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Analysis of Lightning-Caused Distribution Transformer Failures

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This paper investigates the effects of direct strokes to medium-voltage (MV) lines by analyzing the surges at the primary and secondary sides of a single-phase distribution transformer installed in a typical rural network of the state of Rio Grande do Sul, located in the South of Brazil. The distribution transformers of AES Sul, the electric utility, present a high failure rate and a significant number of the failures are attributed to lightning. The transformers are in general protected by surge arresters at the MV terminals and in a few cases also at the low-voltage (LV) side. Different distances between the MV arrester and the transformer as well as various values of ground resistance are considered in the analysis.