

# Superior Coordination with Electronically Controlled Fault Protection

**S&C Featured Solution:** Electronically Controlled Fault Protection

**Location:** United States, Midwest

## Background

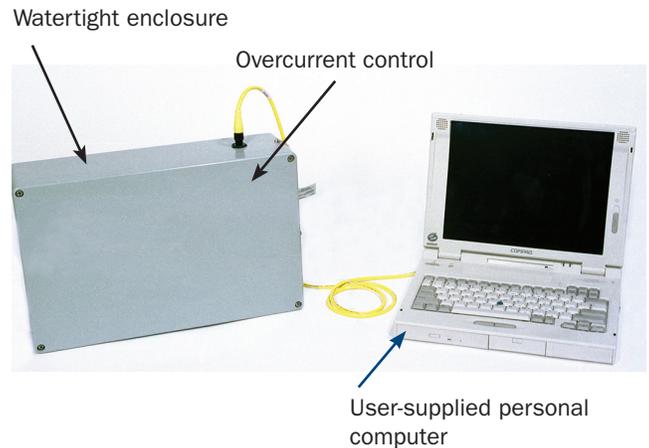
A major Midwestern utility was challenged to provide a higher level of reliability while expanding service to their single largest industrial customer. The large steel rolling mill was served from a 24.9-kV underground distribution system. An existing S&C PMH-11 Pad-Mounted Gear unit tapped off of the 600-A underground feeder to serve the south end of the complex.

The utility needed to install a dedicated tap to serve the load on the north end of the complex including a future processing facility. In addition, a protective device was desired on the main feeder in lieu of a 600-A load-break switch.

The catch was that the new gear had to coordinate with the upstream relay settings as well as the downstream fuses in the pad-mounted gear ... a task that initially proved to be more easily said than done.

## How did they do it?

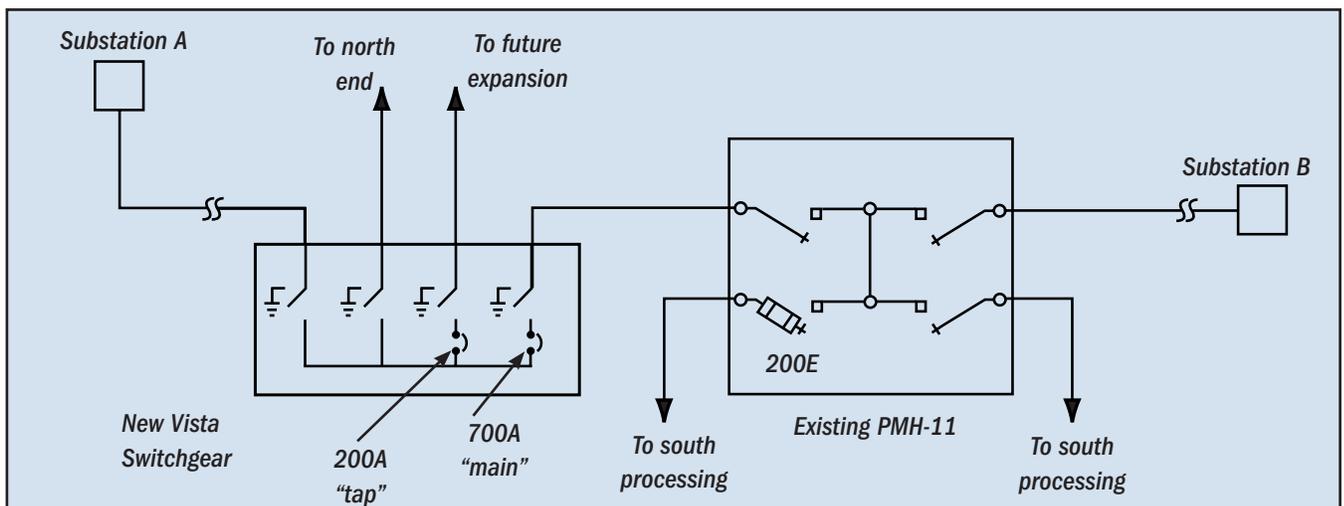
The requirement for a protective device on the 600-A feeder suggested the use of resettable fault interrupters in lieu of 200-A fuses. Now the challenge was to find such a device that met their coordination requirements. This proved to be a near impossible task ... until the protection engineers reviewed the



*User-supplied personal computer is attached to the overcurrent control for programming of the control in the field. Selectable TCCs include E-speed, coordinating-speed tap, and coordinating-speed main curves. Coordinating-speed curves can be tailored to the application using various instantaneous and definite-time settings.*

unique flexibility of the S&C Vista® Underground Distribution Switchgear overcurrent control.

The control's "coordinating speed" curves were specifically designed to "fit" between upstream circuit





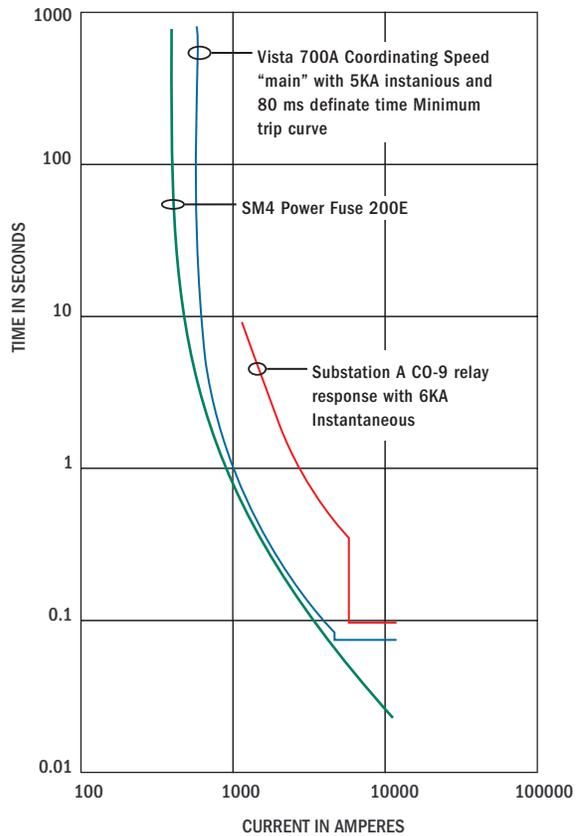
breaker relays and downstream fuses on underground distribution systems. More importantly, the curves can be custom-tailored using easily programmable curve attributes.

### The results ...

The Vista switchgear Model 422 shown in the one-line diagram includes a “main” interrupter to sectionalize the 600-A feeder, plus a “tap” interrupter to feed the future plant expansion. The main interrupter was easily programmed with a 700-A “coordinating speed” curve including 5-kA instantaneous and 80-ms definite-time-delay settings.

The modified Vista TCC will initiate a trip open operation of the “main” interrupter well in advance of the upstream breaker’s 6 kA instantaneous setting, and well before the breaker’s 1/10-second response indicated by the horizontal line on the CO-9 TCC at right. Similarly, for high-magnitude faults downstream of the existing pad-mounted gear, the 80-ms definite time delay allows plenty of time for the downstream fuses to clear the fault. This was important to the protection planners because it ensures that—even for high-magnitude faults causing an instantaneous breaker operation followed by a reclosing operation—the location of a fault can be more easily determined. Of all the devices considered for this application, only the custom-tailored Vista switchgear curves were able to meet these requirements.

The result: service reliability for this customer was improved not only by sectionalizing the main feeder, but also by providing an outstanding fit for their existing coordination scheme. This simple example demonstrates just one of the many unique solutions made possible with the flexible, programmable Vista switchgear overcurrent control.



*The application discussed here utilized a pad-mounted installation of Vista Underground Distribution Switchgear. Vista switchgear is also available for vault installations and for the innovative new UnderCover™ Style installation, both shown above. A wide variety of configurations is available through 38-kV and with any combination of up to six load switches and fault interrupters.*

