Interfacial Breakdown On Contaminated Electrolytic Surfaces

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Summary

The insulation of overhead transmission lines and substations is subjected to several basic types of abnormal conditions that can cause flashovers and outages of long duration. One of these types is abnormal voltage gradients in the insulation system caused by the contamination of solid insulator surfaces. The number of insulators needed to protect against contamination is uncertain, because there is a wide range in the severity of contamination, and there is considerable uncertainty as to the basic mechanisms by which contamination affects the insulation level of a given configuration. This paper outlines the results of investigations of interfacial breakdown on electrolytic surfaces. Models are used to simulate such plotted insulator problems. Effects of the chemical nature of the contaminants and contamination levels on the critical flashover voltage are studied. In order to study such effects, different salts and salts combinations were used on the laboratory model. A single-arc and multiple-arc models are introduced where the phenomena of multiple discharges existing simultaneously on an electrolytic surface is also investigated. Mathematical models are suggested which include the successive formation of multiple-arcs. The results obtained based on the new model agree quite well with the experimental values