

EMTP Testing of Selected PST Protec

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Abstract— In this paper, testing results of selected procedures for protection of phase shifting transformers are presented. A phase shifting transformer (PST) is usually used for varying the voltage phase angle between the two systems which provides controlling of active power transfer. Some types of PSTs (e.g. dual-core symmetrical PST) allow to control phase shift in a certain defined range which means that phase shift between the two systems can be varied on-line. Therefore this type of phase shifting transformers must be protected by relays which are able to on-line compensate for additional phase shift introduced by PST. The main attention is paid to testing of differential protections for transformer energization and external faults for different phase shift values. It has been observed that for such situations standard differential relays may sometimes maloperate. Therefore, these situations should be analyzed and suggestions for protection improvement proposed. The comparison of two protection arrangements has been realized with the signals generated with use of EMTP program.

Keywords— current differential protection, Electromagnetic

series line inductance and compensated line equals X_{SL} between the two systems (a decreasing) by varying elect. In this method a phase shi. used for varying the voltage phase angle shift θ an ad subtracted. The PST is se between two systems, thu expressed according to the fi

$$P = \frac{|V_S|}{X_{PST}}$$

where: X_{PST} is phase shifting angle shift obtained from PS

In Fig. 1 active power

Electromagnetic Transients Program Reference Manual

A Loxley



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