

The Ins and Outs of Outages At CVEA



In a perfect world, the lights would turn on every time you flip the switch and the lights would stay on until you flipped the switch to turn them off. While many of us living in Valdez and the Copper Basin believe this is the perfect place to live, the reality is there are many obstacles that keep the lights from staying on.

In this very real world, we have 50 foot, 60 foot and even taller, trees that aren't content on standing tall forever. We have curious squirrels, inquisitive ravens, majestic bald eagles and a myriad of other bird and mammal species that utilize our poles and lines for resting and travel. Sometimes they find ways around our animal protection devices or chew into our un-nourishing conductor insulation.

We have 30 plus feet of snow that falls annually in the Valdez area and at times weeks upon weeks of -40 degree and below cold snaps in the Copper Basin. We get hurricane force winds, blowing snow, rime ice build-up, and snow and ice packed roads; not to mention an avalanche now and again.

With all that said, our mission is to provide exceptional customer service through safe, reliable, cost-effective electric service and programs.

Safety is our number one priority. We must also deliver reliable electric service while maintaining our fiscal responsibility of protecting the financial health of your cooperative. Wrapping together all three of these mission objectives creates a complex stand-alone system where we generate, transmit, and distribute electricity to all of our member-owners.

A stand-alone system is a system that is entirely dependent on itself. CVEA only receives energy from our own generation sources. As a stand-alone system, we have the disadvantage of being what is called a low inertia system. The inertia in an electrical system refers to the robustness and literally spinning mass of the generators providing power. Generally the system events that you see when the lights blink are the result of a system fault and due to the low inertia system characteristics.

For example, if a tree falls into the line, that tree can act like a very large load to our generators. Just one tree touching one of our energized lines can easily look like a 1,500 kilowatt load to our generators. To put that into perspective, CVEA usually has a maximum system wide load around 13,000 kilowatts.

The magnitude of the fault energy,

created by the tree, is enough to momentarily cause the generators to slow down, causing the voltage and frequency of the system to dip. That momentary dip, or blink, is what you see when there is a fault on the system. Put simply, a fault is an event where one or more electric conductors contact the ground and/or each other.

Sometimes the fault is on an isolated circuit and you see a single blink. Other times the fault is on a main distribution line and you see multiple blinks.

The blinks are generally due to the operation of system protective devices called oil circuit reclosers (OCR) or line fuses. OCRs are designed to temporarily open the electric circuit between a fault and the generating source. CVEA's OCRs will cause up to four blinks before they completely open up and isolate that circuit from the generating source. The line fuses, on the other hand, have one operation and isolate the circuit upon the first operation.

The causes behind the faults vary greatly. It can be as simple as a tree branch blowing into the energized line or it can be very complicated and the true cause of the fault is not determined.

One question we hear a lot is, "What are you doing to prevent outages?" The quick answer is simple, everything we can. The long answer is a bit more complicated.

A major cause of outages has to do with trees falling into the line either through natural decay, natural growth, wind, heavy snow and ice loading, human caused events, etc.

Each year CVEA clears and maintains portions of our dedicated right-of-way, usually within 15 to 25 feet from the center of the line. Still, at our widest granted right-of-way, it would only take a 40 foot tree at the edge of the right-of-way to fall into the line and potentially cause an out-



age. There are many, many trees within CVEA's service territory that reach far higher than 40 feet and although they could cause a future problem, due to private, state, and federal property limitations, we can only maintain what is in the permitted route or what is dictated on an easement.

A second major cause of outages has to do with our furry and feathered friends. It doesn't take much for a curious squirrel to touch the wrong part on top of a transformer to cause big problems.

Every time we have an animal caused event on our system, we go through great lengths to ensure that particular section will not have the same problem again. Some of the items we install after an animal caused outage are transformer bushing shields (Squirrel Guards), insulated cable cover, anti-perching devices, and "bird flappers", which have a high-visibility plastic piece installed on the overhead lines that provide a visual indicator to birds cruising through the area and "flap" around when the wind blows.

When new overhead lines are built, the pole tops are designed to be raptor friendly and new transformer installations are built with Squirrel Guards and insulated cable cover.

Believe it or not, the weather in our paradise is not conducive to reliable transmission and distribution of electricity. It is not possible to design a distribu-

tion system that can take anything and everything Mother Nature has to offer while still being financially responsible or aesthetically pleasing. While our poles and lines are designed to withstand extreme weather, there are times when the system is designed to fail on a small scale before a catastrophic event occurs on a larger portion.

The "designed to fail" concept means that the distribution system is designed such that a tree will break through the wire before breaking a pole or poles. Sometimes the forces are too great and a pole or poles will also fail but the entire system is designed to prevent a domino effect resulting in widespread damage due to a localized event.

The three previous categories are definitely not all of the causes of outages we experience at CVEA, but they are a very large portion of them. Once the protective devices like the OCR do their job to isolate the problem, it's up to the generation protective schemes to keep the entire system up and running.

A small interference is generally not a threat to the entire system but a fault on a main feeder (section of line from a substation) can significantly affect all CVEA members.

As you can see, there are a myriad of ways a power outage can occur.

What can you do to help? If you see power lines sagging due to snow/ice or



Opposite, lines near Eureka loaded with heavy snow and ice

Top left, a tall tree from far outside CVEA's right-of-way in the Copper Basin fell into the power line

Photos by Adam Warwas

Top right, Copper Basin Line Foreman Mike Leeper shows a beaver to be the cause of one outage near Squirrel Creek

Above, a tree on the power line cause a widespread outage in 2011

trees that are in danger of falling into lines, please contact CVEA at 822-3211 in the Copper Basin or 835-4301 in Valdez. Please do not attempt to knock snow/ice off a power line or remove trees on or near the line as any contact with an energized line could cause serious injury or death.

For additional information on power outages or any other CVEA issue, please contact Sharon Crisp at 822-5506, 835-7005, or email crisp@cvea.org. ■

