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The Result of 22.9kV, 50MVA, 100m-class HTS Cable Verification Test

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In order to realize an efficient and economic power delivery, the power cables with higher current density and lower loss are essential to a power utility. Recently several major power cable manufacturers in the world have developed commercially viable HTS cable system which is able to deliver 5 – 8 times more power with less power loss than conventional copper cables. As the largest power utility in Korea, Korea Electric Power Corporation (KEPCO) had decided to conduct a long-term performance test on the HTS cable system, and constructed an HTS cable test yard to verify the reliability of the HTS cable system before planning to install it in a real power grid. As a specimen for the reliability test, KEPCO purchased an HTS cable system from Sumitomo Electric Industries. The 100m, 22.9kV, 50MVA HTS cable system including the cryogenic refrigeration system (CRS) was installed and energized in 2005 with plans to operate until 2009. The test voltage and current for the HTS cable system are supplied through the independent current source and voltage source because the real power load of 50MVA can not be connected to the HTS cable system at the HTS cable test yard due to the shortage of power capacity of the distribution feeder. The main test items include cooling-down and warming-up test, DC critical current test, AC rated current test, AC loss measurement, AC withstand voltage test, heat invasion test, and so on. After conducting long-term test on the HTS cable system for 2 years, we conclude that the HTS cable system can supply more than 5 times electric power than conventional copper cables with the same cross section. The test on the reliability of the HTS cable system is scheduled to continue for more than one year.