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HVDC transformers are power transformers with specific requirements on harmonics, transient stresses, DC currents, DC offset voltage, etc. All these specific requirements need be considered in the design. Goal of the investigation in paper number 11065 was to study the transient coupling effects between converter- and tap winding in more detail.
The simulations have shown that transient signals generated by the converters are transferred to the tap winding. The voltage drops, as can be seen in the voltage curve on the converter side, could not be detected at the step voltage. Only individual peaks that are modulated onto the 50 Hz signal can be observed. A peak voltage increase of 1.2 p.u. can be recognized. Considering the fact, that the step voltage has a voltage level of 1.82 p.u. for 5 minutes resp. 1.58 p.u. for 60 minutes at the IVPD test, the voltage peaks are sufficiently well covered.
It should also be noted that the measurements have shown that the simulation results indicate higher voltage values than reality. Furthermore, the peak voltage would have to be converted with a certain conversion factor from the transient stress to an AC1min value. Under these circumstances, the actual safety margin between the voltage that occurs during operation and the test voltage increases further. Hence, it can be concluded that no additional requirements on transformer insulation coordination are necessary to ensure safe and reliable operation of the converter transformer.