Training Title

TRANSFORMERS, RMU SWITCHGEARS AND CIRCUIT BREAKERS

Training Duration

5 days

Training Dates & Venue

REF EE045	Transformers, RMU Switchgears and Circuit Breakers	5	07 - 11 Oct	$4,250	Dubai, UAE

Training will be held at 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.

TRAINING OVERVIEW

Introduction & Description

Operation and maintenance of electric power equipment to assure that the equipment and systems will operate as intended. Periodic maintenance inspections and tests should be conducted on existing electric power equipment to maintain reliability, to reduce major repair costs, and to trigger need-based maintenance activities. The course describes how equipment operates and how it fails, what inspections and tests should be conducted, and how inspection and test results are evaluated. It also includes developing commissioning procedures and checklists, and developing maintenance programs. Transformers, circuit breakers, buses, motors, relays and other equipment found in substations, electrical rooms, motor control centers, and panel boards will be discussed.
This will ensure the electrical equipment operates correctly so that production is maximized in a safe, cost effective and efficient manner.
Delegates are encouraged to raise queries both during and at any time after attending the course and are also asked to bring with them any technical issues that they may have.

TRAINING OBJECTIVES:

• Following the attendance at this course, participants will return to their respective organizations equipped with new or refreshed skills to ensure that each power components related to the industrial substations are tested and maintained in a fashion that ensures reduced costs and or start-up delays plus identified faults or problems are repaired and the underlying causes are identified and eliminated to reduce further failures.

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.

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. Booklet, Power-Point presentations, Handouts, Videos, User group discussions and practices on case study

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

COURSE OUTLINES

DAILY OUTLINE

Day-1

1.1. Introduction

- **Student introduction**
- **Purpose Of Electrical Maintenance**
- **The golden triangle of Maintenance**
- **Electrical safety rules related to power Electrical Equipments**
    - **o Electrical Definitions**
    - **o Documentation and Notices**
    - **o Safety Equipment**
    - **o Persons**
    - **o Rules For Initiation Of Work**
    - **o Electrical Permit to Work Certificate**
    - **o Sanction for Test Certificate**
    - **o Limitation of Access Certificate**
    - **o Electrical Isolation Certificate**

1.2. Electrical Distribution System

- **References**
- **Distribution System Back ground**
    - **o Transmission system configuration**
    - **o System types**
    - **_ Radial systems**

_ Ring Main Units configurations

- **Substation rating & Arrangements**

- verifying correct condition and operation of the switchgear
    - o Visual Inspections
    - o Mechanical Inspections and Tests
    - o Electrical Tests
    - o Functional Operation Test
    - o Review of Testing and Inspection Results
    - o Trouble shooting

Day-2

2.1. Air Circuit Breaker

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

2.2. Vacuum Circuit Breaker

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

Day-3

3.1. Oil Circuit Breaker

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

3.2. 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

Day-4

4.1. Power Transformers

4.1.1. Transformers types

- Distribution transformers

o ANSI Liquid filled

o Unit and substations transformers

o Pad Mounted transformers

- Single and three phases
- Power transformers ;large , medium and small transformers

- Voltage Transformer (VT) and current transformers (CT's)

4.1.2. 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

Day-5

4.1.3. 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

5. Day-5

5.1.1. Ground Grid Systems

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

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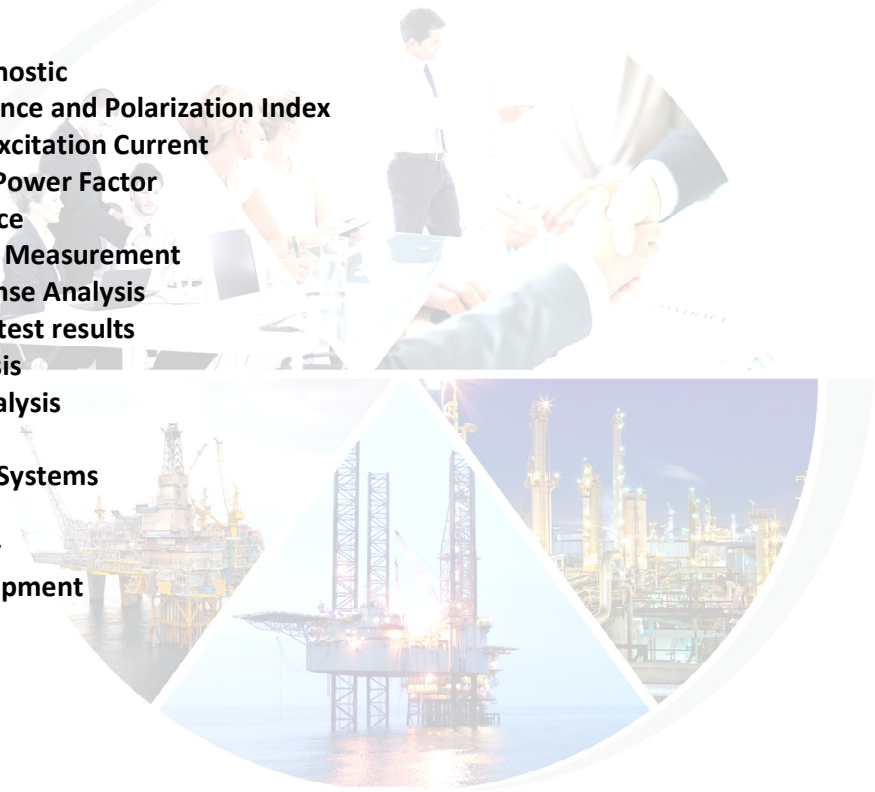

NOTE:

Pre & Post Tests will be conducted

Case Studies, Group Exercises, Group Discussions, Last Day Review & Assessments will be carried out.

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