DC commutation breaker successfully tested in 5000-A HVDC system in China

The Siemens MRTB DC commutation breaker (Metallic Return Transfer Breaker) with a rated current of 5000 ampere (A) has been successfully tested in its Xiluodu-Zhejiang high-voltage direct-current (HVDC) transmission system. Special breaker properties are required for transferring such high currents from one current path to another, a process also known as commutation. The circuit-breaker was integrated in the direct-current switchgear of the Shuanlong converter station and allows the uninterrupted switchover from grounding electrode mode to metallic return transfer mode and vice versa with no need for the operator to reduce the transmission power of the system. Until now, this only functioned with rated DC currents below 5000 A. Siemens has now successfully exceeded this limit with its circuit-breaker, thereby improving the operation, stability and reliability of this high-performance HVDC system in China.

“We’ve successfully tested our DC commutation circuit-breaker at the Shuanlong converter station in operation at full load at 5000 A DC. We’ve thus proven the switching capability of this breaker in what is currently the world’s largest HVDC transmission system with no need for current flow reduction,” said Tim Dawidowsky, CEO of the Transmission Solutions Business Unit in the Siemens Division Energy Management.

Since July 2014, the Siemens HVDC system Xiluodu-Zhejiang has been transmitting eight gigawatts (GW) of power at a DC transmission voltage of 800 kilovolt (kV) over a distance of 1670 kilometers from the Xiluodu hydropower plant in Sichuan province to the highly industrialized province of Zhejiang. This makes it the highest capacity HVDC link in the world at the present time. The circuit-breaker was tested during the high-water season to ensure that the hydropower plant could deliver the
necessary power.

Siemens is already carrying out successful pioneering work in China with ongoing further development of HVDC technology. In 2009, Siemens put into operation the Yunnan-Guangdong transmission system, which was the first ±800 kV DC link in the world. In 2010, the Chinese power supply utility State Grid Corporation of China (SGCC) commissioned a 6.4-GW UHVDC (ultra-high-voltage DC) transmission system using what were then the most powerful thyristor valves and power transformers from Siemens for the first time. Siemens technology is also used in the longest HVDC link in the Jinping-Sunan project, extending over 2,000 kilometers and with a transmission capacity of 7.2 GW. In January 2014, SGCC commissioned Siemens to deliver power transformers, thyristor valves and DC equipment for the world’s first HVDC project with a transmission capacity of 8 GW. The 800-kV HVDC technology used in this project allows the transport of enormous amounts of eco-friendly, CO₂–free hydropower to megacities in China.

Siemens DC commutation breaker successfully tested:

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This press release and a press picture is available at
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