PROGRAM

Sunday, June 10, 2007
18:00-20:00 Registration at DTU and mounting of posters.

Monday, June 11, 2007

08:00-09:00 Registration at DTU and mounting of posters

09:00-09:10 Symposium opening by the chairman: Mogens Henriksen

09:10-10:00 Invited lecture:
Power Electronics and Electrical Apparatus: a Threat?
given by Prof. Gian Carlo Montanari, Italy.

10:00-10:30 Coffee Break / Completion of mounting of posters

10:30-12:00 Session 1 – Transients 1
Chairman: Jarmo Elovaara

Aging Mechanisms of Solid Insulation Subjected to Short Risetime
... Voltage Surges
I. M. Culbert, G. C. Stone
Iris Power, Canada

Partial Discharge Measurements on Components Energized by Power
... Electronic Frequency Converters
Florian Martin, Thomas Leibfried
University of Karlsruhe, Institute of Electric Energy Systems and High Voltage Technologies, Karlsruhe, Germany

Investigations on High Voltage Machine Insulation Systems subjected to ...
Repetitive Pulsed Voltage
Fredrik Sahlén1, Li Ming2, Kenneth Johansson1, Eva Mårtensson, Hans-Åke Eriksson2, Osmo Koponen3, Saija Pääkkönen3
1ABB Corporate research, Västerås, Sweden
2ABB Automation Technologies, Västerås, Sweden
3ABB Electrical Machines, Helsinki, Finland

12:00-13:00 Lunch
13:00-14:00  Session 2 – Transients 2
Chairman: Hans Edin

Detection of Surface Partial Discharges at Semi-Square Voltages ..................21
Elisabeth Lindell, Tord Bengtsson1, Jörgen Blennow, Stanislaw M. Gubanski
High Voltage Engineering, Department of Materials and Manufacturing
Technology, Chalmers University of Technology, Göteborg, Sweden
1also with ABB Corporate Research, Sweden

Effect of Imbedded Particles on DC Breakdown of XLPE Cable Insulation ......25
Erling Ildstad, Frank Mauseth, NTNU, Trondheim, Norway
Rolf Hegerberg, Mildred Selsjord, SINTEF Energy Research, Trondheim,
Norway
Bjørn Sanden, Nexans Norway, Halden, Norway
Marc Jeroense, ABB Power Systems, High Voltage Cables, Karlskrona,
Sweden
Jan Erik Larsen, Statnett SF, Oslo, Norway

Critical Voltage Distributions in Dry Type Transformers: From Voltage ........31
Distribution to Actual Electrical fields
Kenneth Pedersen, Joachim Holbøll, Mogens Henriksen
Technical University of Denmark, Denmark

14:00-14:10  Introduction to the poster session by Peti Hyvönen

14:10-15:00  Poster Session and Coffee

15:00-16:20  Session 3 - Cables
Chairman: Georg Balog

Medium Voltage Power Cable Diagnostics- Review of International....37
Standards and Practices
John Densley
ArborLec Solutions Inc, Toronto, Canada

After laying test of medium voltage cables including PD measurements .........41
Petri Hyvönen
Helsinki University of Technology, Power Systems and High Voltage
Engineering, Finland

Some Electrical Features of Standard XLPE and Water Tree Retardant ......45
Cables
Gunnar Vegge, Hallvard Faremo
SINTEF Energy Research, Trondheim, Norway

Recent Experiences with Commissioning Testing of Transmission Class.........49
Cables
Howard Sedding, Mark Fenger
Kinetics Inc., Toronto, Canada
17:00    Guided tour at “The Open air Museum”
19:00    Symposium Dinner at “The Open Air Museum” in Lyngby

Tuesday, June 12, 2007

09:00-10:20   Session 4 – Measurement and testing techniques 1
Chairman: Rolf Hegerberg

Development of a Data Acquisition System for On-site Partial Discharge Measurements
Vesa Latva-Pukkila, Pekka Nevalainen, Tiila Kangas, Pertti Pakonen
Tampere University of Technology, Institute of Power Engineering, Finland
Pekka Verho
ABB Distribution Automation, Tampere, Finland

Measured Partial Discharge Inception Voltage for a Cavity at Different Applied Frequencies
Cecilia Forssén, Hans Edin
KTH Electrical Engineering, Sweden

Web-based PD monitoring of a Generator in Loforsen
Sonja Berlijn, STRI, Sweden
Tommy Hjort, VB Kraft, Sweden
Sacha Markalous, LDIC, Germany

A Novel Wide Band Transient Detection and Recording System
Morten Erlandsson Lunow, Jens Laulund, DONG Energy, Denmark
Joachim Holbøll, Mogens Henriksen, Ørsted•DTU

10:20-10:40   Coffee Break

10:40-12:00   Session 5 – Measurement and testing techniques 2
Chairman: Anders Jensen

Utilizing High Voltage Containing High Frequency Components for Continuous Dielectric Response Measurements during Aging
Björn Sonerud\textsuperscript{1}, Tord Bengtsson\textsuperscript{1,2}, Jörgen Blennow\textsuperscript{1}, Stanislaw M. Gubanski\textsuperscript{1}
\textsuperscript{1}Chalmers University of Technology, Göteborg, Sweden
\textsuperscript{2}ABB Corporate Research, Västerås, Sweden

On-line Partial Discharge Monitoring of Substations
Pekka Nevalainen, Tiila Kangas, Vesa Latva-Pukkila, Pertti Pakonen
Tampere University of Technology, Finland
Pekka Verho
ABB Oy Distribution Automation, Tampere, Finland
Sensitivity Assessment for Partial Discharge Measurements on........81
Distribution and Transmission Class Cables
Mark Fenger, Howard Sedding
Kinetics Inc., Canada

Onsite Tests on Power Transformers.................................................................85
Peter Werle
ABB AG, Transformers, Halle, Germany

12:00-13:00 Lunch

13:00-14:00 Poster Session and Coffee

14:00-15:10 Session 6 – Insulation materials and systems including emerging Technologies
Chairman: Jesper Hjerrild

The Enlargement Law as a Tool for Comparing the Breakdown........91
Performance of Power Cables: the Role Played by Conductor Radius and Insulation Thickness
Massimo Marzinotto¹, C. Mazzetti¹, G. Mazzanti²
¹ Electrical Engineering Depart." Sapienza", University of Roma, Italy
²Electrical Engineering Depart., University of Bologna, Italy

Space Charge Formation in Two-layered HDPE-objects during Long........95
Term DC-voltage Application
Sidse Trætteberg, Erling Ildstad
Department of Electrical Power Engineering, NTNU, Trondheim, Norway

Performance of a Hybrid Insulation System in Inhomogeneous Electric........99
Field
Frank Mauseth, Arne Nysveen
Norwegian University of Science and Technology(NTNU), Trondheim, Norway

15:10 Closing of Symposium by the new Danish OC member J. T. Holbøll
and invitation to Nord IS09 by the Swedish OC member Stanislaw Gubanski.

Wednesday, June 13, 2007

Technical Tour – full day tour.

Departure (by bus) from Scandic Eremitage Hotel at 09:00.
POSTER SESSION

Chemical changes and remaining voltage withstand of field aged XPLE-cables
Petri Hyvönen, Helsinki University of Technology, Power Systems and High Voltage Engineering, Finland
Anna-Stiina Jääskeläinen, Helsinki University of Technology, Laboratory of Forest Products Chemistry, Finland

Relationship between Electroluminescence and Dissipation Current in Polyethylene under AC Field of Various Frequencies
A. Fujita, S. Bamji, M. Abou-Dakka, A. T. Bulinski
National Research Council of Canada, Ottawa, Ontario, Canada

Experimental Validation of the Volume Effect in the Statistical Enlargement Law for Cable Lines
M. Marzinotto
Electrical Engineering Depart., “Sapienza”, University of Roma, Italy

Partial Discharge Propagation through Cable Systems with Cross-bonding Joints
Paul Wagenaars, I. J. Tigchelaar, P. A. A. F. Wouters
Eindhoven University of Technology, The Netherlands
P. C. J. M. Van der Wielen, E. F. Steennis
KEMA, The Netherlands

AC Breakdown Strength of Polypropylene-Calcium Carbonate Compounds
M. Takala, P. Salovaara, K. Kannus
Tampere University of Technology, High Voltage Laboratory, Tampere, Finland
M. Karttunen, S. Kortet
Technical Research Centre of Finland, Tampere, Finland

Reproducible on-site measurements of transfer function on power transformers in frequency domain
Christian Homagk, Kai Mössner, Thomas Leibfried
Institute of Electric Energy Systems and High-Voltage Technology, University of Karlsruhe, Germany

Design and Testing of a Steam-Resistant Insulation System for the Stator of Low-
V. Sihvo, J. Pyrhönen
Lappeenranta University of Technology, Department of Electrical Engineering, Finland

Effects of Polyhedral Oligomeric Silsesquioxanes on Partial Discharge and Electrical properties of XLPE
Lasse Linnamaa, Kari Kannus
Tampere University of Technology, Institute of Power Engineering, Tampere, Finland
High-Voltage, High-Frequency dielectric properties of mineral transformer oil..........................139
Mischa Nagel, Thomas Leibfried
University of Karlsruhe, Karlsruhe, Germany

Improving PD detection in long cable routes through advanced analysis techniques..................141
A. Cavallini, M. Tozzi, G. C. Montanari
DIE, Università di Bologna, Bologna, Italy.

Inductive Sensors in On-line Partial Discharge Measurements .............................................145
Tiila Kangas, Vesa Latva-Pukkila, Pekka Nevalainen, Pertti Pakonen
Tampere University of Technology, Finland
Pekka Verho
ABB Oy Distribution Automation, Tampere, Finland

A Partial Discharge Pattern Classification Algorithm for Generator Insulation Systems..............149
– Verification based on Test Data and Simulations
Wolfgang Hribernik, Gusztáv Újvári, Gert Pascoli
Arsenal Research, Monitoring, Energy and Drive Technologies, Austria

Repeatability of FRA Measurements and New Connection Technique ......................................153
J. Szczechowski, H. Borsi, E. Gockenbach
Institute of Electric Power Systems, High Voltage Engineering Section (Schering-Institut),
Leibniz Universität Hannover, Germany

New Possibilities of the Oil-paper Insulating Systems .................................................................157
Mentlic, V., Prosr P., Pihera, J., Polanský, R.
University of West Bohemia, Czech Republic

The Evaluation of the Insulation Resource According to the Integral Characteristics ..................161
Of the Overvoltages Effect Duration
Saulius Gudzius, Audrius Jonaitis, Linas Andronis Markevicius, Alfonsas Morkvenas, Renata Stanioniene
Kaunas University of Technology, Faculty of Electrical and Control Engineering, Department
of Electric Power Systems, Lithuania

Partial Discharge Behavior of Insulating Systems for High Voltage Rotating Machine...............165
under Electrical Stress
M. Farahani, E. Gockenbach, H. Borsi
Institute of Electric Power Systems (Schering-Institute), Leibniz Universität Hannover,
Germany

Condition Evaluation of Oil-Pressboard Insulation by Fourier Transform Of Time .................169
Domain Dielectric Response
Setayeshmehr, A., Eicler, C., Akbari, A., Borsi, H., Gockenbach, E.
Institute of Electric Power Systems, High Voltage Engineering Section (Schering – Institute),
Leibniz Universität Hannover, Germany

XIV
Global Experience with TR-XLPE Insulation for Long Life MV Utility Cables

Jerker Kjellqvist¹, Sunderesan Ramachandran²
¹Dow Europe GmbH, Switzerland, ²The Dow Chemical Company, USA

Reproducibility of the FRA-Measurements as an effective method for diagnostic

Oleg Kouzmine, Peter Werle, Janusz Szczechowski
ABB AG, Power Technologies, Business Unit Transformers, Halle, Germany

Return Voltage Measurements - how to Overcome the Length Dependence of the

Rainer Patsch¹, Dieter Kamenka², Johannes Menzel¹
¹Institute of Materials & Diagnostics in Electrical Engineering, University of Siegen, Germany
²SebaKMT, Radeburg, Germany

Partial discharge measurements at varied low frequncy, and some results from

N. Taylor, H. Edin
KTH, Stockholm, Sweden.

A Method to Characterize Wind Turbine Power Fluctuations

Stephane Eisen¹, Esben Larsen¹, Asger Jensen²
¹Technical University of Denmark, ²DONG Energy, Copenhagen, DK