

Rekonfigurasi penyetelan relai jarak pada saluran udara tegangan tinggi akibat adanya penambahan gardu induk spinmill di Balaraja = Reconfiguration of distance relay settings on high voltage overhead transmission lines in addition of the spinmill main substation in Balaraja

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Abstrak

ABSTRACT

Proyeksi kebutuhan tenaga listrik di wilayah Balaraja cenderung mengalami kenaikan peningkatan beban, sehingga untuk memenuhi kebutuhan tersebut diperlukan pengembangan sarana kelistrikan diantaranya pengembangan sistem transmisi. Pengembangan tersebut mengharuskan sistem proteksi pada sistem transmisi untuk disesuaikan dalam hal desain dan setting peralatannya. Salah satu peralatan penting dalam proteksi sistem transmisi adalah relai jarak yang dapat mendeteksi adanya gangguan hubung singkat. Pada skripsi ini, pengembangan sistem transmisi di Balaraja terjadi dengan menambahkan Gardu Induk Spinmill sehingga akan membuat konfigurasi penyetelan relai jarak yang berada didekat Gardu Induk Spinmill akan berubah. Selain itu, secara keseluruhan bentuk konfigurasi saluran udara tegangan tinggi 150 KV di Balaraja adalah saluran ganda ke ganda yang akan berpengaruh terhadap kinerja relai jarak akibat pengaruh infeed dan mutual impedansi urutan nol sehingga penyetelan relai jarak akibat adanya penambahan Gardu Induk Spinmill perlu memperhatikan faktor yang dapat mempengaruhi kinerja relai jarak tersebut. Berdasarkan simulasi setting rekonfigurasi yang telah mempertimbangkan faktor-faktor yang dapat mempengaruhi kinerja relai jarak maka dapat diambil kesimpulan bahwa rekonfigurasi setting relai jarak di Balaraja sudah benar dikarenakan tidak ada zona pengaman yang tumpang tindih dan zona pengaman relai jarak memiliki jangkauan setting yang dapat melindungi saluran transmisi sesuai dengan kaidah penyetelan

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The projection of electricity demand in Balaraja region tends to the load increase, so to fulfill the requirement, it is necessary to develop electricity facilities such as the developing of transmission system. The development requires protection systems on the transmission system to be customized in terms of design and equipment settings. One of the important device in the protection of transmission system is a distance relay that can detect a short circuit fault. In this thesis, the development of transmission system in Balaraja occurs by adding the Spinmill Substation so that it will make the configuration of the distance relay adjustment near the Spinmill Substation will change. In addition, the overall configuration of the 150 KV high voltage overhead transmission lines in Balaraja is double to double channel which will affect the relay distance performance due to the infeed and mutual impedance of zero sequence so that the distance relay adjustment due to the addition of the Spinmill Substation should take into consideration factors affect the performance of the distance relay. Based on the simulation of reconfiguration settings that have considered factors that may affect the performance of the distance relay it can be concluded that the reconfiguration of the relay distance settings in Balaraja is correct because there is no overlapping security zone and the relay distance safety zone has a range of settings that can protect the transmission line according to the setting rules.