

# ELECTRICAL TESTING AND MAINTENANCE

**DISCOUNT PROGRAM PRICING**

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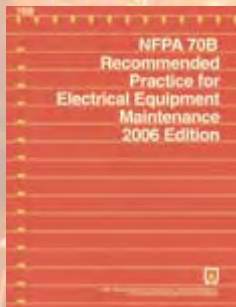
**SASKATOON, SK**  
February 5-6, 2009

**EDMONTON, AB**  
February 9-10, 2009

**VANCOUVER, BC**  
February 11-12, 2009

**TORONTO, ON**  
February 17-18, 2009

Includes NFPA 70b Electrical Maintenance Standard Handbook



and our latest Electrical Maintenance Handbook



## "RECESSION-FRIENDLY" WAYS TO GET THE MOST BANG FROM A SLASHED ELECTRICAL MAINTENANCE BUCK!!



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### LEARNING OUTCOMES:

- Learn How to design and implement a cost-effective "Recession-Friendly" electrical maintenance program.
- Learn the essential procedures for the safe operation, repair, testing, and maintenance of major power equipment.
- Learn how to establish what electrical maintenance work can be done in-house and what must be contracted out.

### WHO SHOULD ATTEND:

This comprehensive two-day course is designed to benefit those working in maintenance that desire to increase their practical knowledge of electrical maintenance standards and practices. The course is open to industrial, commercial and institutional electrical engineering and maintenance professionals, plant electricians, electrical maintenance supervisors, field and plant personnel.

### YOU WILL RECEIVE:

- NFPA 70b Electrical Maintenance Standard (Value \$50.00)
- Our Latest Electrical Maintenance Handbook Volume 8 (Value \$25.00)
- .7 Continuing Education Unit (CEU) Credits for each day of Training
- A FREE Magazine Subscription (Value \$50)
- \$100 Coupon toward any future 2009 Electricity Forum event (restrictions apply)
- Forum Presentations in Paper Format

**ON-SITE TRAINING**  
available  
"We'll Come To You"  
Details inside  
Details



Earn Continuing Education Units (CEUs)



*More than 25,000 Satisfied Students*

# CANADA'S LEADER IN ELECTRICAL TESTING AND MAINTENANCE TRAINING

Has your Electrical Maintenance budget been slashed but you are still responsible for keeping production going and electrical equipment operating? Our "Recession-Friendly" Electrical Testing and Maintenance course will teach you how to prioritize your electrical maintenance strategy, stretch your electrical maintenance budget and at the same time maximize the life and condition of your equipment.

Cost-effective electrical preventive maintenance is the best way to reducing accidents, saving lives, and avoiding costly breakdowns and work stoppages. Our Electrical Testing and Maintenance course is an in-depth examination of electrical testing and predictive maintenance methods and teaches how to maximize the effectiveness of your electrical maintenance investment. Our course introduces students to NETA (North American Electrical Testing Association) "Standard for Maintenance Testing Specifications" and NFPA 70b, "Recommended Practices For Electrical Equipment Maintenance".

These standards apply to preventive maintenance for electrical, electronic, and communication systems and equipment installed in industrial, commercial and institutional power systems.

This course will alert electrical maintenance personnel in utility, industrial, commercial and institutional facilities to the latest North American Electrical Maintenance and Testing Standards and Specifications that cover the suggested field tests and inspections that are available to assess the suitability for continued service and reliability of electrical power distribution equipment and systems. The purpose of NETA and NFPA 70b testing and maintenance specifications is to assure that tested electrical equipment and systems are operational and within applicable standards and manufacturer's tolerances and that the equipment and systems are suitable for continued service. This course will also deal with the important subject of troubleshooting electrical systems and choosing the proper preventive maintenance testing equipment and procedures.

This complete Electrical Testing and Maintenance training course includes a copy of the 230-page NFPA 70b Standard.

## Day One

*James Becker, JPB Training Associates*

### **ELECTRICAL PREVENTIVE MAINTENANCE (EPM) PROGRAM DEVELOPMENT**

#### **PART 1. WHAT IS AN EPM AND WHAT ARE ITS BENEFITS?**

- Planning an EPM Program
- Personnel Safety
- Equipment Loss
- Production Economics
- Main Parts of an EPM Program
- Programmed Inspections
- Recordkeeping
- Training for Safety and Technical Skills

#### **PART 2. PLANNING AND DEVELOPING A PROGRAM**

- Survey of Electrical Installations
- Data Collection
- Single Line Diagrams and Data
- Electrical Equipment Installation Change
- Lighting System Diagrams
- Ventilation
- HVAC
- Control and Monitoring
- Emergency Procedures
- Test and Maintenance Equipment
- Identification of Critical Equipment
- Establishment of a Systematic Program
- Inspection Frequency
- Forms, Planning, Records

#### **PART 3. ELECTRICAL TESTING AND MAINTENANCE STANDARDS**

- Review of NETA's Latest Electrical Maintenance Testing

#### Specifications

- NETA's ANSI Standards for Transformer maintenance
- NETA Critical Switchgear maintenance
- Review of NFPA 70b Electrical Maintenance Standard

#### **PART 4. TEST EQUIPMENT OVERVIEW**

- Insulation Resistance Test Sets (Hipot, Meggar, VLF)
- Contact resistance Testing (Ducter)
- Power Factor Sets (Cap Bridge, Doble)
- Transformer Sets (Winding Resistance, TTR)
- Relay Test sets and AC Current Sources

#### **PART 5. PERSONAL SAFETY**

- Qualification, Tools, Equipment, Training, Arc Flash, NFPA 70e, PPE

#### **PART 6. FUNDAMENTALS OF ELECTRICAL EQUIPMENT MAINTENANCE**

- Scheduling, cleaning, environmental concerns, equipment additions and retrofits

#### **PART 7. SUBSTATIONS AND SWITCHGEAR ASSEMBLIES**

- Insulators
- Conductors
- Air-Disconnecting Switches
- Grounding Equipment
- Enclosures
- Switchgear Assemblies
- Air Circuit Breakers
- Arc Interrupters
- Oil Circuit Breakers
- Interrupter Switches
- Gas-Insulated Substations and Gas-Insulated Equipment
- Maintenance and Repair of the GIS and GIE
- Surge Arresters

- Instrument Transformers and Auxiliary Transformers
- Protective Relays, Meters, and Instruments
- Ground-Fault Indicators
- Network Protectors

### **PART 8. POWER AND DISTRIBUTION TRANSFORMERS**

- Liquid-Filled Transformers
- Regular Inspections
- Current and Voltage Readings
- Temperature Readings
- Liquid-Level Indicator and Pressure/Vacuum Gauges
- Special Inspections and Repairs
- Liquid Maintenance and Analysis
- Fault-Gas Analysis
- Dissolved-Gas-in-Oil Analysis
- Dry-Type Transformers
- Regular Inspections
- Current and Voltage Readings
- Temperature Readings

### **PART 9. POWER CABLES**

- Visual Inspection
- Aerial Installations
- Raceway Installations
- Cable Testing

### **PART 10. MOTOR CONTROL EQUIPMENT**

- Motor Control Preventive Maintenance Guide
- Components and Maintenance of Motor Controls
- Enclosures
- Bus Bar, Wiring, and Terminal Connections
- Disconnects
- Molded Case Breakers
- Fuses
- Contactors
- Motor Overload Relays — Thermal Types
- Pilot and Miscellaneous Control
- Devices
- Mechanical Interlocks

## **Day Two**

### **PART 11. MOLDED-CASE CIRCUIT BREAKERS**

- Types of Molded-Case Circuit Breakers
- Phase-Fault Current Conditions
- Ground-Fault Tripping
- Special-Purpose Breakers
- Inspection and Cleaning
- Loose Connections
- Mechanical Mechanism Exercise

### **PART 12. GROUND FAULT PROTECTION**

- Personal and Equipment Protection

### **PART 13. FUSES**

- Fuses Rated 1000 Volts or Less
- Fuses Rated over 1000 Volts
- Installing and Removing Fuses
- Inspection, Cleaning and Servicing
- Replacement

### **PART 14. ROTATING EQUIPMENT**

- Maintenance, cleaning, Testing
- Stator and Rotor Windings
- Brushes, Collector Rings, and Commutators
- Bearings and Lubrication

### **PART 15. TESTING AND TEST METHODS**

- Acceptance Tests and Maintenance Tests
- Frequency of Tests
- Special Precautions and Safety
- Qualifications of Test Operators
- Insulation Testing
- Dielectric Absorption
- Protective Device Testing
- Circuit Breaker Tests
- Transformer Turns-Ratio and Polarity Tests
- Impedance Testing of Equipment Grounding Conductor
- Infrared Inspection
- Meggaring, Continuity, Hi-Pot testing of equipment

### **PART 16. UNINTERRUPTIBLE POWER SUPPLY (UPS) SYSTEMS**

- UPS System Maintenance Procedures — General
- System Tests, Routine Maintenance, Special Tests

### **PART 17. POWER QUALITY**

- Harmonics
- Transients (Surges)
- Voltage Sags and Swells
- Long-Duration Undervoltages
- Sustained Voltage Interruptions
- Unbalanced Voltages and Single Phasing
- Symptoms — Grounding
- Voltage Fluctuations and Flicker

### **PART 18. GROUNDING**

- Symptoms and Causes of Inadequate Grounding
- Grounding System Inspection, Testing, and Monitoring
- Solutions to Inadequate Grounding

### **PART 19. EPM FROM COMMISSIONING (ACCEPTANCE TESTING) THROUGH MAINTENANCE**

- Commissioning Planning Stages
- Submit Functional Performance Tests (FPTs)
- Costs of Commissioning, New Construction
- Suggestions for Inclusion in a Walk-Through Inspection Checklist

### **PART 20. SINGLE LINE DIAGRAMS AND SYMBOLS**

### **PART 21. FORMS TO DOCUMENT ALL TESTS AND INSPECTIONS**

- Battery inspections
- Breaker Inspections
- Test Results
- Transformer tests, inspections,
- Ground System Tests
- Long-Term Maintenance Guidelines

## **ABOUT THE COURSE LEADER**

Jim Becker is President of JPB Training Associates. Jim is a Retired/Consulting Instructor with Con Edison of New York City. He has more than 40 years of experience in the Electrical field from Electrician to Supervisor to District Operator. For the past ten years, Jim has been instructing electrical workers in the safe operation and maintenance of high voltage equipment of all types and vintages on the Con Edison High Voltage System.

# REGISTRATION

## Act Now! Limited Seating! Register Today!

### REGISTRATION FEES

The registration fee to attend the Electrical Testing and Maintenance course is \$799.00 + \$39.95 GST. The registration fee includes: course documentation, NFPA 70b Electrical Maintenance Standard, Electrical Maintenance Handbook Volume 8, magazine subscription, Electricity Forum \$100 coupon towards any future 2009 Electricity Forum event (Restrictions Apply), refreshments and lunch.

## Save \$50

**REGISTER AND PREPAY** 14 days prior to course date and receive an early bird registration fee of \$749 + \$37.45 GST. Companies registering 3 delegates at the regular price (\$799.00) will receive a 4th registration FREE.



**Register 3 Delegates At Full Price, THE 4TH REGISTRATION IS FREE**

### ON-SITE TRAINING AVAILABLE

Why not request a FREE Electrical Testing and Maintenance Training On-Site Training Course quotation directly for our company?? <http://www.electricityforum.com/on-site-training-feedback.htm> Our on-site training courses are tailored to meet your company's specific requirements and conducted on your own premises for your employees. Save the cost of travel and hotels and save on our regular public enrollment registration fees. Plus, our instructors can work with you in advance to determine the level of electrical training and experience of your employees and the specific applications that you would like covered. Electrical on-site training courses are best because they are delivered using the equipment your electrical technicians use every day. This maximizes the educational value of your electrical training investment. For more information, contact: Randy Hurst, President, The Electricity Forum [randy@electricityforum.com](mailto:randy@electricityforum.com)

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MAIL:  
The Canadian  
Electricity Forum

Unit 215, 1885 Clements Rd.  
Pickering, ON L1W 3V4

### WHEN AND WHERE

(Please indicate where you want to attend the course)

#### Electrical Testing and Maintenance Training Course

**Saskatoon, SK - February 5-6, 2009**

Saskatoon Inn, 2002 Airport Drive, Tel: 306-242-1440

**Edmonton, AB - February 9-10, 2009**

Radisson Hotel Edmonton South, 4440 Gateway Blvd. NW, Tel: 780-437-6010

**Vancouver, BC - February 11-12, 2009**

Best Western Richmond Hotel and Convention Centre, 7551 Westminster Hwy., Tel: 604-273-7878

**Toronto, ON - February 17-18, 2009**

The Quality Suites Toronto Airport, 262 Carlingview Drive, Tel: 416-674-8442

When redeeming a \$100 coupon from a previous course, you must **RESGISTER AND PREPAY** prior to the course date.

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\* Payable to the Canadian Electricity Forum

**CANCELLATION AND REFUND POLICY:** Registration fees are refundable only upon receipt of written notification 10 days prior to the conference date, less a 10 per cent service charge. Substitution of participants is permissible up to and including the day of the forum. The Canadian Electricity Forum reserves the right to cancel any conference it deems necessary and will, in such event, make a full refund of the registration fees.