

Protective Relaying and Communication Schemes for a New 345kV Line

Client: ComEd

The scope of this project was to install a new 345kV position onto a ring bus to accommodate for a new 345kV two-terminal line between ComEd and a neighboring utility company. This new 345kV line position consisted of: one (1) 345kV live tank circuit breaker; two (2) disconnect switches; three (3) CCVT's on 345kV Bus 2; one (1) motor-operated disconnect switch; three (3) metering-grade CT/PT combination units; two (2) 3000 amp line traps (A & C phase); two (2) CCVT's with carrier accessories (A & C phase); three (3) surge arrestors



The new 345kV line included the installation of a new 345kV System 1 relay panel and a new 345kV System 2 relay panel. System 1 was a Phase Comparison relay package (REL352 and backup SEL-321). The System 1 communication interface utilized Power Line Carrier on a single phase with a Pulsar TCF-10B Tranceiver used for Phase Comparison and a second Pulsar TCF-10B used for Direct Transfer Trip. System 2 was a Directional Comparison Unblocking relay package (SEL-321). The System 2 communication interface utilized Power Line Carrier on another single phase with a Pulsar TCF-10B Tranceiver used for Directional Comparison and a second Pulsar TCF-10B used for Direct Transfer Trip. The new 345kV bus-tie circuit breaker included the installation of a new 345kV System 1 and System 2 relay panel. This relay panel consisted of a reclosing scheme for an adjacent 345kV line (SEL-279H2), a reclosing scheme for the new 345kV line (SEL-279H2), a breaker failure scheme (SEL-251C), a live-tank breaker failure scheme (SEL-501), and a Switch onto Fault (SOTF) scheme (SEL-501). A new 345kV control panel was also installed. This panel consisted of a synchronizing switch, control switch, indicating lights, and reclose cut-outs for the new 345kV bus-tie circuit breaker; a control switch and indicating lights for the new 345kV line MOD; a digital meter for the new 345kV line; indicating lights for 345kV Bus Voltage; and a new synch-scope. The scope of this project also included the replacement of an existing electromechanical reclosing relay on an adjacent 345kV circuit breaker (SEL-279H2). A new SEL2032 communication processor cabinet was also installed to accommodate the new and existing microprocessor relays. This was a two tiered system consisting of one (1) upper tier SEL2032 and two (2) lower tier SEL2032s. One (1) lower tier SEL2032 was used for the 138kV system and the other was used for the 345kV system.

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