Abstract

This paper deals with the development of XLPE cable system for a HVDC link and refers to Pre-Qualification test.

An XLPE material, free from the accumulation of space charges, was applied to make a DC extruded cable. And the factory joint was made with an extruded molded joint.

A yearlong performance test (long-term test) carried through on the DC XLPE cable system, which resulted in no breakdown. Subsequently, a number of sample pieces underwent an impulse test as superimposed on the DC voltage, and with success.

In conclusion, the DC XLPE cable system had its performance confirmed: the makings of HVDC transmission.

Keywords: XLPE cable, DC transmission, Space charge, Pre-Qualification Test

1. Introduction

The DC power cable transmission is more suited to long distance or high power, than the AC transmission. The conventional DC power cables have been of an oil-filled (OF) cable or mass impregnated non-drain (MIND) cable. But the OF cable can hardly carry thorough a distant transmission, within the limits of its irksome oil-refilling, and the MIND cable can rarely carry high power, due to the rather-low, tolerable, operating temperature.

In contrast, the AC transmission has been applying XLPE insulated power cables in widespread use. Practically, 500kV XLPE insulated power cables are applied in commercial line[1]. The XLPE insulated cable, free from oil or grease, is friendly to the environment and preferable, and then expected to perform in the DC power transmission.

Against the background, the authors developed a 500kV DC XLPE cables[2][3]. This paper describes the proceedings of developing the DC cable (500kV DC XLPE cable), along with its pre-qualification test.