Qualification and Demonstration of a 80 kV 500 MW HTS DC Cable for Applying into Real Grid

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Abstract — Until now some countries including South Korea have made big progress and many efforts in the development of HTS power equipments, especially a superconducting power cable system is the strongest candidate among them from the viewpoint of applying to real grid owing to high current capacity of it. In South Korea, High Tc superconducting (HTS) cables and their application to build a DC power transmission system with the advantages of high transport current capability and no resistive transmission loss have been studied. Qualification tests of 100m 3kA DC 80kV HTS cable have been carried out and it had been installed and tested successfully in order to meet qualification test requirements made by KEPCO Grid Company which based on HTS experiences and international standardization on both HTS cable and conventional DC cable. It had been performed like conventional dc cable during 6 months in KEPCO Gochang Power Testing Fields since the end of 2012. Thanks to successful qualification testing results of it, KEPCO will have operated and demonstrated DC 500MW 80kV HTS cable system in KEPCO real grid since June 2014, in order to evaluate practical requirements and confirm technical feasibility of it for the first time in the world. This paper says the recommendation and results of qualification tests in it and the way how to test it in detail.

Keywords (Index Terms) — Qualification, Demonstration, HTS AC Cable, HTS DC Cable, AC loss, Load Cycle, Thermal Cycle