

Basics of SFRA and Interpretation criteria for condition assessment of Power transformers

Course Code: TR-B-2, Duration: 2 days

Session 1: Introduction

- ✦ Introductions
- ✦ Short circuit failures in transformers
- ✦ Competing diagnostic techniques
- ✦ SFRA theory and practice
 - Basic circuit theory EE and expected SFRA responses of RLC network
 - Series and Parallel resonance of RLC circuit SFRA response
 - Modeling of Transformer winding and expected SFRA response in various frequency range.

Session 2: Basic requirement of SFRA measurement

- ✦ Grounding requirements
- ✦ Recommendations for making good SFRA measurements
- ✦ Typical SFRA responses
- ✦ Repeatability

Session 3: Good Measurement of SFRA

- ✦ Discussion of relevant safety requirements
- ✦ Operation of SFRA instrument software
- ✦ Use of test leads
- ✦ Measurements on a transformer

Session 4: Basic principle of interpretation of SFRA results

- ✦ *Review of measurements made during practical session*
- ✦ *Interpretation strategies: reference, phase, sisters*
- ✦ *Using Cross-correlation Coefficients to Analyze Transformer SFRA Traces*
- ✦ *Analysis and interpretation of various fault by SFRA*
 - *Hoop buckling of inner windings*
 - *Axial collapse*
 - *Failure of clamping*
 - *Tap lead movement*
 - *Faulty core ground*
 - *Shorted turn fault*
 - *High Impedance fault*

Session 5: Advanced features of SFRA interpretation

- ✦ *SFRA Test data: Pitfalls in SFRA*
- ✦ *Effect of Residual measurement*
- ✦ *SFRA analysis of transformer with and without oil filled*
- ✦ *Effect of Core Grounding and earth circuit on SFRA*
- ✦ *SFRA measurement of the transformer with irreversible Tapchanger*
- ✦ *Field and Factory SFRA plot comparison criteria*
- ✦ *Using Cross-Correlation Coefficients to Analyze Transformer SFRA Traces*

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