ABSTRAK

IMAM HIDAYATULLAH.

Analisa Optimasi Operasi Baterai 110VDC Dengan Metode Equalizing di GITET Jawa 9&10

Dibimbing oleh JUARA MANGAPUL, S.T., M.Si.

Sistem baterai *Direct Current* (DC) 110VDC di Gardu Induk Tegangan Ekstra Tinggi (GITET) adalah komponen kritis yang menjamin keandalan sistem proteksi dan kontrol selama gangguan, khususnya saat kehilangan daya utama (*blackout*). Kinerja optimal baterai sangat bergantung pada keseimbangan tegangan antar sel. Seiring waktu, perbedaan *state of charge* antar sel baterai timbul, yang jika dibiarkan dapat mengurangi kapasitas total dan memperpendek usia baterai. Penelitian ini berfokus pada optimasi operasi battery 110VDC di GITET Jawa 9&10 melalui implementasi dan analisis metode Equalizing Charge. Tujuan utama adalah untuk mengembalikan kesamaan tegangan dan densitas elektrolit antar sel, memaksimalkan kapasitas *discharge*, serta mengurangi risiko kegagalan sistem proteksi. Metode yang digunakan melibatkan pengamatan dan perekaman data tegangan sel sebelum dan sesudah Equalizing Charge, yang diterapkan dengan menaikkan tegangan *charging* di atas batas *float* selama periode waktu tertentu. Hasil studi menunjukkan bahwa Equalizing Charge efektif dalam mengurangi deviasi tegangan antar sel secara signifikan, sehingga memastikan baterai beroperasi pada tingkat keandalan tertinggi. Penerapan metode ini sangat direkomendasikan sebagai prosedur pemeliharaan rutin untuk memperpanjang umur aset dan menjamin stabilitas sistem tenaga listrik.

Kata Kunci : Baterai 110VDC, Equalizing Charge, Keandalan.

ABSTRACT

IMAM HIDAYATULLAH.

Optimization Analysis 110VDC Battery Operation Using the Equalizing Method at GITET Jawa 9&10

Supervised by JUARA MANGAPUL, S.T., M.Si.

The 110VDC Direct Current (DC) battery system at the Extra High Voltage Substation (GITET) is a critical component that ensures the reliability of the protection and control system during disturbances, particularly during power blackouts. Optimal battery performance is highly dependent on the voltage balance between cells. Over time, differences in the state of charge between battery cells develop, which, if left unchecked, can reduce the total capacity and shorten the battery's lifespan. This research focuses on optimizing 110VDC battery operation at GITET Jawa 9&10 through the implementation and analysis of the Equalizing Charge method. The main objective is to restore equal voltage and electrolyte density between cells, maximize discharge capacity, and reduce the risk of protection system failure. The method used involves observing and recording cell voltage data before and after Equalizing Charge, which is applied by raising the charging voltage above the float limit for a specified period. The study results show that Equalizing Charge is effective in significantly reducing inter-cell voltage deviation, ensuring the battery operates at the highest level of reliability. This method is highly recommended as a routine maintenance procedure to extend asset life and ensure power system stability.

Keywords: 110VDC Battery, Equalizing Charge, Reliability.