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ELECTRICAL TESTING AND COMMISSIONING

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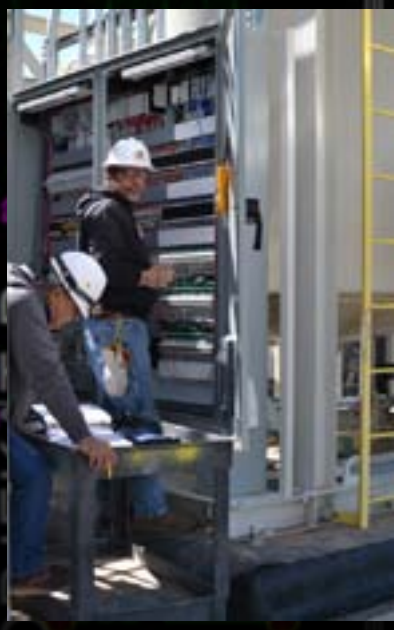

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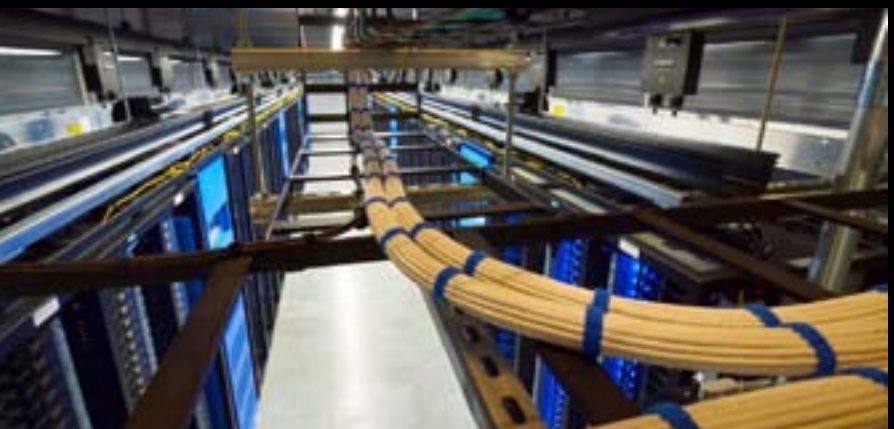

BONUS FEATURES

- FREE 100-Page Digital Electrical Maintenance Handbook (Value $20)
- $100 Coupon Toward any Future Electricity Forum Event (Restrictions Apply)
- 1.4 Continuing Education Unit (CEU) Credits
- FREE Magazine Subscription (Value $25.00)
- Course Materials in Paper Format

2-DAY COURSE
$799

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WHY YOU SHOULD TAKE THIS COURSE

This Electrical Testing and Commissioning Training course covers practices and procedures that are essential to the safe start up of any electrical system for the first time, regardless of its size, type or industry.

Electrical Testing and Commissioning is a very special occurrence and poses some unique challenges to electrical personnel. Inexperience and poor planning will inevitably result in prolonged delays in the start up which can lead to costly productivity losses. This course provides invaluable information to anyone who wishes to know and understand the role of Electrical testing, troubleshooting and commissioning of electric power systems.

The importance of planning and preparation for the project, from engineering to testing, troubleshooting and commissioning and eventual start up, will be emphasized. This course deals with safety considerations and testing and start-up procedures for all the components of any electrical system. The course leader will also offer useful guidelines on what to do when things go wrong during this phase of a project. This course provides guidelines to anyone who wishes to know and understand the role of commissioning in a project, whatever its size. The importance of planning and preparation for the project, from engineering to commissioning and start up, will be emphasized. This course includes the safety considerations in maintenance and testing procedures for all the components of any electrical system.

AGENDA - DAY 1

Electrical System Documentation

- IEEE Device numbers
- Drawing Symbols
- Single lines drawings
- 3 line drawings
- AC/DC Trip & Control Schematics
- Electrical Wiring Diagrams & Connection Wiring Diagrams
- General System Design, Lay-out and Drawings
- Protection Relay Setting Sheets
- Manufacturer Manuals
- Warranty

Analysis and Design of Electrical Systems

- Time-Current Characteristics
- Ground Fault Systems
- Coordination studies
- Short Circuit Studies
- ARC Flash Calculation
- Dynamic Load Study –Motor starting
- Unbalance Load Study

Testing Procedures

- DC Voltage Testing Techniques
- Insulation resistance tests
- Step voltage and high voltage tests
- Testing power factor correcting capacitors
- AC Voltage Testing Techniques
- Power factor and dissipation factor tests
- Power Transformer On Power and Off Power Testing
- Power Transformer Oil Testing

Electrical Safety Requirements during System installation and Equipment Maintenance

- Construction Site Considerations
- Safety during a start up project
- Temporary generators and construction power
- Personal Protective Equipment Voltage Detection Equipment, Hot-sticks, Grounds
- Temporary Grounds
- Interlocking
- Tagging and Permits
- Qualified Electrical Personnel
- Roles and duty of Authorizing Personnel

Commissioning Electric Power Systems

- Management of Start Up & Commissioning Projects
- Turnover Packages
- Terminology
- Objectives
- Specifications
- Documentation
- Drawing control, field mark ups and “as built”
- Test sheet document control
- Keeping track of completed tasks
- Deficiency tracking

COURSE INSTRUCTOR

SAM PHERWANI

Electricity Forum Testing & Troubleshooting Consultant

COURSE TIMETABLE

BOTH DAYS
Start: 8:00 a.m.
Coffee Break: 10:00 a.m.
Lunch: 12:00 noon
Finish: 4:30 p.m.

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Commissioning Electric Power Systems

Large Area System Commissioning
- Ensuring the system is working completely
- Using electrical drawings & flow-sheets
- Sensing Devices
- Isolating devices and isolating points

Transformer Commissioning
- General Construction, Operation & Safety
- Field Assembly and Vacuum Filling of Power Transformers
- Handling Transformer Oil, Tap-changers
- Transformer Protective Devices, Bushings, auxiliary devices alarms & trips
- Dry type transformers: inspection, acceptance tests
- Liquid type transformer: inspection, and acceptance tests
- Routine transformer tests: AC high potential testing, polarity test, induced potential test, polarization index test, and DC winding resistance tests
- Transformer Oil test, On Power and Off Power Expectation.

Circuit Breaker and Switchgear Commissioning
- General Construction, Operation & Safety
- Metal Clad Switchgear construction and safety features
- Commissioning Switchgear
- 600V Breaker construction and safety features
- Capacitors
- Current Transformers
- Instrument Transformers, Test switches, Metering and Relaying Devices
- Insulation resistance measurement test
- DC or AC hi-pot testing
- Power factor or dielectric loss test
- Circuit breaker contact resistance test

Commissioning Control Systems and Instrumentation
- Field devices
- Input and outputs
- Program verification
- Power up and start-up
- Sensors
- PLC and PAC Based Systems
- Distributed Control Systems
- SCADA

Commissioning Motors and Drive Systems
- Motor checks and testing
- Wiring & cable Run
- VFD checkout and start-up
- Filters
- Servo Systems

Substation Equipment Commissioning
- Ground Grid Design, Grounding (Step & Touch Potentials, Earth Resistivity, Bonding Resistance)
- Testing ground grids and soil resistivity
- High voltage towers and switches
- Outdoor SF6 Breakers
- Other Breaker Types
- Other Substation Equipment

Plant Start Up Procedures
- Pre-energization checklists
- First energization procedures
- Phase rotation and other measured system parameter
- Systems and their integration
- Energizing sequence
- Safety considerations
- Load checks
- Documentation
- Correction of defects
- Spare parts
- Final acceptance

4:00 pm -- Day 2 Wrap Up
- Review Quiz
- Questions and Discussions

"Our motivation is your education."

WAYS TO REGISTER

(905) 686-1040

(905) 686-1078

ON-LINE:
www.electricityforum.com/electrical-training/electrical-testing-and-commissioning

MAIL:
The Electricity Forum
1885 Clements Rd., Unit 218
Pickering, ON L1W 3V4

ATTENDEE INFORMATION

To receive registration fee discounts, you must **REGISTER AND PREPAY** prior to the course date.

NAME _____

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COMPANY _____

ADDRESS _____

CITY _____

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REGISTRATION FEES

The registration fee to attend this course is $799.00 + Tax. The fee includes course material, a FREE magazine subscription, a $100 coupon towards any future 2018/2019 Electricity Forum event (restrictions apply), refreshments. NOTE: LUNCH IS PROVIDED WITH THIS COURSE.

REGISTER 3 DELEGATES AT FULL PRICE AND GET THE 4th REGISTRATION FREE!

SAVE $50

REGISTER AND PREPAY 14 Days prior to course date and receive an early bird discount of $50 off the full price.

WHEN & WHERE

(Please check the date/location where you want to attend the course)

ELECTRICAL TESTING AND COMMISIONING COURSE LOCATIONS:

☐ **Mississauga, ON - November 15-16, 2018**
Hampton Inn and Suites Toronto Airport
3279 Caroga Drive
Tel: 905-671-4730

☐ **Ottawa, ON - November 19-20 , 2018**
Radisson Hotel Ottawa Parliment Hill
402 Queen Street
(613) 236-1133

☐ **Winnipeg, MB - November 26-27, 2018**
Sandman Hotel & Suites Winnipeg Airport
1750 Sargent Ave.
Tel: 204-775-7263

☐ **Calgary, AB - November 28-29, 2018**
Holiday Inn Calgary Airport
1250 McKinnon Drive
403-230-1999

☐ **Richmond, BC - December 3-4, 2018**
Sandman Signature Vancouver Hotel & Resort
10251 ST. Edwards Drive
Tel: 604-278-9611

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