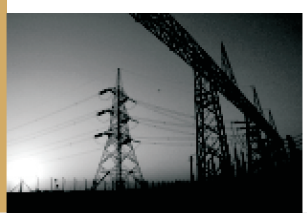
FERRORESONANCE CASE STUDY IN 69 KV SUBSTATION

Authors: Jaffar Al Sheef, Saudi Aramco, Johnson Thomai, DAR Engineering

Ferroresonance phenomenon is hard to predict during power systems design studies. Although ferroresonance is harmful condition, power system design studies do not cover ferroresonance as they are often performed through steady state analysis software packages through phasor representation which are not suited to uncover power system susceptibility to ferroresonance. However, ferroresonance has been experienced in several installations which then called for a detailed study through EMTP modeling to diagnose and determine mitigation solutions.

This paper explains detailed of a ferroresonance case study that was experienced during energization for the first time a 69 kV substation in a hydrocarbon plant. The new 69 kV substation is a replacement to an existing one which never experienced ferroresonance. However, as soon as the new substation is energized through ungrounded power source, substation equipment generated high noise and extremely distorted voltage was observed. The paper will first explain the substation configuration. Then the incident details will follow. The details of the EMTP study will be discussed. Finally, mitigations to prevent ferroresonance occurrence will be evaluated and recommended.

*This paper was presented at GCC CIGRE 2011, Kuwait



To read the full paper, please contact
dar@dar-engineering.com