



RELAY PROTECTION & CONTROL



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Emerging technological advances coupled with stringent regulatory compliance requirements create an increasingly complex Grid engineering landscape. PGE has a distinguished history in providing Relay Protection & Control engineering services to the Power Systems industry. PGE prides itself on its proven performance quality and earned customer trust in providing Protection and Control engineering services.

The PGE quality control and assurance processes ensure PGE personnel are armed and proficient with the most up-to-date training, tools, resources and knowledge of customer and industry relay protection and control engineering procedures and standards. PGE staff is skilled in active listening to the customer, while providing and delivering the best engineering services possible with an expectation of exceeding our customers' Relay Protection & Control needs. As a matter of corporate policy, all PGE Relay Protection & Control designs procedures and processes adhere to our customers' most stringent requirements, while utilizing IEEE standards and manufacturers' equipment recommendations as foundations.

RELAY PROTECTION & CONTROL SERVICES

www.powergridengineering.com/protection-and-control-services

RELAY DESIGN

- Functional Single-line Diagram
- Relay Control Panel Layout
- Point-to-Point Wiring Diagram

SCADA/RTU/METER CONFIGURATION & COMMISSIONING

- Meter Settings
- Host & RTU
- HMI/PLC/SCADA
- Phasor Measuring Units (PMUs)

EQUIPMENT SPECIFICATION

- Remote/Network Terminal Unit
- Substation Communications Architectures
- IED Hardware
- Transformer/Breaker Monitoring

EQUIPMENT & TECHNOLOGY EVALUATION & ANALYSIS

- HMI
- Substation Automation
- Remote Input/Output
- Data Concentrators
- Ethernet for SCADA

RELAY SETTINGS & ENGINEERING

- Fault Studies
- Coordination Studies
- Control Logic
- Relay Communications Networks
- Transformer/Transmission/Bus/Generation & Feeder Protection Engineering Designs



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about *PGE* services
and solutions, visit
powergridengineering.com
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PROTECTION & CONTROL PORTFOLIO HIGHLIGHTS

www.powergridengineering.com/protection-and-control-experience

230 kV Bus Protection Master Template Florida	Designed a customer standard TEMPLATE for applying protection to a 230 kV bus connected to a 500/230 kV transformer. Design included panels and a standard drawing package to apply protection schemes to both new and existing facilities.
Relay High Speed Communications Florida	Eliminated legacy RTUs and upgraded protection and control at four Distribution substations. Designs included new SEL-351 relays and an SEL-3530 RTAC. PGE also performed multiple substations print designs, relay settings and communications configuration and commissioning.
Substation Design Florida	New control house, two 230 kV lines, 230/115 kV autotransformer, upgraded 115 kV protection and controls for four lines, and upgraded protection for two 115/13 kV Distribution transformers and 10 Feeders.
Transformer Paralleling Florida	Added transformer paralleling scheme for two 230/69 kV autotransformers using Beckwith transformer paralleling controls.
Protection Schemes Upgrade Kentucky	Upgraded protection and controls for 138/69 kV substation including two 138 kV lines, one 138/69 kV autotransformer and two 69 kV lines.
Line Relay Upgrades Florida	Upgraded 230 kV protective primary and secondary line relays for a Central Florida Transmission Line and upgraded control relays for two 230 kV breakers.
Substation Modifications Florida	Designed a modification to split the bus differential into two zones – with a requirement that a single transformer or bus fault did not trip the entire substation. The design package added a new panel with differential relays, modified trip and lockout circuits.
APSTF Step 2 Analysis Florida	Performed Step 2 Analysis for 230 kV switchyard based on FRCC's Step 2 analysis, protection and stability task force procedure.
500 kV Breaker Fail Master Template Florida	Designed a company-wide standard for applying Breaker Failure Scheme to 500 kV breakers arranged in a breaker and a half configuration. The design supported easy modification for alternate station configurations. The deliverable included a standard drawing package that could be used by engineering staff to apply the protective scheme to either new or existing facilities.
500 kV Multi-phase Project Florida	Multi-phase project to reconfigure and expand the 500 kV yard, relocated 500 kV Line, installed four new single phase 500/230 kV transformers, replaced three existing single phase 500/230 kV transformers with four single phase 500/230 kV transformers, and removed failed 500/230 kV three phase transformer. Project included reconfiguration and expansion of existing 230 kV yard, relocated two 230 kV lines, and upgraded four existing 230kV breakers. All protection and control relocated to a new control house. Legacy RTU upgraded to service existing electromechanical protection and control.
230 kV PMU Installation	Installed a series of phasor measuring units (PMUs) around several 230 kV lines. These were the first PMUs designed and implemented in our client's system.

