International Symposium on International Standards for Ultra High Voltage

18-21 July 2007
Beijing, China

Who should attend?
The IEC/CIGRE symposium is for utilities, transmission system planners and operators, contractors, equipment manufacturers, transmission design engineers, research and test laboratories, government regulators and universities.
The Need for UHV Standards

One of the dilemmas facing governments and utilities today is how to supply large amounts of electrical energy for growing populations in a way that is both efficient and has a minimal impact on the environment. In those countries, such as Brazil, China and India, the challenge lies in getting the electricity from the power generating stations thousands of kilometres away to the urban populations. "Ultra high voltage" offers the potential to meet this challenge.

The world's experts on Ultra High Voltage are convening in Beijing, China from 18-21 July under the auspices of the International Electrotechnical Commission (IEC) and CIGRE, the International Council on Large Electric Systems, to map out the way forward for this new technology and its potential applications.

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**Provisional Programme**

**WEDNESDAY 18 JULY 2007**

**08:30 - 10:30 OPENING CEREMONY**

Chinese authorities, Chinese National Committees of IEC and CIGRE
Mr. Jacques Régis, IEC President-elect
Mr. Jean Kowal, CIGRE Secretary General

**BACKGROUND AND OBJECTIVE OF THE SYMPOSIUM**

Dr. Hisatoshi Ikeda, IEC SB 1 Chairman

**KEYNOTE SPEECH**

Needs, state of the art, problems (incl. technical, practical, financial, ...), and currently perceived needs for standards. (Future standardization needs should be partly a result of the current symposium.)
Prof. K. Froehlich, CIGRE TC Chairman

**INVITED SPEECH**

Developments of Ultra High Voltage in China
State Grid Company of China

**11:00 - 13:00 NEEDS AND PLANS – SESSION 1-1**

1. UHV AC Transmission Systems – Challenge for the Future, Schilling and Lerch, Siemens AG, Germany

2. Open aspects and possible alternative technologies following the UHV 1000 kV Italian experience, Italian Panel on UHV, Italy

3. Research and Application of UHV AC, SGCC, China

4. Life Cycle Assessment of Ultra High Voltage system layout and operation compared to 420/550 kV AC power systems, Aachen University, Germany

**13:00 - 15:00 LUNCH AND POSTER SESSION 1**

**15:00 - 17:00 NEEDS AND PLANS – SESSION 1-2**

1. Prospective plans of UHV AC Transmission in Japan, by TEPCO, CRIEPI and Prof. Yokoyama (Tokyo Univ.), Chair of Japanese National Committee of IEC TC 8, Japan

2. Engineering Design of ±800 kV UHV DC Project, CSG, China

3. India Powergrid 800 kV DC Project, Nayak and Sasmal, Powergrid, India

4. 800 kV AC and 600 kV DC Brazilian transmission systems – Experience and future trends, Jorge Amon Filho et al., Brazil
08:30 - 10:30  SYSTEMS – SESSION 2-1

1. Planning of UHV systems with respect to insulation coordination based on CIGRE experience, C. Neumann and K.-H. Weck, Germany

2. System aspects of 1100kV AC transmission technologies in Japan: Insulation coordination and solutions for network problems peculiar to UHV AC transmission system, Masaru Ishii (University of Tokyo) et al., Japan

3. Limitation of the overvoltages in 1000 kV pilot project in China, Ji-ming Lin et al., China

4. Parameters of lightning stroke into 1100 kV transmission lines and lightning overvoltages wave propagation along such lines, G.N. Alexandrov (St. Petersburg Technical University), Russia

5. Modelling of UHV DC transmission line exposure to direct lightning strokes, F. Rizk, Canada

11:00 - 13:00  SYSTEMS – SESSION 2-2

1. Design of 1000 kV UHV transmission line, Yongwei Li et al., China

2. 1100 kV overhead transmission line optimum design for the increase of its reliability, G.N. Alexandrov (St. Petersburg Technical University), Russia

3. Technical challenges in the design, testing and reliable operation of advanced UHV (AC and DC) transmission lines, Elias Ghannoum, Chairman IEC TC 7, et al., Canada

4. Special design and arrangements of UHV AC conductors and subconductors taking reduction of environmental impact into consideration, Masanori Isozaki, Tokyo electric Power Company, et al., Japan and Spain

5. Non-Conventional AC solutions adequate for very long distance transmission - An alternative for the AMAZON Transmission System, Carlos Portela, João B. G. Ferreira da Silva and Maria das Graças Alvim, Brazil

13:00 - 15:00  LUNCH AND POSTER SESSION 2

15:00 - 17:00  SUBSTATIONS – SESSION 2-3

1. Design principles for 1000 kV AC substation, Yan-qiao Liang, China

2. Suitable configuration of switchgear for UHV AC substation, authors from China, Russia, Japan

3. Basic design / specifications of GIS for UHV AC and its verification test at site, authors from Japan
4. Estimation of VFTO for GIS and HGIS of China 1000 kV UHV pilot project and its suppressing countermeasures, Ban Liangeng et al., China

5. Environmental consideration for UHV substations, authors from China and Japan

FRIDAY 20 JULY 2007

08:30 - 10:30 EQUIPMENT 1 – SESSION 2-4

1. Technical requirements for UHV switching equipment, CIGRE WG A3.22

2. Prospects for creation of new generation of ultra-high voltage equipment, All-Russian Electrotechnical Institute, Moscow, Russia

3. Development of 1100 kV gas circuit breakers and their verification tests, authors from Japan

4. The Transient Characteristics Required by 1100kV circuit-breakers in China, Ji-ming Lin et al, China

11:00 - 13:00 EQUIPMENT 2 – SESSION 2-5

1. MO-surge arresters for voltage systems above 550 kV; experience and challenges for the future, WG A3.17 & WG A3.21

2. Development of UHV Surge Arresters and their Verification Tests, authors from Japan

3. Challenges and performed tests for the development of UHV AC and 800kV HVDC bushings, R Hartings, Bengt-Olof Stenestam, ABB Power Technologies, Sweden

4. Underground cables for UHV AC transmission: the Italian experience, M. Marelli, PRYSMIAN, Italy

LUNCH AND POSTER SESSION 3

13:00 - 15:00

15:00 - 17:00 TRANSFORMERS – SESSION 2-6

1. Transformer technology for UHV AC and DC, M.Saravolac/D.Wright, AREVA

2. Insulation level and test technology of UHV transformers, L. Guangfan and co-authors, China Electric Power Research Inst., Beijing, China

3. Important considerations for the development of insulation structures for UHV transformers 1000 kV AC and 800kV DC, A. Lindroth, ABB Transformers, Sweden

4. Insulation problems of UHV transformer + Experience with installation and service of autotransformers 667 MVA,1150/500 kV, A. K. Lokhanin, VEI Moscow, Victor Sokolov, VEI-ZTZ-Service, Russia
5. Development and long term field tests for 1050kV, 3000MVA UHV Transformer in Japan, Y. Shirasaka (Japan AE Power Systems), Y. Ebisawa (Toshiba), H. Murakami (MELCO), T. Kobayashi (TEPCO), T. Kawamura (University of Tokyo), Japan

SATURDAY 21 JULY 2007

08:30 - 10:30 DC – SESSION 3-1

1. Technical and economic challenges for HVDC at +/- 800 kV, R. N. Nayak and M.M. Rashwan on behalf of WG B4.45, CIGRE, India

2. Technological development of 800 kV DC in China, Zhao Jie, Hong Chao, China

3. Design and testing of 800 kV thyristor valves, N. Mc Leod AREVA, United Kingdom

4. 800 kV DC Insulation coordination, Test Levels and R&D, V. Lescale and others, Sweden

5. Selection of insulation levels for 800 kV HVDC equipment, M. Haeusler, H. Huang, SIEMENS, Germany

11:00 - 13:00 TESTING – SESSION 4

1. Testing challenges for UHV equipment, Italian Panel for UHV, Italy

2. No title yet: Abstract addresses AC & DC measurement problems, Gockenbach et al

3. High-power testing of circuit breakers rated 800 kV and above, KEMA HPL

4. Making and breaking tests of UHV circuit-breakers with opening/closing parallel resistors, T. Kawamura (University of Tokyo), E. Haginomori (Chuo University), Y. Goda (CRIEPI), M. Nakajima (JAEPS), T. Sawada (Mitsubishi Electric Corporation), H. Kawano (Toshiba Corporation), Japan

13:00 - 14:00 LUNCH

14:00 - 17:00 STANDARDIZATION – SESSION 5

Places of CIGRE and IEC in the Standardization process, Jean Kowal, CIGRE Secretary General.

1. The need of coordination of network requirements with design rules in IEC standardization, H. Koch, Siemens AG, Germany

2. Standardization of UHV AC transmission technology field, Jian-bin Fan et al, China

3. Standardization of HVDC transmission, Yong-qing Yu et al, China
4. Standardization of insulation withstand levels for UHV systems in IEC TC 28, Insulation co-ordination, Dr.-Ing. Karl-Heinz Weck (Chairman IEC TC 28), Germany

Synthesis from Session Rapporteurs from IEC and CIGRE

Round-table and audience discussion

Summary presentation: Issues for and process of standardization of UHV – next steps - Includes consideration of future IEC–CIGRE ad hoc coordination group, Dr. Ikeda, Japan

About UHV

Ultra High Voltage - or UHV - is defined as voltages of 1 000 kV alternating current, or higher, and 800kV direct current, or higher, and it is needed for two main reasons. The first is to deliver large quantities of power over very long distances with very little loss of power (higher voltage means lower current on the transmission line and therefore lower loss). The second is to deliver large quantities of power to cities without having a proliferation of transmission lines. If you can deliver lots more power with just one line, you do not have to build more lines and the resulting overall impact is reduced. In places where demand is growing but room for transmission lines is limited this is critical because it means only one power line corridor is needed, not several. International standards for UHV do not exist yet, so they need to be developed to ensure the safe and efficient use of this technology. It is a technical challenge for manufacturers, utilities and, ultimately, a regulatory issue for governments. IEC and CIGRE are the bodies responsible for technical specifications for this technology.
About CIGRE  www.cigre.org

CIGRE (International Council on Large Electric Systems) is one of the leading worldwide Organizations on Electric Power Systems, covering their technical, economic, environmental, organisational and regulatory aspects. A permanent, non-governmental and non-profit International Association, based in France, CIGRE was founded in 1921 and aims to:

- Facilitate and develop the exchange of engineering knowledge and information, between engineering personnel and technical specialists in all countries as regards generation and high voltage transmission of electricity.
- Add value to the knowledge and information exchanged by synthesizing state-of-the-art and world practices.
- Make managers, decision-makers and regulators aware of the synthesis of CIGRE’s work, in the area of electric power.

More specifically, issues related to planning and operation of power systems, as well as design, construction, maintenance and disposal of HV equipment and plants are at the core of CIGRE’s mission. Problems related to protection of power systems, telecontrol, telecommunication equipment and information systems are also part of CIGRE’s area of concern.

About IEC www.iec.ch

The International Electrotechnical Commission (IEC) is the world’s leading organization that prepares and publishes International Standards for all electrical, electronic and related technologies - collectively known as "electrotechnology". IEC’s coverage is vast - from standards for power stations to standards for electrical safety in the home or workplace, to industrial automation standards, to standards for multimedia, just to mention a few.

The IEC activities embrace all electrotechnology on land, at sea and in the air, as well as associated disciplines including terminology, electromagnetic compatibility, performance, safety and the environment, including work on increasing electrical energy efficiency and the development of standards for renewable energies.

Registration

All papers presented at the Symposium will be made available to all delegates. The fee for delegates is CHF 450 (Euros 300).

For further information and registration details, please contact Antoinette Pitteloud, IEC/CIGRE UHV Symposium Coordinator by email api@iec.ch, telephone +41 22 919 02 35 or visit www.iec.ch/uhv.