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MEASUREMENT OF SWITCHING SURGES IN ONSHORE WINDFARMS AND RESONANCE OVERVOLTAGES IN TRANSFORMER WINDINGS

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Abstracts

In this paper, measurement of switching surges during energization of a step-up transformer at an onshore wind farm is presented. Wind turbine transformers may be frequently switched into and out of the collector grid depending on the wind profile. Fast transients are generated during the opening or closing of the circuit breakers. The measured transients during energizing of the transformer showed a pre-strike behaviour with fast, repetitive, high du/dt values. FFT analysis was performed on the measured waveforms to understand the magnitude of the frequency components. As with internal resonance, if a frequency component of the incoming surge equals a resonant frequency of the transformer winding, internal winding resonance can occur. A prototype transformer was then manufactured with taps at the winding ends for part-winding resonance testing. A discussion of part winding resonance tests and possible implications of these fast transients on internal winding resonance is presented.