #4 AWG Cu. or #2 AWG Al. for 100 amp service
- 2/0 AWG Cu. or 4/0 AWG Al. for 200 amp service
- 250 MCM Cu. or 350 MCM Al. for 320 amp service

A service disconnect (fused or circuit breaker) sized appropriately to the size of the meter loop wires and load to be served shall be installed for all underground circuits.

## **VI. Other Service Related Items**

If the location of the requested service is more than 300 feet removed from an existing high voltage power line, than primary service will need to be extended. This primary service can typically be extended overhead or underground. All facilities indicated as being provided by the Cooperative at no cost, are assumed to be for a permanent residence. The cost for other types of service requests are evaluated on the usage and permanence of the requested services.

### **Overhead Primary**

Un-insulated wires attached to insulators on poles generally 25 feet in the air. The line is constructed within a 30 foot wide easement also referred to as a Right-of-Way which will be cleared of all trees.

The Cooperative will provide a one span extension (approximately 300') and a single phase transformer at no cost for a permanent residence.

Additional length or spans will be provided on of unit cost basis as designed by the Service Planning Technician.

A metered secondary service will be required in order obtain usable voltage in the home.

Member Action Items:

- Easement
- Right-of-Way Clearing

## **Underground Primary**

An insulated conductor is installed underground in conduit at a depth of approximately 4 feet. This type of line is constructed within a 15 foot wide easement cleared of all large trees.

The Cooperative will provide the riser, to transition from overhead to underground and a pad mounted transformer located within 150' of the home.

The member is responsible for the cost for the facilities between the riser and transformer.

The trench, conduit, wire, and other required materials will be provided on of unit cost basis as designed by the Service Planning Technician. The trench and conduit can be provided by the member.

A metered secondary service will be required in order obtain usable voltage in the home.

Member Action Items:

- Easement
- Right-of-Way
- UG Primary Installation (See UG 60)

## **Easement**

An easement is a legal document which provides the Cooperative with certain properties rights that allows it to own, access and maintain the primary electric facilities on your property. The easement rights are necessary to allow the Cooperative to utilize all or a portion of the electric line in order to provide service to future property owners adjacent to your property. The easement area is 30 feet wide for an overhead line and 15 feet wide for an underground line for the entire length of the primary lines. The easement document will be provided by the Cooperative. The easement must be signed by all property owners in the presence of a notary public. The easement can be signed at a Cooperative office, bank or any institution that has a notary public. The Cooperative will record the executed easement in the applicable county. If other persons properties have to be crossed in order to extend service, the Cooperative will endeavor to obtain easement from them. No cooperative construction will proceed until all required easement have been obtained.

### **Right of Way Clearing**

All trees must be removed from the Right-of-Way, otherwise known as the easement area, and will be maintained in that manner. Building and other structures are not permitted within the Right-of-Way.

The Member is responsible for the cost of clearing the Right-of-Way for new construction. After the initial clearing the Cooperative will maintain the Right-of-Way for the life of the line.

The Consumer may clear the Right-of-Way themselves or pay the Cooperative a fixed fee based on the quantity of tree to be trimmed and/or removed.

The Cooperative employs contractors to clear Right-of-Way. This is generally the most cost effective method for trimming and removing trees. The consumer may clear the Right-of-Way but in order to obtain 30 feet of clearance, ground to sky, many trees at the edges of the Right-of-Way will need to be unnecessarily removed. The Cooperative's contractor can side trim trees at the edge of the Right-of-Way but this limited scope of work may not be cost effective for the owner. The crew can chip limbs when they have direct access to chipper. Any large wood will be wind rowed on property at the edge of the Right-of-Way. Additional services can be performed at the hourly crew rate.

### **VII. Notice**

**The guidelines listed above are not a complete list of code or Cooperative requirements but a general summary of what is required. A qualified electrician will know the full requirements as to what will be needed to supply you with safe and reliable electric service. If you are not familiar with this type of construction we highly suggest that you employ a qualified contractor to perform the work for you.**

**Definition of terms**

**Transformer:** Device used to reduce the primary voltage, 7,200 volts to secondary voltage, 120 and 240 volts for use in the home or business. Normally encased within an oil filled gray tank installed on a pole or within a green cubical tank set on a concrete pad.

**Pedestal:** A non-metallic enclosure used to connect multiple secondary cables.

**Conduit:** A plastic pipe that is used to protect wire.

**Riser:** A section of conduit used to protect wire as it enters or exits the ground.

**Primary (voltage):** The distribution voltage used by the Cooperative to supply power to a general area. These wires and cables are energized at either 7,200 volts or 14,400 volts.

**Secondary (voltage):** The supply voltage used at homes or businesses. These voltages can be 120/240 volts for homes and three phase voltages such as 120/208 and 277/480 volts for businesses.

**Easement:** Legal permission for a third party such as a municipality or utility to locate and maintain facilities on private property.

**AWG:** A wire sizing convention for wires sized 4/0 (four aught) and smaller. The larger the AWG number, the smaller the size of wire.

**MCM:** A wire sizing convention for measuring the circumference of wire (Million Circular Mils). The larger the number the larger the size of wire.

**Meter Base:** A metal box that has provisions for the installation of the electric service meter.

**Meter Pedestal:** A manufactured device that incorporates a meter base, a riser, structural support, main breaker and service disconnect into one assembly.

**Schedule:** A sizing convention for indicating the wall thickness of pipe and conduit. Typical sizes, increasing in grade, are DB, 20, 40 and 80.

### METER POLE INSTALLATION DRAWING "A1"







