

ABSTRAK

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Judul : Analisis Kinerja Sistem Proteksi Saat Keadaan Manuver Jaringan Dan Eksisting Pada Feeder CLWU Gardu Induk Garut 150 kV

Penelitian ini menganalisis kinerja sistem proteksi pada penyulang CLWU dan MGWT di Gardu Induk Garut 150 kV milik PT PLN (Persero) dalam dua kondisi operasi: kondisi eksisting dan kondisi manuver jaringan. Tujuan penelitian adalah menilai performa Over Current Relay (OCR) dan Ground Fault Relay (GFR) terhadap gangguan hubung singkat (1 fasa ke tanah, 2 fasa, 2 fasa ke tanah, dan 3 fasa) pada tiga tingkat pembebanan (20 %, 80 %, dan 100 %) menggunakan simulasi ETAP 19.0.1. Hasil simulasi menunjukkan bahwa pada kondisi eksisting terdapat beberapa relay yang memiliki waktu operasi $> 1,0$ detik dan ditemukan miskoordinasi antara relay Outgoing 20 kV dan Incoming 150 kV pada titik-titik tertentu; pada kondisi manuver jaringan waktu kerja relay cenderung lebih lambat dan margin koordinasi menurun akibat perubahan konfigurasi saluran. Secara kuantitatif, perbedaan waktu operasi antara kondisi eksisting dan manuver mencapai rentang yang signifikan pada beberapa titik, sehingga menurunkan selektivitas proteksi. Dengan demikian diperlukan evaluasi dan optimasi pengaturan arus pickup dan Time Multiplier Setting (TMS) untuk meningkatkan selektivitas dan kecepatan sistem proteksi sehingga kontinuitas pasokan 20 kV lebih terjaga.

Kata kunci: sistem proteksi, gangguan hubung singkat, OCR, GFR, ETAP, manuver jaringan, gardu induk 150 kV

ABSTRACT

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Judul : Analysis of Protection System Performance During Network
Maneuvering and Existing Conditions at the CLWU Feeder
of the 150 kV Garut Substation*

This study analyzes the performance of the protection system on the CLWU and MGWT feeders at the 150 kV Garut Substation owned by PT PLN (Persero) in two operating conditions: existing conditions and network maneuver conditions. The purpose of the study is to assess the performance of the Over Current Relay (OCR) and Ground Fault Relay (GFR) against short circuit faults (1 phase to ground, 2 phases, 2 phases to ground, and 3 phases) at three loading levels (20%, 80%, and 100%) using ETAP 19.0.1 simulation. The simulation results show that in the existing condition there are several relays that have an operating time > 1.0 second and miscoordination is found between the Outgoing 20 kV and Incoming 150 kV relays at certain points; in the network maneuver conditions the relay operating time tends to be slower and the coordination margin decreases due to changes in the line configuration. Quantitatively, the difference in operating time between existing and maneuver conditions reaches a significant range at several points, thus reducing the selectivity of protection. Thus, evaluation and optimization of the pickup current and Time Multiplier Setting (TMS) settings are required to improve the selectivity and speed of the protection system so that the continuity of the 20 kV supply is better maintained.

Keywords : protection system, short circuit fault, OCR, GFR, ETAP, network maneuver, 150 kV substation