



Versatile Metal-Enclosed Switchgear Features Redundant Main Bus

S&C Featured Solution: Alduti-Rupter® Switching System and Type AS-30 Switch Operator

Location: Texas, United States

Customer Challenge

A large Texas oil refinery needed to upgrade and expand their 12-kV distribution system. The refinery's managers were well satisfied with the performance of their existing S&C Metal-Enclosed Switchgear, and thus anticipated using additional S&C gear for the project. But the new gear would need to fulfill some special requirements . . .

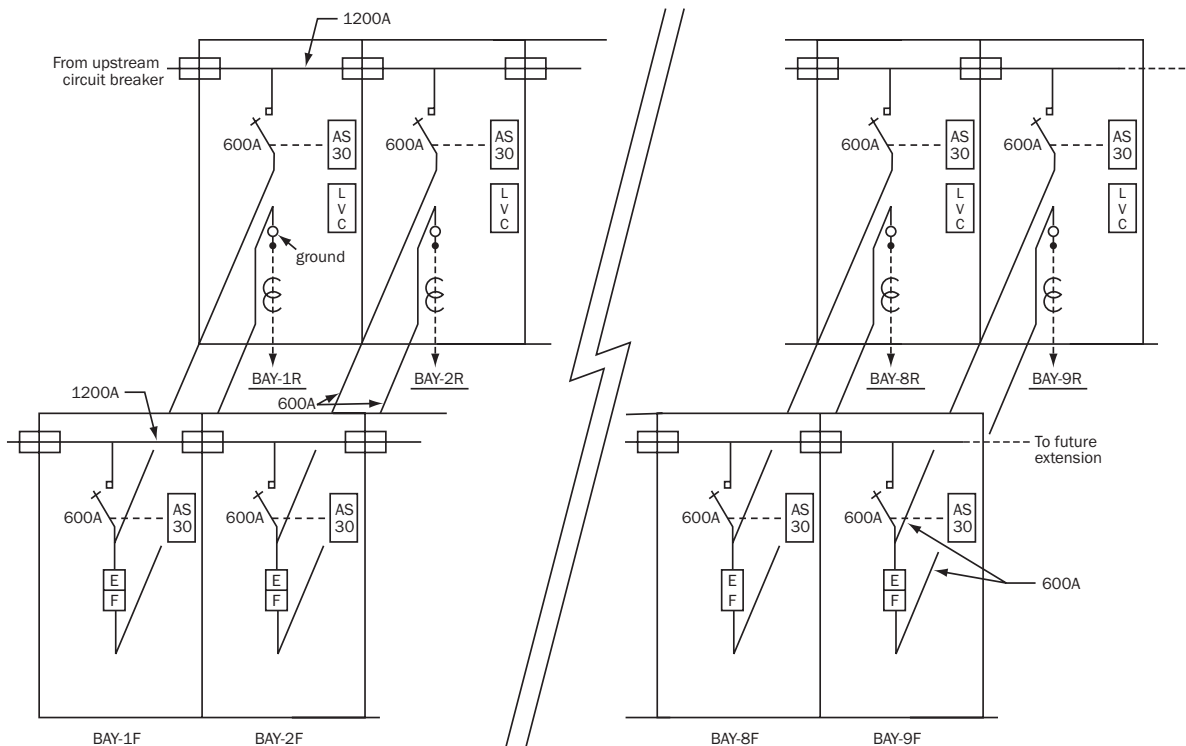
The new switchgear would need to include redundant main bus connected to separate sources through upstream circuit breakers. Nine feeder sections would be required, each comprised of two bays as

shown in the single-line diagram. Each bay would include an interrupter switch, allowing the load to be powered from either bus—thus simplifying system maintenance. Each load would be protected by a three-phase set of power fuses located in one of the feeder section bays.

In addition, the switchgear would need to be capable of clearing resistance-limited ground faults of up to 1000 amperes.

The new switchgear would also need to feature arc-resistant construction. Such construction would afford heightened protection for operating personnel.

Drawing of feeder sections comprised of two bays, that each have an interrupter switch allowing for either bus to power the load.





S&C Solution

The refinery was furnished with arc-resistant 13.8-kV S&C Metal-Enclosed Switchgear having a short-circuit rating of 600 MVA. Each feeder bay of the gear is equipped with an S&C Alduti-Rupter Switch and Type AS-30 Switch Operator. The Alduti-Rupter Switch, rated 600 amperes continuous, can interrupt resistance-limited ground fault currents of up to 1200 amperes.

Either Alduti-Rupter Switch of a feeder section can serve its respective load, which is protected by S&C Fault Fiter® Electronic Power Fuses. Fault Fiter Electronic Power Fuses provide excellent coordination with downstream transformer primary fusing.

Each feeder section includes a specially designed relaying scheme, which detects downstream resistance-limited ground faults and sends an “open” signal to the switch operator of the switch serving the

load. The relaying scheme includes a time delay. If the ground fault is cleared by a downstream fuse before the time delay expires, the relay resets, preventing opening of the switch. The switchgear also includes provisions for future bus extensions in Bays 9F and 9R.

Results

The two-switch arrangement provides a means for maintaining service to the load while one bus is out of service. The relaying scheme allows switch operation to be coordinated with downstream fuses, precluding unnecessary switching in clearing resistance-limited ground faults.

Arc-resistant S&C Metal-Enclosed Switchgear has passed the rigorous certification testing requirements of Canadian Standard EEMAC G14.1. This unique gear minimizes potential injury to personnel standing nearby, should a fault occur within the gear.

Each of the 9 feeder sections includes a specially designed relaying scheme, which detects downstream resistance-limited ground faults.

