

Training Title

Substation maintenance & troubleshooting of switchgears & SF6

Training Duration

5 days

Training Date

Ref EE100	Substation maintenance & troubleshooting of switchgears & SF6	5	23 – 27 Sept '18	\$4,250	Dubai, UAE
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In any of the 5 star hotels. The exact venue will be informed once finalized.

Training Fees

- 4,250 US\$ per participant for Public Training includes Materials/Handouts, tea/coffee breaks, refreshments & Buffet Lunch

Training Certificate

Define Management Consultancy & Training Certificate of course completion will be issued to all attendees.

Language: English

TRAINING OBJECTIVES

- Substation types, applications, components and safety procedures
- Medium-voltage circuit breaker maintenance and testing methods
- Perform insulation resistance, contact resistance on air, oil and vacuum breakers, and tank loss index on oil circuit breaker and vacuum bottle integrity tests on vacuum breaker
- Switchgear arrangement, torque requirements, insulation systems and maintenance intervals
- Perform switchgear inspection and maintenance in lab
- Battery types, applications, systems and components
- Perform battery maintenance and testing in lab

TRAINING METHODOLOGY

A highly interactive combination of lectures and discussion sessions will be managed to maximize the amount and quality of information and knowledge transfer. The sessions will start by raising the most relevant questions, and motivate everybody find the right



answers. The delegates will also be encouraged to raise their own questions and to share in the development of the right answers using their own analysis and experiences. Tests of multiple-choice type will be made available on daily basis to examine the effectiveness of delivering the course.

- 30% Lectures
- 30% Workshops and work presentation
- 20% Group Work & Practical Exercises
- 20% Videos & General Discussions

Who Should Attend?

This course is intended for Electrical Engineers, Electrical Supervisors and Electrical Technicians engaged in the commissioning, testing, start-up, troubleshooting, maintenance and repair of Electrical Equipment and Control Systems. Because the methods and examples are generic, trainee from all industries especially oil and gas fields will benefit. Participants need no specific requirements other than good understanding of electricity and magnetism and some relevant experience.

COURSE DETAILED OUTLINE

Following topics will be covered in 5 days.

1. Daily Outline

1.1. Introduction

- Student introduction
- Purpose Of Electrical Maintenance
- The golden triangle of Maintenance
- Electrical safety rules
- Pre test

1.2. Electrical Distribution System

- References
- Distribution System Back ground
 - Transmission system configuration
 - System types

- Radial systems
- Substation rating & Arrangements
- verifying correct condition and operation of the switchgear
 - Visual Inspections
 - Mechanical Inspections and Tests
 - Electrical Tests
 - Functional Operation Test
 - Review of Testing and Inspection Results
 - Trouble shooting

1.3. Air Circuit Breaker

- Construction
- Operation C/H
- Rating And name plate data
- Protection C/H
- Applications

1.4. Vacuum Circuit Breaker

- Construction
- Operation C/H
- Rating And name plate data
- Protection C/H
- Applications

1.5. Oil Circuit Breaker

- Construction

- Operation C/H
- Rating And name plate data
- Protection C/H
- Dissolved Gas Analysis
- Applications

1.6. Verifying Correct Condition , Maintenance And Operation Of Air , Vacuum & Oil Circuit Breakers

- Visual Inspections
- Mechanical inspection and tests
- Electrical Tests
- Review of testing and inspection results

1.7. Power Transformers

1.7.1.Transformers types

- Distribution transformers
 - ANSI Liquid filled
 - Unit and substations transformers
 - Pad Mounted transformers
- Single and three phases
- Power transformers ;large , medium and small transformers
- Voltage Transformer (VT) and current transformers (CT's)

1.7.2.Accessories & Protective Devices

- Double Float Buchholz relay
- Dial Type Contact Thermometer
- Magnetic oil –Level Indicator

- Protective devices for hermetically sealed transformers
- Pressure Relief device
- Dehydrating Breather
- Bushing Current transformer
- Additional accessories
- Protective relaying

1.7.3. General diagnostic

- Insulation Resistance and Polarization Index
- Turns Ratio and Excitation Current
- Capacitance and Power Factor
- Winding Resistance
- Recovery Voltage Measurement
- Frequency Response Analysis
- Interpretation of test results
- Oil Quality Analysis
- Dissolved Gas Analysis

1.7.4. Lightning Arrestors

- Types
- Inspection
- Testing

1.7.5. Ground Grid Systems

- Purpose
- Grounding theory
- Types of test equipment
- Inspection
- Testing

1.7.6. Batteries and Chargers

- Types of station batteries

- Battery systems
- Maintenance
- Inspection

1.7.7. Open session for questions, answers and case studies

NOTE:

- Pre & Post Tests will be conducted
- Case Studies, Group Exercises, Group Discussions, Last Day Review & Assessments will be carried out.

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