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ELECTRICAL GENERATORS & STANDBY EMERGENCY POWER SYSTEM TRAINING

September 8-9, 2016	**Toronto, ON**
September 12-13, 2016	**Winnipeg, MB**
September 14-15, 2016	**Saskatoon, SK**
September 19-20, 2016	**Edmonton, AB**
September 21-22, 2016	**Richmond, BC**

Installation, Testing, Troubleshooting and Maintenance of Electrical Generators & Standby Emergency Power Systems

BONUS FEATURES

- UPS Electrical Handbook
- **$100 Coupon** Toward any Future 2016-17 Electricity Forum Event
- 1.4 Continuing Education Unit (CEU) Credits
- **FREE** Intelligent Power Today Magazine Subscription
- Forum Presentations in Paper Format
- Refreshments and lunch provided

2-DAY COURSE
$799

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THE ELECTRICITY FORUM EST. 1986

complete course details:
www.electricityforum.com/forums/generators-standby-power.html

ELECTRICAL GENERATORS & STANDBY EMERGENCY POWER SYSTEM TRAINING

From portable electrical generators to standby power cogeneration units - from the facility manager to the maintenance technician - this backup power generation course is designed for anyone involved with electrical generation equipment in their plant or facility.

In today's industrial, commercial and institutional power systems environment, nothing can be taken for granted. Severe weather can cause power outages for a few seconds or several days. Explosions and fire can sever lines to your facility. Sometimes we simply experience blackouts because the utility power grid is overloaded. Critical power situations demand 100 per cent power, 100 per cent of the time. Whatever the cause, lack of electricity at your facility can be devastating, whether you are responsible for a power system at a hospital, a treatment plant providing water for your community, or a banking or telecommunications network facility which must deliver a service uninterrupted.

During this course, you will learn what you can do, and should do with standby electrical generators and emergency power generation systems, to make sure your facility will keep running even if the electricity to your plant or facility doesn't.

WHO SHOULD ATTEND

This course is designed for anyone involved with emergency onsite power generation systems or working in any facility where an emergency power supply is absolutely critical! In this seminar, students are invited to attend from a wide variety of industries, skill-levels, company sizes, and backgrounds. If you're not sure you'll fit in, or will benefit from this class, don't worry - you will - as long as you have an interest in onsite power generators or UPS systems!

All Electrical Maintenance Personnel in:

- Industrial Facilities and Manufacturing Plants
- Government Buildings
- Telecommunications and Banking Systems
- ISPs
- Commercial Office Buildings
- Hospitals and Critical Medical Facilities
- Waste Water Facilities
- Water Treatment Facilities
- Airports
- Pharmaceutical Labs
- Colleges and Universities

Including:

- Plant Electrical Engineers
- Electrical Maintenance Managers
- Electrical Maintenance Technicians
- Facility/Plant Managers
- Consulting Electrical Engineers
- Emergency Preparedness Compliance Officers
- Mechanics
- Building Engineers
- Multi-craft & Cross Training Personnel
- Any person needing a basic course in emergency power and standby electrical generators

AGENDA - DAY 1

1. ENGINE CYCLES: BRAYTON AND OTTO: INLET; COMPRESSION; COMBUSTION; EXHAUST

- **Brayton Cycle explained**
- **OTTO cycle explained**
- **Inlet function and design**
- **Compression Function and Design**
- **Combustion Function and Design**
- **Exhaust Function and Design**

2. COMBUSTION-BURNER CONSTRUCTION AND FUNCTION

- **Combustion construction and function**
- **Burner construction and function**

3. COMPRESSORS: AXIAL, SINGLE ROTOR; MULTIPLE STAGE; CENTRIFUGAL

- **Type of Compressors**
- **Axial compressor Single Stage Construction and function**
- **Axial compressor Multiple Stage Construction and function**
- **Centrifugal Compressor**

4. GAS TURBINES: EXAMPLE: BRAYTON MODEL: OPEN AND CLOSED CYCLE

- **Example of a gas turbine, Bryaton Model**
- **Open and close Cycle of Bryaton Model**

5. POWER TURBINES

- **Two Spool Turbine**
- **Power Turbine Blade**
- **Power Turbine Inlet Compressor Burner and Nozzle**

6. ENGINES: TURBOJET; TURBOPROP; TURBOFAN; TURBOSHAFT; RAMJET

- **Design Functions and Parameters of Turbojet Engine**
- **Design Functions and Parameters of Turboprop Engine**
- **Design Functions and Parameters of Turboshaft Engine**
- **Design Functions and Parameters of Turbojet Ramjet**

7. GOVERNOR CONTROL, BLOCK DIAGRAM

- **Governor Control loop Block diagram**
- **Fuel Modulation and Speed Control**
- **Vibration Amortization and Control**

8. COMPRESSOR SURGE AND COMPRESSOR STALL CONDITION

- **Compressor Surge Condition Explained**
- **compressor Stall Condition Explained**

9. TYPES OF EXCITATION - AUTOMATIC VOLTAGE REGULATOR

- **Automatic Voltage regulator functions; parameters; settings and alarms**
- **Static Generator exciter-SCR Based**
- **Rotating Engine with diode rectifier exciter**

10. GENERATOR CONTROLLER FUNCTION LOCAL AND REMOTE COMMANDS, CONTROLLER SETTINGS AND ALARMS

- **Implementation of NFPA 110 LEVEL 1 REQUIREMENTS**
- **IMPLEMENTATION OF NFPA 99 AND NEC REQUIREMENTS**
- **IMPLEMENTATION OF UL 508 AND CAN/CSA 282**

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11. TRIP POINTS, AND SHUT DOWN CONDITIONS

- Emergency Stop
- High coolant temperature
- High Oil Temperature
- Controller Internal Fault
- Locked Rotor Fault
- Low Coolant Level
- Low Oil Level
- Low Oil Pressure
- High Generator Winding Temperature Master switch error
- Over Crank
- Over Speed
- Generator Over Voltage
- Generator Under Voltage
- Generator Over Frequency
- Generator Under Frequency
- Coolant signal loss
- Oil pressure signal loss

12. POWER TRANSFER FROM UTILITY TO BACKUP GENERATOR AND FROM BACKUP GENERATOR TO UTILITY, AUTO AND MANUAL

- Isolated neutral transfer (3 phase only)
- Neutral Transfer

13. GENERATOR PROTECTION: IEEE 242 & IEEE 37.102

- Requirements for Generator Protection: Short circuit; Unbalance Voltage; Reverse Power; Loss of Excitation

14. GENERATOR GROUNDING AND BONDING

- Solid grounding
- High Impedance grounding
- Safety Bonding requirements

15. GENERATOR REQUIREMENTS HAVING UPS LOAD

- Timing and Synchronization of the UPS frequency connected to a Backup generator
- Event Flow in case of a blackout

16. GENERATOR SIZING; INSTALLATION AND TESTING REQUIREMENTS

- Generator Load Characteristic-Static and Dynamic load to be considered
- Installation requirement, gas emission and safety
- Testing requirements according to IEEE 282-09

SESSION 6: CURRENT TRANSFORMERS (CTS) & VOLTAGE TRANSFORMERS (VTS)

- Various types of CTs, VTs & CVTs
- Theory and characteristics of CTs
- Application requirements of CTs for protective relaying
- Accuracy classifications
- Future trends in CT design
- Testing of CTs and VTs

AGENDA - DAY 2

17. EXAMPLE OF A 750KVA/600V BACKUP GENERATOR:

- Example of a Detroit Diesel Generator Engine: 6 cylinder, in line 4 stroke Turbocharged and intercooled
- Standard Accessories

18. MAINTENANCE ACTIVITY RELATED TO THE ENGINE:

- Replacement of dry type filter with service indicator
- Replacing Lube oil filter
- Replacing Flexible Fuel lines supply and return
- Maintaining: Battery; Charger; Fuel Injection System; Oil Sump and Drain; fuel pump

19. ALTERNATOR RATINGS AND MAXIMUM TEMPERATURES

- Alternator rating and maximum temperature
- Alternator winding and grounding
- Alternator Bearings Maintenance
- Rotor Winding, brushless design

20. GENERATOR VOLTAGE REGULATORS

- Solid state, 0.25 per cent Regulation
- VOLT/HERTZ Operation; voltage stability and tuning
- Paralleling capability and drooping
- Var and PF control
- Monitoring Parameters:
- Electrical: Voltage; Currents; Frequency; Loading: Power Factor; Duty Level; Battery voltage
- Mechanical: Coolant Temperature; Level; Oil Pressure; Fuel used; Fuel Pressure; Fuel Temperature, Run time, etc

21. OPERATIONAL AND MAINTENANCE RECORDS

- Mandatory Testing of backup Generators, IEEE and NFPA
- Application example using service documentation and tuning software

COURSE TIMETABLE

BOTH DAYS

Start: 8:00 a.m.
Break: 10:00 a.m.
Lunch: 12:00 noon (included with course)
Break: 2:00 p.m.
Finish: 4:30 p.m.

COURSE INSTRUCTOR

DR.EDUARD LOICZLI, P.ENG. SENIOR ELECTRICAL ENGINEER, THE ELECTRICITY FORUM

"Our motivation is your education."

WAYS TO REGISTER

1 (855) 824-6131

(905) 686-1078

ON-LINE:
www.electricityforum.com/forums/generators-standby-power.html

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 _____

TITLE _____

COMPANY _____

ADDRESS _____

CITY _____

PROVINCE _____

POSTAL CODE _____

E-MAIL _____

TEL ( ) _____

FAX ( ) _____

METHOD OF PAYMENT

☐ **Bill My Credit Card**

☐ **AMEX** ☐ **VISA** ☐ **MasterCard**

Card # _____

Exp. Date _____

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Card Holders Name _____

REGISTRATION FEES

The registration fee to attend the two-day Standby Generators & Emergency Power Systems training course is $799.00 + GST/HST. The fee includes Course presentation materials, CEU Credit, refreshments, Lunch Is Included.

Register and prepay 14 days before forum date and receive an early bird discount of $50.00

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

WHEN & WHERE

Toronto, ON - September 8-9, 2016
Hampton Inn and Suites
3279 Caroga Drive, Mississauga, ON
Tel: 905-671-4730

Winnipeg, MB - September 12-13, 2016
Four Points by Sheraton Winnipeg International Airport
1999 Wellington Avenue
Tel: 204-775-5222

Saskatoon, SK - September 14-15, 2016
Sandman Airport Hotel
310 Circle Dr
Tel: 306-477-4844

Edmonton, AB - September 19-20, 2016
Sawridge Inn Edmonton South
4235 Gateway Blvd NW
Tel: 780-438-1222

Richmond, BC - September 21-22, 2016
Holiday Inn Vancouver Airport
10720 Cambie Road
Tel: 604-821-1818

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.
The 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.