

ABSTRAK

DEDE NASRULLOH.

Pengaruh Metode Pemeliharaan SUTM 20 kV Melalui PDKB SL Terhadap Keandalan Sistem UP3 Banten Utara.

Dibimbing oleh **Hasna Satya Dini, S.T., M.T.**

Pemeliharaan jaringan Saluran Udara Tegangan Menengah (SUTM) 20 kV merupakan salah satu upaya penting dalam menjaga kontinuitas penyaluran energi listrik kepada pelanggan. Umumnya, kegiatan pemeliharaan dilakukan dengan mematikan aliran listrik atau dalam kondisi tidak bertegangan, sehingga menimbulkan kerugian baik bagi pelanggan maupun pihak penyedia listrik. Untuk mengatasi hal tersebut, PT PLN (Persero) Unit Pelaksana Pelanggan (UP3) Banten Utara menerapkan metode Pekerjaan Dalam Keadaan Bertegangan Sentuh Langsung (PDKB SL). Penggunaan metode ini bertujuan untuk menjaga keandalan sistem distribusi yang diukur melalui beberapa indikator seperti *System Average Interruption Duration Index* (SAIDI), *System Average Interruption Frequency Index* (SAIFI), serta *Energy Not Supplied* (ENS). Metode PDKB Sentuh Langsung merupakan teknik pelaksanaan pemeliharaan, perbaikan, maupun pengembangan jaringan listrik tanpa memutus aliran listrik atau dalam kondisi sistem tetap bertegangan. Pekerjaan ini dilaksanakan oleh personel bersertifikat dengan memperhatikan standar keselamatan kerja yang ketat. Tujuan utama penerapan metode ini adalah agar proses pemeliharaan tidak mengakibatkan pemadaman listrik, sehingga kontinuitas dan keandalan suplai energi tetap terjaga. Dalam pelaksanaannya, aspek keselamatan kerja bagi petugas (linesman) menjadi prioritas utama, karena keberhasilan metode ini tidak hanya diukur dari keandalan sistem, tetapi juga dari kemampuan mencegah potensi kecelakaan kerja. Berdasarkan hasil penelitian yang dilakukan pada penerapan metode Pekerjaan Dalam Keadaan Bertegangan Sentuh Langsung (PDKB SL) pada jaringan SUTM 20 kV di PT PLN (Persero) UP3 Banten Utara, diperoleh temuan bahwa metode ini secara signifikan mampu menjaga kontinuitas penyaluran tenaga listrik selama kegiatan pemeliharaan berlangsung. Pelaksanaan pekerjaan tanpa pemadaman terbukti menghilangkan kebutuhan pemutusan suplai listrik kepada pelanggan pada saat dilakukan perbaikan, penggantian komponen, maupun pekerjaan preventif lainnya. Dari aspek keandalan sistem distribusi, terdapat peningkatan kinerja yang ditunjukkan melalui perbaikan indikator keandalan, yaitu penurunan nilai SAIDI dan SAIFI serta penurunan nilai ENS. Peningkatan efisiensi operasional perusahaan, pengurangan potensi kerugian ekonomi akibat pemadaman terencana serta tetap terjaganya aspek keselamatan kerja melalui penerapan standar K3 yang ketat.

Kata Kunci: PDKB Sentuh Langsung, Pemeliharaan SUTM 20 kV, Keandalan Sistem, SAIDI, SAIFI.

ABSTRACT

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The Effect of the 20kV SUTM Maintenance Method Through PDKB SL on the Reliability of the North Banten UP3 System.

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The maintenance of 20 kV Medium Voltage Overhead Distribution Networks (SUTM) is an essential effort to ensure the continuity of electric power distribution to customers. Generally, maintenance activities are carried out under de-energized conditions by shutting down the network to ensure personnel safety. However, this approach may cause losses for both customers and the electricity provider. Therefore, PT PLN (Persero) UP3 Banten Utara has implemented the Live-Line Bare-Hand Maintenance Method (PDKB SL) in its network maintenance operations. The Bare-Hand Method (PDKB SL) is a live-line maintenance technique that enables repair, maintenance, and replacement of network components while the system remains energized, allowing electricity supply to continue without interruption. The main objective of applying this method is to maintain the reliability of the power distribution system, which is evaluated through several reliability indices, including the System Average Interruption Duration Index (SAIDI), System Average Interruption Frequency Index (SAIFI), and Energy Not Supplied (ENS). The implementation of the PDKB Bare-Hand Method must strictly comply with safety and security standards to protect the personnel (linesmen) performing the work. The success of this method is not only determined by maintaining uninterrupted power supply but also by ensuring a high level of occupational safety. Based on the results of research conducted on the application of the Direct Contact Voltage Work (PDKB SL) method on the 20 kV SUTM network at PT PLN (Persero) UP3 North Banten, it was found that this method was significantly able to maintain the continuity of electricity distribution during maintenance activities. The implementation of work without blackouts was proven to eliminate the need for disconnection of electricity supply to customers when repairs, component replacements, or other preventive work were carried out. From the aspect of distribution system reliability, there was an increase in performance as indicated by improvements in reliability indicators, namely a decrease in SAIDI and SAIFI values and a decrease in ENS values. Increased company operational efficiency, reduced potential economic losses due to planned blackouts and maintained occupational safety aspects through the implementation of strict K3 standards.

Keywords: 20 kV Overhead Line, Live-Line Bare-Hand Method, Network Reliability, SAIDI, SAIFI.