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IEEE Guide for Online Monitoring and Recording Systems for Transient Overvoltages in Electric Power Systems

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IEEE Guide for Online Monitoring and Recording Systems for Transient Overvoltages in Electric Power Systems

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Abstract: The guide for the online monitoring and recording system of transient overvoltages in power system is used to regularize its methods, define the concrete structure of recording system for transient overvoltages, and identify the requirements of capability checkout and uncertainty in online monitoring and recording systems.

Keywords: capability checkout, divider system, IEEE 1894™, recording system, transient overvoltages

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Introduction

This introduction is not part of IEEE Std 1894™-2015, IEEE Guide for Online Monitoring and Recording Systems for Transient Overvoltages in Electric Power Systems.

Transmission and transformation apparatuses in power systems may be subject to lightning overvoltage or switching overvoltage at any time. Lightning overvoltage may invade transmission lines and cause failure when a substation has many output transmission lines or lightning is located in the incidence area. Internal overvoltage may occur when a no-load transmission line or a no-load transformer is removed from the system. A grounding fault may cause arc grounding overvoltage. The value of these overvoltages can reach two to five times the system's operating voltage. If insulation coordination is improper or defective in substations, overvoltages may cause damage to primary equipment. Furthermore, if the insulation of an apparatus is defected or aged, overvoltages may cause insulation breakdown.

Existing standards on measuring and recording overvoltages are not mainly applied to transient overvoltages but are applied to power frequency overvoltage in power systems. Transient overvoltages are different to power frequency overvoltage in waveform, amplitude, measuring equipment and measuring technique. This standard is developed to standardize the techniques for online monitoring and recording of the transient overvoltages.

Contents

IEEE Guide for Online Monitoring and Recording Systems for Transient Overvoltages in Electric Power Systems

1. Scope

This guide presents methods for online monitoring and recording of the transient overvoltages in a three-phase AC power system when the voltage level is higher than 1 kV. It applies to the qualitative measurement of transient overvoltages in substations, power stations, and transmission lines. The results are used for power system operating condition analyses.

This guide does not include online monitoring and recording of very fast transient overvoltage (VFTO) caused by operation of GIS disconnectors.