Transient Stability Study of North Oman Interconnected Power System for Year 2002

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Abstract

Transient stability of interconnected power systems has been and continues to be a major concern in power systems operation. In order to achieve the required reliability of the power system through the provision of continuous electric service, it is necessary that interconnected power systems be designed to be stable under any conceivable disturbance. This project presents the transient stability analysis of the northern interconnected power system for the Ministry of Housing, Electricity and Water (MHEW) of Sultanate of Oman. The system model has been developed for power flow and transient stability analysis for several modes of operation. Time-domain simulations have been performed under different major disturbances such as three-phases faults, line tripping or loss of generation units for peak load condition of the summer year 2002. The tuning of the excitation system parameters to enhance system stability has also been considered in the analysis. After the system simulated on the computer program (CYME), the results shown that the system is stable for most of the disturbances considered. The results have also shown that improper settings of excitation system parameters could lead the system to instability under fault conditions. The critical clearing time (CCT) has also been determined for fault disturbances. If the fault is cleared after the CCT, the system will be unstable. The CCT is important to choose the speed of relays for clearing the fault. This study is very important as a base for any future project when generation and/or transmission expansion takes place in MHEW.