

Three phase circuit protection and submersible switchgear automation

Challenge

As part of a major upgrade project to increase service reliability of their extensive 4kV underground distribution system, the utility was faced with spending millions to replace aging cables. Most of the circuits had old PILC cable in very confined, underground vaults subject to submersion. As an alternative, the utility investigated placing protective switching devices at the circuit midpoints, in order to reduce the number of customer outage-minutes. This also presented great challenges, as utility safety practices mandated any switching be done either remotely from outside the vault or by first de-energizing the switch.

The project plans also included the requirement of incorporating any switch replacement into a future SCADA system for data monitoring and remote operation.

Solution

The utility selected G&W Electric's 15kV Trident® solid dielectric fault interrupters with remote control. These vacuum style interrupters offered electronic relay-emulation curves that provided coordination with other system protective devices. The electronics were able to be placed within the interrupter housing, eliminating the need for a separate submersible control box and cabling.

To make the required elbow connections, the utility simply installed transition splices or pulled in new extruded dielectric cable. In addition, the Trident fault interrupters were strategically placed at a circuit tie point, enabling the outage to be back-fed by an adjacent circuit. The interrupter provided resettable overcurrent protection without having to replace or stock fuse links.

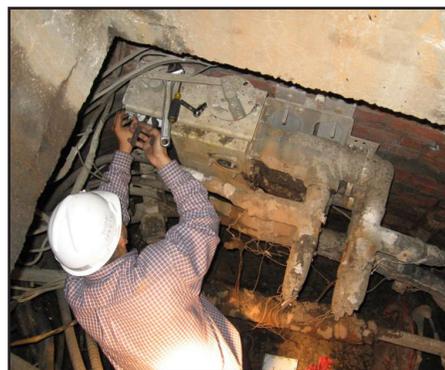
The unit was ordered with a motor actuator and DC portable remote control, which the utility crew kept on their trucks, permitting pushbutton remote control from outside the vault. Future SCADA requirements could be easily accommodated by adding an RTU or relay control.



The interrupter incorporated a top mounted motor actuator permitting above ground operation using a portable control. Future SCADA requirements can utilize the same motor actuators.



Three phase fault interrupter mounted horizontally due to limited vault space. The vault opening is only 23" in diameter. Vaults are subject to complete submersion.



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