

CIGRE WORKING GROUP A2.34 – PROGRESS REPORT
Guide for Transformer Maintenance
August 2009
Claude Rajotte, convenor

SUMMARY

The CIGRE Working Group A2.34 main objective is to prepare a guide for transformer maintenance that will help transformer users to define and apply best practices for transformer maintenance. This CIGRE working group consists of industry experts representing utilities, transformer manufacturers, and third parts.

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MEETINGS

The WG was proposed at the Paris Session 2006 and was approved by Paris at the end of 2006. From now, there was five meeting:

- Meeting #1: Montreal, Canada – May 2007
- Meeting #2: Brugges, Belgium – October 2007 (SCA2/D1 Colloquium)
- Meeting #3: Geneva – June 2008
- Meeting #4: Paris – August 2008
- Meeting #5: Prague – May 2009
- Meeting #6: Cape Town – August 2009
- Meeting #7: Spring 2010

ORGANISATION

The WG is divided in five different TF:

- TF1: Maintenance practices, condition assessment and diagnostic
- TF2: Transformer Oil: criteria, treatment and economics
- TF3: Transformer Accessories: specification and maintenance
- TF4: Human and material aspects of transformer maintenance
- TF 5: On-site repair and testing

TIMETABLE (revision)

#	Dates	WG Objective
1	May 14,15th 2007	Table of content - preliminary TF leaders and members identified Phase 1 items identified and assigned
2	October 10th, 2007	Table of content – draft Drafts – Phase 1 items Phase 2 items identified and assigned
3	June 2008	Table of content – second draft Drafts – Phase 2 items Remaining items identified and assigned
4	August 2008	First Internal Draft for the whole brochure
5	April 2009	Second Internal Draft for the brochure
6	August 2009	Third Internal Draft
7	Spring 2010	Final version release for circulation into SCA2
8	August 2010	Final report published

PROGRESS AND NEXT STEPS

- Third draft improvements
- Editorial work
- Final revision for circulation into SCA2
- Publication for Paris 2010
- Publication of a report for Electra
- Preparation of a Tutorial

OVERVIEW OF THE BROCHURE TABLE OF CONTENT (according to Draft #3)

Chapter 1 Introduction.....	
1.1 Guide on Transformer Maintenance	
1.2 Transformer Operation and maintenance cycle	
Chapter 2 Maintenance Strategy	
2.1 Condition Assessment Feasibility	
2.2 Time-based maintenance	
2.3 Condition based maintenance.....	
2.4 Continuous on-line monitoring	
Chapter 3 Maintenance Process	
3.1 Maintenance Planning	
3.2 Maintenance organization	
3.3 Maintenance execution	
3.4 Maintenance recording	
3.5 Maintenance optimization	
Chapter 4 Transformer Component Selection and Maintenance	
4.1 Bushing	
4.2 Oil preservation system	
4.3 Cooling systems.....	
4.4 Gaskets.....	
4.5 Gauges, indicators and relays.....	
4.6 Control cabinet.....	
4.7 Current Transformers (CT)	
4.8 On-Load-Tap Changer.....	
4.9 DETC	
4.10 Lightning (Surge) Arresters.....	
4.11 Transformer active part	
4.12 Sensing and monitoring devices.....	
Chapter 5 Maintenance action repertory	
5.1 Electrical Measurement Methods for On-Site Transformer Diagnosis.....	
5.2 Oil, DGA and Paper tests	
5.3 OLTC tests	
5.4 Maintenance Inspection Tasks repertory	
5.5 Insulation drying.....	
5.6 Physical and Chemical oil treatments	
5.7 Oil treatment relative to Corrosive Sulfur problems	
Chapter 6 Major work – transformer repair	
6.1.- On-Site Repair - Definition.....	
6.2.- On-Site Repair – Why and when ?	
6.3.- On-Site Repair – Process	
6.4.- Economics	
6.5.- Environmental considerations.....	
6.6.- Summary and recommendations.....	

Appendix:

1. Bibliography
2. Survey Results
3. SF6 Transformer Maintenance Particularities
4. Maintenance Manual Specifications
5. Maintenance Tracking
6. Examples of Maintenance Process Reports
7. Example of Failure Notification
8. Static Electrification in Power Transformers
9. Life cycle assessment on CO2 Emission for Power Transformer
10. Power Transformer Life Cycle Impacts
11. Oil Sampling