"Fault Ride Through"-capability – network stability as a key challenge in power plants

Hanover, April 7, 2014 – The key purpose of a network connection regulation - which is sometimes referred to as a network code - is to provide harmonized guidelines to the network operators. This allows increased level of security and effectiveness of the power grid operation.

Since the network code has to encompass a broad variety of generation technologies and operating conditions, the grid code requirements pose several challenges to any specific generator and its control systems.

One of the most challenging requirements in existing network regulations is the so-called “Fault Ride Through (FRT)” capability. This is a requirement for a generator to maintain synchronous operation when a severe disturbance occurs in electrical proximity of the generator. This requirement plays an important role in enhancing the overall power system transient stability. It helps the grid operator to prevent system-wide disturbances such as, for example, cascading failures and blackouts.

It is well-known that the excitation system of a synchronous machine has a strong influence on the transient stability of that machine; therefore, fulfilling the FRT capability requirement is tightly related to the properties of the excitation system.

Since the FRT involves severe disturbances to the power system and to the generator, the fulfillment of FRT requirements must be verified in computer-aided simulations rather than on site. Therefore, in specific cases, ABB perform network code verification simulations in order to ensure that UNITROL excitation systems are compliant with the most stringent network regulations. Typically such simulations are performed using a hardware-in-the-loop (HIL) setup and a real-time simulator. This way, the simulations do not need to rely on any simplifying modeling assumptions, providing high fidelity simulation results.

Once the simulation work is completed, conclusions regarding the stability properties of the power plant can be drawn.

Thanks to the powerful hardware and exceptionally flexible software, UNITROL excitation systems have always been able to comply with the most demanding network requirements.

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