SPE ELECTRICAL – POWER SYSTEM STUDIES

Power System Analysis is an essential part of any electrical design process, as the analysis validates that a design is safe and will work as expected. This analysis is frequently mandated by utility companies before energisation approval is given and is a key process in avoiding last minute design changes. SPE is highly experienced in all aspects of power system studies, and has undertaken a wide range of complex studies for many large clients and on many complex plants. At SPE, our engineering consultants use the industry leading software packages ETAP and Digsilent Powerfactory for main power system studies, EMTP, EMTP-ATP and PSCAD for more detailed electromagnetic studies and CDEGS for earthing studies.

Loadflow Studies

SPE can undertake loadflow studies for a wide range of operational scenarios, to validate how the system performs during planned and unplanned outages and standby conditions. As part of the loadflow analysis our team will examine equipment loading, power system losses and the voltage profile of the system to identify correct tap settings and ranges as well as identify the need for any reactive power compensation equipment to improve the power factor.

Short Circuit Studies

SPE has experience of a wide range of short circuit study approaches, and is familiar with IEC 60909, IEC 61363, ENA G74 and the ANSI C37 standard. The SPE team also has a detailed knowledge of more complex short circuit scenarios and the issues relating to asymmetrical duty of circuit breakers due to high X/R ratios.

Arc Flash Studies

Arc flash studies are becoming increasingly important, as they can help ensure that operational personnel are adequately protected, and provided with suitable PPE for carrying out switching duties. These studies look at the typical busbar clearances, working distance, fault levels and protection operating time to identify the total incident energy in Cal/cm^2 that operators are exposed to and the level of PPE required.

Motor Starting Studies

SPE can undertake simple static motor starting studies to identify the initial voltage sag associated with starting a motor Direct On Line or with a star-delta starter or soft-starter. In addition, our team can also carry out more complex dynamic motor starting evaluations, which consider the motor and load behavior, as well as the dynamic response of any generators on the system.

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Protection Studies

SPE has experience of undertaking a wide range of protection studies from simple overcurrent / earth fault coordination studies, to configuring complex differential protection schemes and investigating nuisance protection trips. Correct protection settings of relays are of vital importance to any electrical system, as it ensures that, should a fault occur, only the faulted item of equipment is removed from service, and the healthy equipment is kept on line.

Fault Ride Through Studies

Fault Ride Through (FRT) studies are usually required for any major generating plant, that is to be connected to the electrical transmission network, to demonstrate that the generators can support the system in the event of a transmission fault. SPE is experienced in these complex studies, and can accurately simulate the dynamic response of the system to upstream faults in order to gain network operator approval.

Stability Studies

Transient and Dynamic stability studies are most frequently associated with island power systems and embedded generators, and are used to measure voltage stability, frequency stability in relation to faults, loss of main supplies, generation and load acceptance and rejection. These studies are useful for identifying any need for load shedding systems, fast differential protection schemes or other forms of power system compensation.

Electromagnetic Studies

SPE can undertake more complex electromagnetic studies using EMTP-ATP, EMTP or PSCAD. These very powerful software packages allow complex analysis of non-linear and transient events such as transformer inrush, insulation coordination (lightning and switching transients) as well as TRV studies.

Earthing Studies

Earthing of HV systems is a complex area that needs specialist knowledge and simulation software. SPE uses the industry leading CDEGS package, which allows us to analyse virtually any earthing system and associated buried structure. This allows us to calculate the Earth Potential Rise (EPR) and associated Touch and Step Voltages.

For more details on any of these studies, please contact us.

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