B.9.4.

Comparative laboratory evaluations of TR-XLPE, XLPE and EPR 15 kV, insulated cables

M. Walker, Sr. Member IEEE, Center Point Energy, Houston, TX, USA
C. Katz, Fellow IEEE, Cable Technology Laboratories, Inc., New Brunswick, NJ, USA
B. Fryszczyn, Member IEEE, Cable Technology Laboratories, Inc., New Brunswick, NJ, USA
R. Keefe, Member IEEE, E.P.R.I. Palo Alto, CA, USA

A four year project is underway to evaluate the performance of nine 15 kV rated cables aged in the laboratory under identical voltage accelerated conditions in ambient temperature water (25 ± 5°C). The cables are of similar design. The variable in the cables; which is the focus of this study, is the type of insulation and shield materials utilized.

This paper provides comparative information, after two years of aging, for three different classifications of insulation used on medium voltage cables in the USA; three TR-XLPE's, one XLPE and one type of EPR. The results for other cables in the program are published elsewhere.

One of the purposes of the program is to establish if all three TR-XLPE insulated cables perform similarly. Another purpose is to compare the performance of TR-XLPE insulated cables with that of XLPE and EPR insulated cables. The data includes changes in ac and impulse voltage breakdown stress, 0.1 Hz dissipation factor and other selected characterization tests.

The two year's of laboratory aging has provided data indicating that not all so called, TR-XLPE insulated cables perform in a similar fashion. The data also reveals that cable insulated with XLPE has as good or better performance than some of the TR-XLPE insulated cables that were a part of this study. The ac breakdown strength of some of the TR-XLPE cables remained remarkably stable during the aging period, while the impulse strength of all cables insulated with TR-XLPE fell initially but stabilized over time. The EPR cable initially lost both ac and impulse strength, but also stabilized over time.