



System VI™ Switchgear with Fault Fiter® Eliminates Costly Breaker Gear in Network System

S&C Featured Solutions: System VI Switchgear with Fault Fiter Electronic Power Fuses

Location: East Coast, United States

Customer Challenge

Selecting the location for the electrical equipment was a challenge in designing a new 800-foot-tall office tower on the East Coast.

Because space around downtown high-rise buildings is minimal, the electric utility usually places its 26.4-kV network transformers and protectors in vaults beneath the sidewalk. But in this application, the vaults wouldn't fit. The problem was finally resolved when the building owner offered the 14th floor and some ground-floor space to the utility.

An even more pressing issue was the need for switchgear that could handle the high fault currents on the network and limit the let-through energy to a value required by the insulating fluid in the network transformers.

Traditionally, the utility uses metal-clad gear to protect network transformers. But in this case, the ground-overcurrent relay for the substation breaker would be set so fast that no breaker gear could coordinate with it.

S&C Solution

Of all the gear considered, SF₆-insulated S&C Vista® Underground Distribution Switchgear was the most promising. Vista switchgear is much more compact than metal clad or metal-enclosed switchgear, and its overcurrent control offers a wide variety of time-current characteristics. And with Vista switchgear, a huge cost savings could be realized.

Ground faults are resistance-limited to 2200 amperes... well within the 16-kA rating of Vista switchgear. But the 22-kA available three-phase fault current was an issue.

System studies showed that 400-ampere S&C Fault Fiter Electronic Power Fuses with the underground-subloop-type TCC could protect both the transformers and Vista switchgear from the high fault currents, while coordinating perfectly with the substation breaker. With their 3000-ampere instantaneous pickup and extremely fast 8-millisecond total clearing time, these Fault Fiter fuses were ideal for the application.





The Fault Fiter fuses would be furnished in an air-insulated bay. Such bays, along with Vista switchgear units, comprise S&C System VI Switchgear. The air-insulated bays and Vista switchgear units are electrically connected with SF₆-to-air bus through-bushings.

Four identical S&C System VI Switchgear assemblies rated 29 kV maximum were furnished on the ground floor of the office tower. Each includes the following:

- **Section 1**—An air-insulated entrance bay with an S&C Alduti-Rupter® Switch driven by an S&C AS-30 Switch Operator
- **Section 2**—An air-insulated bay with Fault Fiter fuses, S&C Voltage Sensors, and an S&C Type SPD Open-Phase Detector
- **Section 3**—A two-way Vista switchgear Model 202

A 26.4-kV utility feeder serves each System VI Switchgear assembly, as shown at the bottom of the single-line diagram below. Each System VI Switchgear assembly, in turn, serves one of four circuits in the ground-floor network and an associated Vista switchgear Model 514 unit on the 14th floor. Each Vista switchgear Model 514 includes three fault-interrupter ways that feed a load circuit in a separate network, as shown at the top of the single-line diagram. A fourth fault-interrupter way in each Vista switchgear Model 514 is a spare to feed a future network.

Results

The System VI Switchgear with Fault Fiter Electronic Power Fuses provides protection for the network transformers that could not be achieved by breaker gear. And the Vista switchgear yielded large savings in capital costs and eliminated the ongoing maintenance expense of breaker gear.

The System VI Switchgear also saved 500 ft² of valuable space... and the load lifted to the 14th floor was 80,000 lbs. lighter!

