



Technical Diagnostic Services Training Institute

Substation Testing and Maintenance I 36 Hours

Who Should Attend?

This course will be of benefit to technicians, supervisors, field engineers, apprentices and others who actually perform or are responsible for the maintenance, testing and evaluation of the most common types of substations devices.

Course Description:

Participants will perform the maintenance and testing required for common substation devices, including power transformers, lightning arrestors, protective relays and insulating liquids. This hands-on, practical-based course focuses on what to do, when to do it, how to interpret the results from testing and maintenance, and the actual test procedure required.

Learning Objectives:

- Review of current industrial substation safety requirements.
- Explain the value of performing transformer insulating liquid test and dissolved gas analysis.
- How to perform the various tests required on industrial and utility transformer.
- Evaluate transformer test data.
- Explain the various tests used to determine serviceability of lightning arrestors.
- Overview of protective relays associated with substations.

Prerequisites: Training and/or 2 years experience in electrical maintenance or construction with a good understanding of electrical theory and a working knowledge of electrical testing and electrical systems.

Experience in high voltage substations is a plus.

TDSTI

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Substation Maintenance I Course

I. Introduction

- A) Student Introductions
- B) Pre-Test
- C) Safety

II. The Substation As A System

- A) Application
- B) Common Problems

III. Lightning Arrestors

- A) Types
- B) Inspection
- C) Maintenance
- D) Testing

IV. Transformers

- A) Types
- B) Insulating Liquids
 - i) Sampling
 - ii) Dissolved-Gas Analysis (DGA)
 - iii) Testing

V. Load-tap changers

- A) Inspections
- B) Maintenance
- C) Testing

VI. Transformer Testing

- A) Insulation Resistance
- B) Winding Resistance
- C) Turns Ratio (TTR)
- D) Winding Power Factor
- E) Bushing Power Factor
- F) Core Excitation Current

VII. Air Switches-Overview

- A) Overhead
- B) Enclosed Disconnects
- C) Inspection
- D) Testing & Maintenance

VIII. Circuit Breakers-Overview

- A) Construction and Operation
 - i) Air
 - ii) Vacuum
 - iii) Oil
 - iv) SF-6 introduction (classroom only)
- B) Inspection & Maintenance
- C) Major Maintenance Requirements

IX. Circuit Breakers Testing-Overview

- A) Contact Resistance
- B) Insulation Resistance
- C) Power Factor
- D) Vacuum Integrity
- E) Oil
- F) Time-Travel

X. Course Conclusion

- A) Class Review
- B) Final Examination

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