A non-technical explanation of recent problems with Electrical Circuit 12-01 in Westminster

The purpose of this short article is to give the reader an explanation of recent outages that have occurred on electric circuit 12-01, a secondary feed from our substation that serves areas west of Hwy 183 and "back feeds" areas off of North Avenue in Westminster.

Since October 16th the Westminster has had five outages, four which affected the entire circuit. We recorded outages on November 5th, November 10th, November 14th and November 15th (2). In short the reason is failure of a programmable relay in the breaker serving that circuit which does not allow the fault protection on that circuit i.e., transformer fuses and "reclosers" to function properly when a ground fault occurs.

The ground faults that trigger the outages are routine. In all but one of the cases it has been squirrels climbing into transformers grounding the "stinger wire" thus creating a ground fault on the 12-01 circuit. The other instance was a limb fell into a conductor on Hobson Street.

What definitely is NOT routine is the reaction of the relay inside the breaker at the substation for circuit 12-01. In all cases the electric current should have "blinked", with the relay opening momentarily until the fault cleared. In these last cases we know it blinked twice and then stayed open which causes power service to be disrupted to the entire circuit. When the relay first acted it should have caused a transformer fuse to blow open in the closest transformer to the ground fault and limited the outage to only those homes served by that transformer.

Now even MORE background if you are still interested.

The October 16th incident on Simpson Street was the first sign we had a bad relay inside the breaker and precipitated these later events. It did not open, a conductor burned through and fell to the ground and caused a small grass fire. That was the first sign that fault protection was beginning to fail at the substation.

Westminster had three operating circuits covering the entire town. Up until last year the Electric Department had tied two of the circuits together for about a year. The City became concerned that the electrical load was unevenly balanced and we attempted to separate the electrical load again about December of last year. We bought two used large substation breakers from the City of Seneca who operates with the same type of substation equipment Westminster has.

No problem so far, as we rocked along until the October 16th Simpson Street incident. We consulted with Richard Tucker of Tucker and Associates, based outside Charlotte, NC, an electrical engineer who has been engaged with the City's distribution system since 1978. He also has served as Seneca's consulting engineer and knows both of our systems well.

Tucker came here, after the October event, and concluded the programmable setting in the relay were inaccurate, and that is why it failed on October 16th. Shortly thereafter he re-set them according to what he felt were the conditions right for Westminster's circuit 12-01.

On November 5th a squirrel on Freeman Street tripped the substation breaker. This alerted us that the problem had not been resolved. On November 8th Mr. Tucker came to Westminster and on-site reprogrammed the breaker again reducing the "sensitivity" so that it would force fault protection on the line, such as transmission fuses to "blow" and limit the damage caused by the fault to a local area.

On November 10th we had an outage when the relay open, once again due to a squirrel, and then tried to close twice and then locked opened permanently. On November 14th the system actually worked correctly and blew a transmission fuse on Hall Street where service was only disrupted to just those homes it served until the fuse could be re-set.

Yesterday, November 15th, we had two incidences, both squirrels, that opened the relay and that subsequently did not close permanently after attempting to do so twice.

Our option at this point was to again check the programmable relay. Mr. Tucker feels at this point the used relays may have had settings configured particular to the demands of the Seneca circuit for which it prepared. As of today, November 16th, additional calculations are being made to accurately configure the programmable relay at the substation.

In the interim these protective measures are being undertaken. The two circuits are being tied back together. This is not a permanent solution. Up until these circuits were separated we had complaints of "blinking" when the one substation relay protected both circuits from ground fault. This may occur again until we the permanent fix in place.

In addition today we are placing "squirrel protection" on all transformers starting at North Avenue and working west. This is a Band-Aid solution at this point but can help until the permanent fix is placed.

We know outages even for a short duration are aggravating but we are taking steps to minimize these occurrences.

-Chris Carter-