

# The Pulse of Power

Newsletter from ABB AB, Components

Volume 35, December 2007

## A few words from the Managing Director

The year 2007 will soon be ending and it will be the best year ever in the company's history. I would like to thank all of our customers – new and old – for choosing ABB as supplier for bushings and tap-changers. Our goal is to be your best alternative when you compare price, quality, on-time delivery and service. Our production continue to increase year-by-year, and this year we have seen a drastic increase in tap-changers as well as both oil impregnated and resin impregnated bushings.

The last few years we have substantially increased our investment in R&D which means that new advanced products with higher customer value will be available in the near future. In the beginning of 2008 we will launch the VUCG vacuum tap-changer and the new generation of motor-drive, and more new products will follow. We have also seen an increase in the demand for dry resin impregnated bushings as well as for oil impregnated bushings. A new assembly line for very large bushings (>500 kV) was inaugurated during the year and we have started to deliver 800 kV and 1100 kV bushings to customers all over the world from this top-of-the-line workshop.

In our operational development program, we focus on continuous improvements utilizing the traditional and long term earned skills amongst all our staff. This concept has proven to be very successful in helping us to be an even better supplier to all our customers.

2008 will be a very interesting year for our company with large investments to increase our capacity in different areas of our production.

I am looking forward to working together with you all and I would like to take this opportunity to wish you all a Very Merry Christmas and a Happy New Year!

*Lars Nilsson*

Group Vice President  
Head of Product Group Insulation and Components



## Cooperation in voltage regulation market

ABB AB, Components Ludvika, Sweden and A. Eberle GmbH & Co. KG, Nuremberg, Germany have entered into an official cooperation in the market for tap-changer voltage regulation. From today tap-changers, manufactured by us, are recommended to be equipped with an automatic voltage regulator type REG-DA or REG-D (19" version). A. Eberle is one of the worlds largest producers of automatic voltage regulators with a global service organisation and has a leading position on the important German market. Standard features like various parallel operation methods (with ParaGramer), which can be easily set and commissioned. It has added values like a recorder with statistics and also a logbook. Transducer can be connected for transformer monitoring (following IEC 60076-7: "Loading Guide"). These functionalities are available, integrated in the mentioned devices without additional equipment. In the same way connections to all SCADA-systems are possible, up to the newest worldwide standard IEC 61850.

The cooperation generates a win-win situation where ABB and A. Eberle will give our customers a very competitive and reliable offering for voltage control.

*Voltage regulator  
REG-DA*



*Voltage regulation  
system REGSys*



**ABB**

## First delivery for 1100 kV for commercial service

We are ready to deliver GOE with BIL 2600 kV bushings to State Grid Corporation of China for their first 1100 kV project. The order is for 11 bushings and they will be used for all reactors for substations at the line Jindongnan-Nanyang-Jingmen.

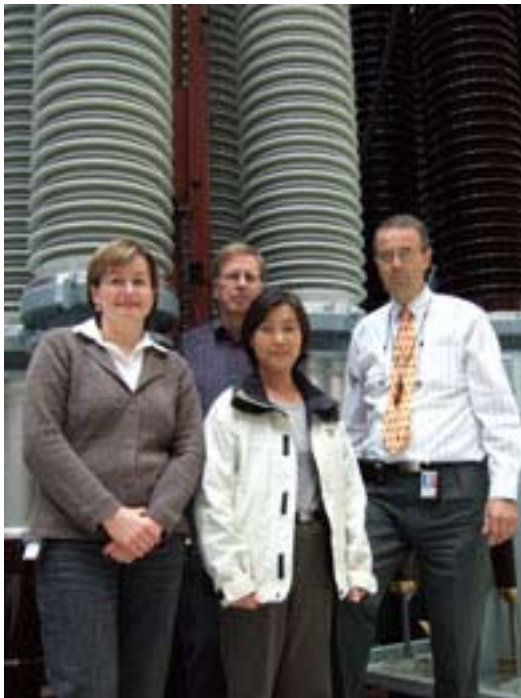
The receiving of the order is quite a team effort. The Swedish group of Jihong Li, Bengt-Olof Stenestam, Natalia Gutman and Lars Strandberg has cooperated closely with Andy-CheungHai So and JiangSheng Liu from Front End Sales Hongkong and Kina.

The bushing is 14 m long and weighs approximately 6,000 kg. The transport crate is a wooden box reinforced with a steel frame, 15 m long and weighs approximately 3,000 kg.

The order has generated further interest, and we have another three inquiries from Transformer manufacturers in China.

Today we have orders from all continents in our order backlog. The order confirms our number one position in the world as manufacturer of bushings for 800 kV and above.

Although this is our first order for commercial service, UHV is not a new technology for ABB



*The Swedish part of the team effort: Natalia Gutman, Bengt-Olof Stenestam, Jihong Li and Lars Strandberg.*



## UHV at ASEA and ABB throughout the history

UHV is not new to ABB and Components.

Already in 1970, a 1500 kV bushing was manufactured for an AEP test station. Figs. 1 and 2.

In 1978 a 1800 kV bushing for 1765 kV system voltage was manufactured. Fig. 3.

In 1998 we manufactured the world's probably largest transformer bushing for a test laboratory in South Korea. The weight is 12 500 kg and the overall length is 15 m. It is designed for a rated voltage of 1800 kV, 5000 A current, and Lightning Impulse Withstand of 3500 kV peak. Fig. 4.



## Long term test for 800 kV HVDC equipment

In order to verify the long term behaviour of the 800 kV HVDC wall and converter transformer bushing and the other 800 kV DC equipment, all relevant pieces of equipment are installed in a long term test circuit at STRI in Ludvika, Sweden, and energized at 855 kV DC, since November 2006.

The test circuit includes a “valve hall” where the temperature is kept above 50 °C, to simulate the actual operating conditions for the bushings. The transformer bushing protrudes inside the “valve hall” and is connected to the wall bushing that is installed in the wall. The remaining equipment as listed below, are installed outdoors, together with the voltage generator.

The following equipment (test objects) are included in the test circuit installation:

1. Transformer prototype
2. Wall bushing
3. Optical current transducer
4. Voltage divider
5. Pole arrester
6. Smoothing reactor prototype
7. RI Capacitor
8. Disconnecter
10. By pass breaker

In addition to the above test objects, the following test equipment associated with the voltage source can also be seen on the layout:

9. Voltage transformer
11. Voltage divider
12. Transformer
13. DC voltage generator

The test installation has been operating satisfactorily since November 2006, without any problems and has provided confidence in ABB’s design for 800 kV UHVDC bushings and other equipments including design of electrode arrangements and bus-bars.

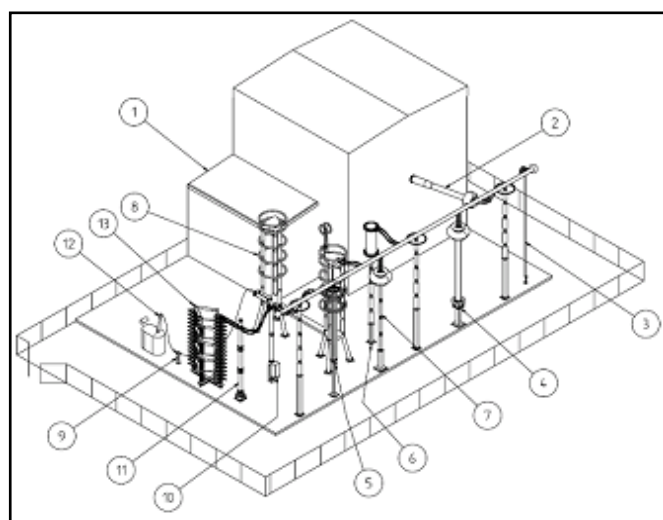
With the confidence gained with satisfactory operation of the long term test circuit, the conclusion is that 800 kV DC will account for a significant part of world growth in power transmission capacity over the next several years.



800 kV HVDC long term test circuit installation at STRI.



The wall bushing (left) and the transformer bushing (right) inside the “valve hall”.



800 kV HVDC long term test circuit layout.

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