€TRAINING

Electrical Equipment & Control Systems: Commissioning, Testing & Start-Up of Electrical Systems

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Introduction:

The safe and efficient operation of modern electrical equipment and control systems requires the successful testing, start-up, and commissioning of this equipment, or system, to ensure correct operation, plus;

- Accurate troubleshooting
- Subsequent repair of this equipment, or system
- Ensuring continued productivity

Delegates are encouraged to bring with them any technical issues that they may wish to discuss during the seminar.

Course Objectives:

At the end of this course, the participants will be able to:

- Understand of commissioning procedures
- Understand of troubleshooting procedures
- Improve capability in the use of test equipment
- Better Understand of failure modes and failure analysis
- Refresh awareness of electrical safety concerns
- Understand the testing process
- Plan and prepare for testing
- Plan and carry out inspections
- Perform primary and secondary injections
- Plan the first energization
- Perform phasing tests
- Consider safety aspects during testing

Targeted Audience:

- Testing Engineers / Technicians
- Maintenance Engineers / Technicians
- Managers of Engineering departments
- Consulting Engineers / Technicians
- Project Engineers
- Safety Professionals
- Others who want a solid preparation in testing & commissioning

Course Outlines:

Unit 1: The Technology of Electrical Equipment:

- Transformers - Power supplies UPS - Batteries
- Generators - Switchgear - Disconnect switches
- Neutral ground resistors NGR
- Motor control centers MCC - Variable frequency/speed drives VFD/VSD
- Programmable logic controllers PLC - Distributed control systems DCS
- Power monitoring
- Control relays/timers/switches - Motor/feeder protective devices
- Miscellaneous equipment - Heaters, solenoid valves, electric valve actuators, and signaling/alarm devices

Unit 2: Commissioning and Testing of Electrical Equipment:

- Methods
- Principles - Special techniques
- NEC checklists

Unit 3: Troubleshooting of Electrical Equipment:

- Methods - Terminology - Principles
- Special techniques
- Case studies/examples
- Single line drawings
- Group exercises

Unit 4: The Use of Test Equipment:

- Digital voltmeter DVM
- Megger
- Frequency meter
- Temperature probes/pyrometers
- Ammeters, Power meters
- Load banks
- Digital hydrometers
- Cable fault locators

Unit 5: The Interpretation and Use of Drawings:

- Single-line electrical drawings
- Control schematics
- Wiring lists
- P&ID□s
- Logic and standard symbols

Unit 6: The Development of a Job Plan:

- Identification of the troubleshooting step-by-step sequence
- Procedure preparation
- Follow-up
- Safety considerations and training

Unit 7: The Identification and Repair of Problems/Failures:

- Common mode failures, Phase imbalance
- Electronic component failure, Fusing
- Fusing
- Motor windings/bearings/brushes
- Excitation circuits
- Battery cells, Inverters/rectifiers
- Inverters/rectifiers
- Bushings - Switches
- Control circuits
- Ground faults

Unit 8: A Review of Safety Requirements:

- Area classifications
- NEC electrical codes, Safety Information