

Here's how an electric co-op installs underground cable

BY LE SPEARMAN

Ken Norem, director of operations and engineering at Prairie Energy Cooperative in Clarion, says his cooperative regularly installs underground service to new or established commercial and industrial accounts, acreages and subdivisions. The co-op also uses underground cable when addressing clearance issues related to grain bins and trees, as well as conflicts with other utilities, such as transmission poles near substations.

The cooperative owns a trenching and backhoe machine that its crews use for underground electric cable installations. In addition, the co-op also hires contractors that use the boring equipment to install electric cable underground without disturbing the ground's surface.

"When members contact Prairie

Energy concerning the addition of—or to make a change in—electrical service, we can offer them the option of installing underground cable," says Norem. He adds the cooperative shares the cost for installation with members who choose underground cable.

"We do this through what we call 'aid to construction,' where we collect a portion of the difference between the cost of an overhead and underground installation," explains Norem. "Currently, we are running about \$1.50 per foot for trenching and about \$1.50 per foot for the cable."

The co-op uses underground cable in new subdivisions because the covenants require underground installation. "Initially, the developer pays the co-op what they call a 'pre-

payment,'" says Norem. "They take the total cost of the project and divide it by the number of lots. Then, as each lot is sold, the co-op basically reimburses the developer for that lot."

If the lots are not sold during a predetermined period of time, the balance of the prepayment is forfeited to the cooperative. This process promotes economic development and at the same time protects the current members' assets.

For the underground cable installation shown here, Prairie Energy Cooperative member Ron Hughes requested a service change to underground cable because he wanted to eliminate overhead lines that ran through the trees on his property. "This is an example of aid to construction for one of our members," says Norem. ■

Photos by Le Spearman



(From left) Brent Grove, Andy Weiskamp and Tim Slaichert use a backhoe and hand shovels to expose existing utility connections at the pole that connect to the homeowner's electrical service.



Thomas Clevenger (left) and Casey Buns prepare the underground cable by cleaning the exposed insulation, before it's inserted into the terminator that connects the cable to the overhead feed line.



Clevenger and Buns twist exposed copper wires from the underground cable to create a neutral connection to a grounding rod, which will safely discharge excess electrical energy into the ground.



Grove (left) and Weiskamp use the backhoe and a hand shovel to expose utilities—including both electric and telephone cables—at the pole that brings electrical service onto the homeowner's land.



Grove operates Prairie Energy Cooperative's trencher/backhoe. This machine can dig a trench up to 72 inches deep, but the co-op runs its primary underground cable 48 inches deep.



The crew pulls the underground cable from the storage and transport reel to the riser pole—the first service pole on the homeowner’s property. This cable will carry 7,200 volts to a pad-mount transformer.



(From left) Slaichert, Clevenger and Weiskamp position a new primary underground electrical cable under an existing telephone line, because the underground electrical cable needs to run deeper than the telephone wire.



Weiskamp installs a lightning arrester on a pole bracket. The next step in the process is hanging the underground electrical primary cable on the riser pole, next to the lightning arrester.



Weiskamp nails a plastic shield (called a “U-Guard”) over the electric cable attached to the riser pole to protect the cable from wear and to prevent anyone from coming into contact with the underground cable.



Back on the ground, Grove operates the trenching machine as Weiskamp checks the trench’s depth. The next step is laying the cable into the trench and covering it with a 12-inch layer of fill dirt.



After the underground cable is covered, the crew lays a red plastic caution tape along the line, before the trench is filled. This protective tape acts as a warning flag for anyone attempting to dig near the installed cable.



(From left) Buns, Weiskamp and Adam Anderson position the new electrical transformer on a base called a "pad." All of the electrical connections for the property owner's service will be made within this unit.



Clevenger (left) and Anderson pull the underground cable through the pad and place an elbow on the end of the cable, to create a safe connection when the cable is attached to the transformer.



Anderson (left) and Clevenger remove the outer jacket—the protective insulating layer—from the primary underground electrical cable, before starting to make the final connections to the transformer.



Clevenger (left) and Anderson install an elbow to the end of the underground electrical cable and attach it to the transformer. They also connected the secondary household voltage wires that go to the pole.



To protect the electric cooperative's transformer case and internal windings from voltage surges caused by things such as lightning, Clevenger (left) and Anderson install an elbow arrester.



Anderson double-checks his work as he prepares to energize the electrical connection in the transformer. The unit converts the 7,200 volts from the underground cable to 110 and 240 volts for the co-op member's use.