



CIGRÉ Study Committee Report SCA2 – Transformers

October 18th, 2010

Vancouver



Claude Rajotte, Hydro-Québec-TransÉnergie

The Transformer Committee (A2)



Scope : Design, construction, manufacture and operation for all kinds of power transformers, including industrial , DC converters and phase-shift transformers and for all types of reactors and transformer components (bushing, tap-changer...)

In the past (*known as SC12*) activities were focussed on design problems related to the rapid increase of rated voltage and power



Today, the two Strategic Directions for A2 future activities are :

- **Services to Customers** (Reliability, Life management, Economics, Tutorials, ...)
- **Technology Issues** (Safety, New technologies and New concepts, Electrical environment, Pre-standardisation work, ...)

Chairman: Claude Rajotte (CA) 

Secretary: Patrick Picher (CA)

Canadian Representative: Elisa Figueroa 2

Recent CIGRE BROCHURES


<i>Scope</i>	<i>Ref</i>	<i>Year</i>
Economics of Transformer Management	248	2004
Guide: Transformer Data Lifetime Management	298	2006
Mechanical Cond. Assessment of Xfo Windings	342	2008
Recom. for Condition Monitoring & Assessment	343	2008
Moisture Equilibrium within Transfo. Insulation	349	2008
Copper Sulphide in Transformer Insulation	378	2009
Thermal Performances	393	2009
HVDC Tr. – Test, ageing, reliability in service	406	2010
HVDC Tr. – Guidelines for design review	407	2010

To be published in 2010:

WG A2.34: Guide for Transformer Maintenance

WG A2.35: Experiences in service with new insulating liquids

Present A2 Activities

- 24 regular members
- 19 observer members
- 10 WG's (2 are finishing their mandate)
- 181 experts: 12 Canadians 
- 4 AG's
- 35 countries represented

Present A2 WG

WG A2-33 -Fire Safety (A. Petersen/AU)



- Avoidance of tank rupture
- Precaution to fire victim
- Precautions to fire origin



WG A2-34 Guide for Transformer Maintenance (C. Rajotte/CA)



- Define best practices, periodicities
- Diagnostic techniques
- Advanced maintenance activities
- Human and material aspects, planning
- Competences, training, on-site repair, etc.



Present A2 WG

WG A2-35 Experiences in service with new liquids (R. Martin/UK)

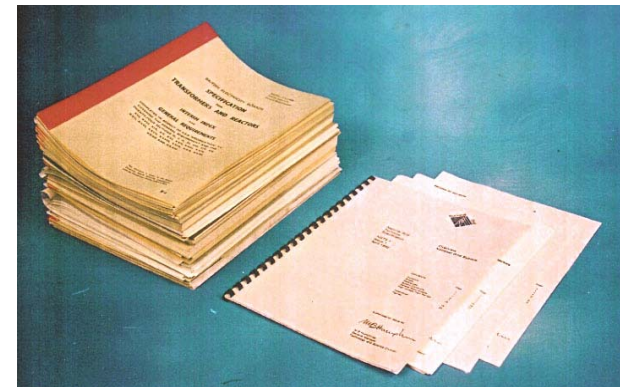
- Physical, Chemical and Electrical properties of alternative fluids in comparison with Mineral oil
- Review of experience in service of new fluids, relevance of service tests as opposed to mineral oil
- Maintenance, Reliability, Longevity and interaction of fluids with solid insulation.



WG A2-36 Guide for Transformer Procurement

(T. Breckenbridge / UK)

- Prepare a new guide for assessing the capability of transformer manufacturers that evaluates technical competence and experience
- Review and update of the existing CIGRE A2 documents on procurement



Present A2 WG

WG A2-37 Transformer Reliability Survey (S. Tenbohlen/DE)



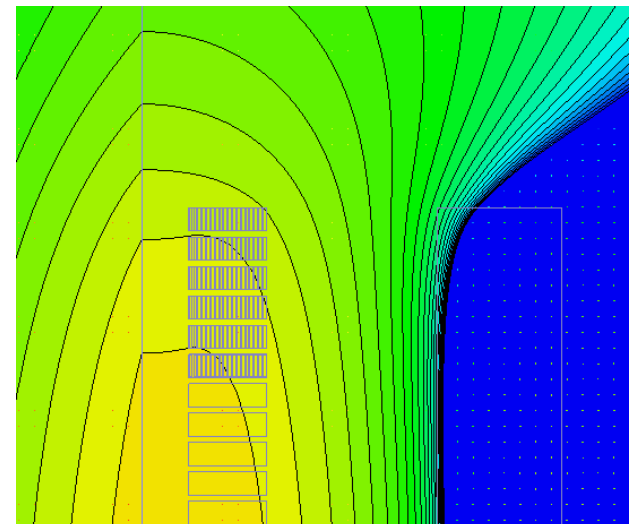
- Review all existing national surveys and study different practices (data collection, compilation, etc.)
- Discuss the differences and identify best practices
- Compile and present the information available in these national survey reports
- Make recommendations to improve the situation



WG A2-38 Transformer Thermal Modelling (J. Lapworth/UK)



- Describe the state of the art techniques in transformer thermal modelling to evaluate winding hottest spot as well as hot spots on other metallic parts
- Examples of application of hottest spot direct measurement and best practices
- Recommendation for improvement of standards



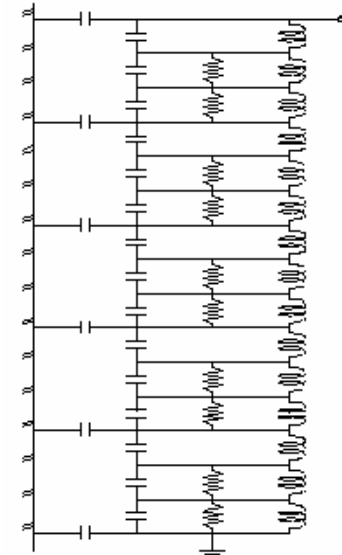
Present A2 WG

JWG A2/C4.39 - Electrical Transient Interaction between transformers and the Power System



(A.Rocha/BR)

- Assess and discuss the different types of electrical transient interaction
- Discuss the general increase in transformer dielectric failures in the system.



WG A2.40 - Copper sulphide long-term mitigation and risk assessment

(J. Lukic/RS) 

- Method, tools and diagnostic
- Metal passivator stability and efficiency
- Efficiency of existing on-site oil treatment



Present A2 WG

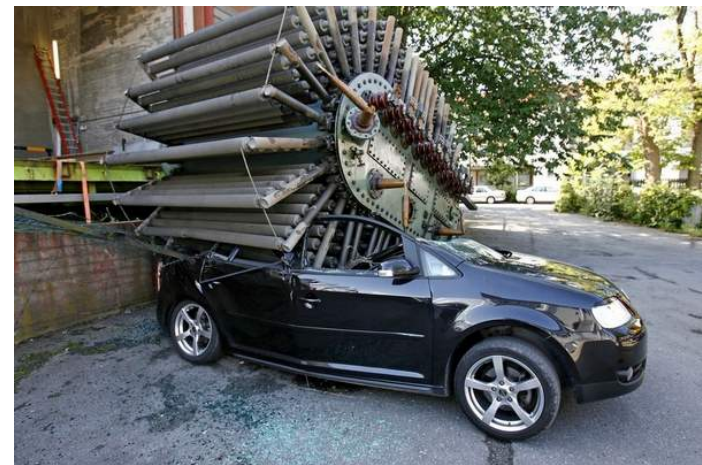
JWG A2/D1.41 - Oil conductivity under DC condition (A. Küchler/DE)

- Started under recommendation of WG A2/B4.28
- Review techniques and standards for measurement of conductivity of liquids
- Suggestions for new standards



WG A2.42 - Guide on transformer Transportation (A. Mjelve/NO)

- Typical conditions/forces during transport
- Specifications and design review
- Requirements on transportation issues



WG in preparation

WG A2.43 Transformer bushings reliability (A. Mikulecky/HR)

- Bushing failure definition
- Failure mechanisms for OIP, RBP, RIP
- Bushings failure rate
- Predicted life time, maintenance, diagnostic

Future WG (in discussion)

- Transformer Intelligent Monitoring
- Life cycle, Repair/refurbish/replace, end of life decision
- Post-mortem analysis, failure investigation
- Shunt Reactor



Past SC A2 Sessions & Colloquium

2007 Bruges Colloquium

- Guidance in new insulation liquids
- Life estimation of transformers in service
- Reactors and related items

2008 Paris Session

- Performance in service of new insulation systems for transfo.
- Reliability and risk assessment of transformers in service
- Reactors (shunt, shunt with regulation, series, neutral) and related items

2009 Cape Town (with A3 and B3)

- Substation layouts
- End of Life Asset Management
- Maintenance of Equipment for Maximum Reliability

2010 Paris Session

- Transformer Incident in Service
- Transformer Life
- Transformer modelling

Future SC A2 Sessions & Colloquium

Colloquium 2011: Kyoto, Japan Joint Colloquium with D1

- Transformer Maintenance, monitoring, diagnostics and related testing
- New material
- Transient phenomena and testing



Paris 2012 Preferential Subjects (to be confirmed):

- Transformer for the network of the future
- Transformer Eco design / Eco use
- Transformer magnetic circuit

