

## Line Current Differential For Overhead Feeder

Umatilla Electric Cooperative (UEC), a Coop located in northern Oregon, was serving an important customer via an overhead feeder. This feeder was protected with (2) SEL-387L Line Differential relays and a main distribution breaker. This two-terminal 15kV line differential scheme is represented in Figure 1 below.

As the customer’s facility expanded, a tap was installed in the middle of the feeder to provide power to an additional load. As a result, the existing line current differential protection scheme was no longer suitable, as under normal operation the measured incoming current was no longer equal to the measured outgoing current.

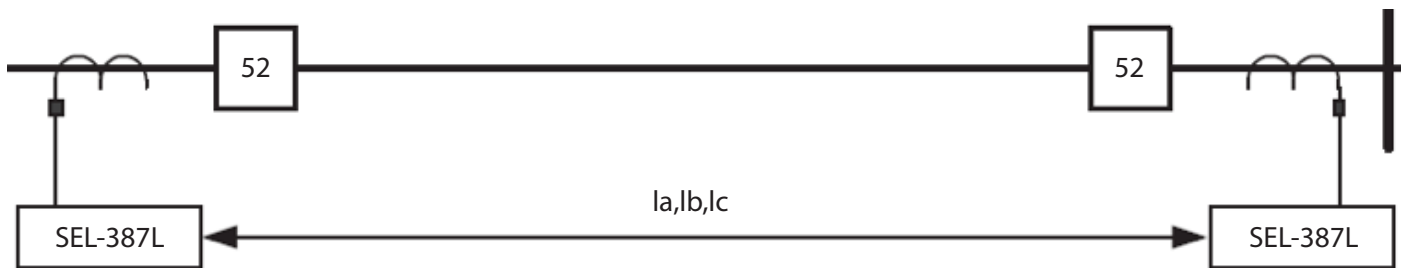


Figure 1

### Adding a Terminal

In order to maintain the line current differential setup, G&W Electric provided 15kV Viper®-S reclosers paired with SEL-311L controls to protect the newly added tap. The control was programmed to provide one-shot to lockout protection. A second Viper-S/311L combination was provided by G&W Electric, and installed at the substation in place of one of the SEL-387L relays.

### Maintaining Accuracy

To provide the relays with current data with the required accuracy, the Vipers were equipped by G&W Electric with “external” CTs, instead of the standard encapsulated internal CTs normally provided with the Viper. These 1,200:5 single ratio CTs have a C200 relaying class. The CTs are factory installed over the silicone insulators of the Viper-S, resulting in a compact, site-ready design as shown in the photo below.

### Advanced Communication

Fiber optic communication was installed between the pole mounted SEL-311L and the SEL-311L in the substation.