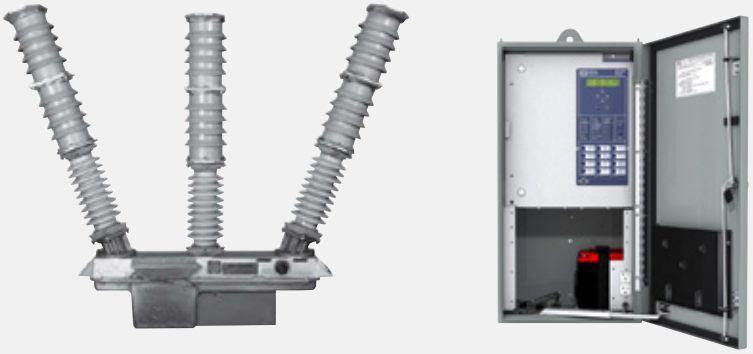
CASE STUDY

Increasing reliability in 46 kV transmission lines



Industry: Electric utility
Challenge: Address reliability issues and extended outages associated with 46 kV transmission lines
Product: Joslyn Hi-Voltage®
46 kV recloser

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01 46 kV Joslyn Hi-Voltage recloser system with SEL 651R control

Abstract
A large electrical utility company encountered reliability issues and extended outages associated with their 46 kV transmission lines. These transmission lines had a high degree of exposure to adverse conditions and were located in thick forests with limited accessibility. Since the only protection system on these long transmission lines was located at the substation, the protective schemes were set to trip and lock out if an overcurrent situation arose. Under the existing configuration, a simple, temporary event, such as a tree branch coming into contact with the line, would result in a line outage that left thousands of people without power in the adjacent rural areas. Due to travel time needed for crews to reach the area to restore lines and return service, these outages were unnecessarily extended. The lack of fault isolation/sectionalizing combined with the need for manual service restoration significantly increased customers' electrical downtime as well as the utility's maintenance costs.

Solution
Through its Joslyn Hi-Voltage brand, ABB offers a complete solution to allow utility companies to quickly detect and isolate faulted sections of their 46 kV transmission lines. The Joslyn Hi-Voltage 46 kV recloser is easily programmed to respond to overcurrent levels defined by the user. The control can be set to automatically reclose (re-energize) the line up to four times after a fault is detected. These four attempts are performed to clear and restore the load for temporary fault conditions. The recloser system uses a maintenance-free vacuum interrupting medium with fault interrupting capacity up to 3000 amps.* In addition, the recloser is insulated with a proprietary solid-dielectric material, and so the switching device does not present environmental concerns such as oil- and SF6-based insulated devices do. For this application, the Joslyn 46 kV recloser has been integrated with the SEL® 651R control to give the system communication capabilities for monitoring/operating the recloser remotely, along with the various levels of overcurrent protection.

Product application

The complete 46 kV system includes the following components:

- One 46 kV recloser
- One mounting bracket
- Three current sensors
- One wiring junction box
- One SEL 651R control equipped with a cellular modem and antenna
- One main interface cable
- One AC powering cable

Conclusion

The system integration described above offers a drastic improvement in eliminating many customer blackouts, shortening the duration of outages and increasing the utility's overall power transmission reliability. The combination of using reclosing and on-board remote monitoring/operating capabilities results in significant reductions in labor cost and outage durations. In addition, the SEL 651R control's capability to store valuable line event and load profile information can be used to further reduce repair costs and perform load flow analysis.

Contact your local agent today for more details about this application or how Joslyn Hi-Voltage reclosers and capacitor switches can meet the needs of your application.

* Because it contains no oil or gas to leak or require monitoring, the Joslyn Hi-Voltage 46 kV recloser is considered maintenance-free.

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