



PGE 6TH ANNUAL RELAY PHILOSOPHIES SEMINAR

JUNE 25TH - 28TH, 2012

Power Grid Engineering, LLC (PGE) will be holding the first of a two-part series on Relay Philosophies in Lake Mary, Fla. Encompassing basic theories of Protection & Control, this seminar will cover everything from PZ Diagrams to Schematic Drawings, and is designed for engineers, engineering technicians, consultants and other industry professionals.

TOPICS

- **SUBSTATION CONFIGURATIONS, PROTECTION ZONES & SINGLELINE DIAGRAMS**
(MONDAY 8 a.m. - 5 p.m.) • The basic fundamentals of relay design philosophies, beginning with an explanation of the substation configurations utilized at major investment owned utilities. • How to develop a protection zone diagram and using drawing to develop a singleline diagram.
- **CURRENT TRANSFORMER FUNDAMENTALS**
(TUESDAY 8 a.m. - 12 p.m.) • Application of current transformers, excitation current, excitation voltage, excitation impedance, saturation, knee point, CT performance, ratio considerations, accuracy class and the equivalent circuit.
- **BREAKER CONTROL & RECLOSING**
(TUESDAY 1 p.m. - 5 p.m.) • How breakers are controlled. • Devices that cause breakers to trip and automatically reclose. • The reclosing philosophy with application to transmission breaker control with an SEL-351S. • Testing specifics in reference to the SEL-351S application. • A testing procedure for the SEL-351S in a transmission breaker control application. • A logic diagram will be reviewed in detail.
- **DIFFERENTIAL PROTECTION SCHEMES**
(WEDNESDAY 8 a.m. - 12 p.m.) • How differential protection schemes work. • Bus differential and transformer differentials. • Multiple scenarios of current flow analysis of differential circuits using Kirchoff's Current Law.
- **TRANSFORMER PROTECTION**
(WEDNESDAY 1 p.m. - 5 p.m.) • Review the fundamentals of how power transformers work. • Discuss protection concepts used to protect transformers from faults. • Scenarios of how transformers are applied in substations.
- **LINE PROTECTION SCHEMES**
(THURSDAY 8 a.m. - 12 p.m.) • How impedance line protection works. • This class discusses step distance line protection and the use of multiple zones. • End-to-end protection schemes like POTT, PUTT, DCB and DCUB showing logic diagrams demonstrating how each scheme works.
- **BREAKER FAILURE THEORY AND APPLICATION**
(THURSDAY 1 p.m. - 5 p.m.) • Breaker failure and how it's generally applied at most electric utilities. • Analyze the exact sequence with timing used on breaker failure applications. • Breaker failure on many different drawings with each representation explained in full detail.



INSTRUCTOR

Instruction will be provided by **Michael Wright, PE**. Michael began teaching classes in Protection and Control Philosophy in 2001 for Progress Energy. In 2003, Michael developed a 40 hour curriculum designed to explain the macro view of Protection and Control. This year marks his 10th consecutive year teaching Relay Philosophies and Training. Additionally, Michael has served as an adjunct professor at Valencia Community College instructing courses on the Fundamentals of AC Circuits and serves as the President of Power Grid Engineering.

2012 SEMINAR SCHEDULE

MONDAY JUNE 25-FRIDAY JUNE 28
8:00am – 5:00pm
Marriot, Lake Mary FL
*Breakfast provided
Seminar fee: **\$475**

MONDAY AUGUST 13-FRIDAY AUGUST 17
8:00am – 5:00pm
Marriot, Lake Mary FL
*Breakfast provided
Seminar fee: **\$475**

To request additional information, or register for training, please email pr@powergridmail.com, or visit www.powergridengineering.com