

Investigating the Open-circuit fault behaviour in HVDC Mono-polar system

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Abstract

It has been argued that when a single-line-to-ground fault is applied at the inverter on the alternating current side, the voltage will drop. Likewise, when a fault is applied on a LLG fault at the inverter, the currents of the alternating current system of the rectifier will experience various disturbances. In this study, we focus on a converter station on the rectifier side of a HVDC system. Three fault cases, namely, D4D5 open-circuit fault, D1D2 open-circuit fault, and D3D4D6D2 open-circuit fault and their behavior on the alternating current system of the rectifier, AC system of the inverter as well as the direct current link with detailed simulations were carried out. An HVDC mono-polar system was modeled using the MATLAB/Simulink software environment. It was discovered that the D4D5 and D1D2 open-circuit faults and the AC system of the rectifier side would both have the same increase in AC voltages, whereas the behavior of the AC currents of both faults would remain normal with no effect. It was also shown that during the D3D4D6D2 open-circuit fault, the alternating current voltages and currents at the inverter side would experience zeros in a short time and then rise with a false sinusoidal waveform

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