

Preliminary Studies of Transient Stability for the 380 kV Connection West-Central of Saudi Electricity Company

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Abstract : This paper is to present and discuss the new planned 380 kV transmission line performance under steady and transient states. Dynamic modeling and analysis of such inter-tie, which is, proposed to transfer energy from west to south and vice versa will be demonstrated and discussed. The west-central-south inter-tie links Al-Aula-Zaba-Tabuk-Tubajal-Jawf-Hail. It is essential to investigate the transient over-voltage to assure steady and stable transmission over such inter-tie. Saudi Electricity Company (SEC) has been improving its grid to make the whole country as an interconnected system. Already east, central and west were interconnected, yet mostly each is fed with its local generation. The SEC is planning to establish many inter-ties to strengthen the transient stability of its grid. The paper studies one of the important links of 380 kV, 220 km between Tabouk and Tubarjal, which is a step towards connecting the West with the South region. Modeling and analysis using some softwares will be utilized under different scenarios. Adoption of methods to stabilize and increase its power transmission are also discussed. Improvement of power system transients has been controlled by FACTS elements such the Static Var Compensators (SVC) receiving a wide interest since many technical studies have proven their effects on damping system oscillations and stability enhancement. Illustrations of the transient at each main generating or load bus will be checked in all inter-tie links. A brief review of possible means to solve the transient over-voltage problem using different FACTS element modeling will be discussed.

Keywords : transient stability, static var compensator, central-west interconnected system, damping controller, Saudi Electricity Company

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