

ABSTRAK

ANALISIS KONDISI ISOLATOR *OUTDOOR* TERPOLUSI DEBU UREA DENGAN METODE PRPD DAN *TIME FREQUENCY* DI PT. PUPUK SRIWIDJAJA

(2026 : xv + 92 halaman + Daftar Gambar + Daftar Tabel + Lampiran)

Rindo Gustian
062330310528
Jurusan Teknik Elektro
Program Studi Teknik Listrik
Politeknik Negeri Sriwijaya

Penelitian ini bertujuan menganalisis karakteristik *partial discharge* (PD) pada *Outdoor Station Post Insulator* 13,8 kV yang terpapar debu urea di lingkungan PT Pupuk Sriwidjaja (Pusri) Palembang. Kontaminasi debu urea pada permukaan isolator dapat meningkatkan konduktivitas permukaan dan memicu aktivitas PD yang berpotensi menyebabkan degradasi isolasi. Pengukuran dilakukan menggunakan perangkat *Megger PD Scan* dengan sensor ultrasonik, kemudian diolah menggunakan MATLAB untuk menghasilkan pola *Phase Resolved Partial Discharge* (PRPD) serta analisis *Time Frequency Partial Discharge* (TFPD) melalui metode STFT, FFT, dan CWT. Hasil menunjukkan nilai ultrasonik -5 dB hingga 4 dB, dengan aktivitas PD tertinggi pada Reactor P4. Pola PRPD memperlihatkan distribusi pulsa simetris pada kedua setengah siklus tegangan AC dengan intensitas rendah yang mengindikasikan *surface discharge* akibat kontaminasi permukaan. Analisis TFPD menunjukkan frekuensi dominan sebesar 24,41 kHz. Secara keseluruhan, kondisi isolasi masih tergolong baik dan aman beroperasi, sehingga kombinasi metode PRPD dan TFPD terbukti efektif sebagai teknik pemantauan kondisi isolator secara komprehensif.

Kata kunci: *partial discharge*, isolator *outdoor*, debu urea, PRPD, *time frequency*, STFT, CWT.

ABSTRACT
ANALYSIS OF THE CONDITION OF OUTDOOR ISOLATORS POLLUTED
BY UREA DUST USING THE PRPD AND TIME-FREQUENCY METHODS
AT PT. PUPUK SRIWIDJAJA

(2026 : xv + 92 Page + List of Pictures + List of Tables + List of Appedix)

Rindo Gustian
062330310528
Departmen of Electrical Engineering
DIII Electrical Engeniring Study Program
Sriwijaya State Polytechnic

This study aims to analyze the characteristics of partial discharge (PD) on a 13.8 kV Outdoor Station Post Insulator exposed to urea dust contamination at PT Pupuk Sriwidjaja (Pusri) Palembang. Urea dust deposited on the insulator surface increases surface conductivity and triggers PD activity that may lead to insulation degradation. Measurements were conducted using a Megger PD Scan device with a ultrasonic sensor, then processed in MATLAB to generate Phase Resolved Partial Discharge (PRPD) patterns and Time Frequency Partial Discharge (TFPD) analysis using STFT, FFT, and CWT methods. Results showed ultrasonic values of -5 dB to 4 dB, with the highest PD activity detected at Reactor P4. The PRPD pattern displayed symmetric pulse distribution across both half-cycles of the AC waveform at low intensity, indicating surface discharge due to surface contamination. TFPD analysis revealed a dominant frequency of 24.41 kHz. Overall, the insulation condition remains good and safe for operation, confirming that the combined PRPD and TFPD methods are effective for comprehensive insulator condition monitoring.

Keywords: *partial discharge, outdoor insulator, urea dust, PRPD, time frequency, STFT, CWT.*