

**PENGENDALIAN EMISI PARTIKULAT BERDASARKAN SEBARANNYA  
DARI INDUSTRI PEMBANGKIT LISTRIK TENAGA UAP (PLTU) DI  
DESA KARANGKANDRI, KECAMATAN KESUGIHAN, KABUPATEN  
CILACAP, PROVINSI JAWA TENGAH**

**Oleh:  
Arih Fitra Cahayani  
114170061**

**INTISARI**

Keterdapatn sektor perindustrian di Indonesia menjadikan salah satu sumber penyumbang emisi polutan ke udara sehingga timbul kekhawatiran melebihi baku mutu. PLTU berbahan bakar batubara di Indonesia masih sering ditemui salah satunya terdapat di Desa Karangandri, Kecamatan Kesugihan, Cilacap, Jawa Tengah. Batubara tersebut menghasilkan emisi berupa partikulat. Tujuan penelitian ini dilakukan untuk mengetahui kondisi sebaran partikulat dan memberikan rekayasa teknis pengendalian pencemaran udara sebagai arahan pengelolaan pada penelitian ini.

Metode yang digunakan pada penelitian ini adalah metode kuantitatif. Perolehan data primer dan sekunder dihimpun dan didapatkan dengan survei dan pemetaan di lapangan, uji laboratorium, dan metode sampling. Penentuan sampel udara dengan cara *purposive sampling* berdasarkan radius panjang daerah penelitian yakni 4 km dengan pembagian tiap 2 km. Kemudian, dilakukan pengambilan radius 2 km lainnya pada sisi barat dan sisi timur PLTU sehingga terdapat 4 titik pengambilan sampel udara. Uji laboratorium digunakan untuk mengitung konsentrasi partikulat/TSP. Pengolahan data dilakukan dengan analisis matematis untuk penentuan konsentrasi satuan 24 jam dan deskriptif yang didukung dengan aplikasi *ArcGIS*. Parameter penelitian ini ialah konsentrasi TSP (partikulat), kecepatan angin, arah angin, tekanan udara dan suhu.

Hasil penelitian menunjukkan bahwa dari 4 titik lokasi pengambilan sampel udara yang telah dilakukan konversi selama 24 jam dengan baku mutu  $230 \mu\text{g}/\text{Nm}^3$ . Lokasi 1 terletak di 2 km utara PLTU menghasilkan  $370,866 \mu\text{g}/\text{Nm}^3$ . Lokasi 2 terletak 4 km dari PLTU menghasilkan  $192,905 \mu\text{g}/\text{Nm}^3$ . Lokasi 3 terletak 2 km barat PLTU menghasilkan  $412,980 \mu\text{g}/\text{Nm}^3$ . Lokasi 4 terletak 2 km timur PLTU menghasilkan  $247,923 \mu\text{g}/\text{Nm}^3$ . Arahan pengelolaan pada penelitian ini rekomendasi pengoptimalan alat pengendali partikulat/debu berupa *Electrostatic Precipitator* (EP) dan dilakukan rancangan desain berupa jalur hijau dengan beberapa jenis tumbuhan berefektivitas baik dalam pengendalian sebaran partikulat salah satunya ialah Glodogan Tiang (*Polyalthia longifolia*) sebagai pohon endemik daerah penelitian.

**Kata Kunci:** Emisi; *Electrostatic Precipitator* (EP); Partikulat; Industri; Pembangkit Listrik Tenaga Uap (PLTU); Pencemaran udara; Jalur Hijau.

**CONTROL OF PARTICULATE EMISSIONS BASED ON DISTRIBUTION  
FROM THE STEAM POWER PLANT INDUSTRY (PLTU)  
IN KARANGKANDRI VILLAGE, KESUGIHAN DISTRICT,  
CILACAP REGENCY, CENTRAL JAVA PROVINCE**

**By:  
Arih Fitra Cahayani  
114170061**

**ABSTRACT**

*The presence of the industrial sector in Indonesia is one of the sources of pollutant emissions into the air, so there is concern that it will exceed the quality standard. Coal-fired power plants in Indonesia are still often found, one of which is in Karangkandri Village, Kesugihan District, Cilacap, Central Java. The coal produces emissions in the form of particulates. The purpose of this study was to determine the condition of the distribution of particulates and provide technical engineering for controlling air pollution as a management direction in this study.*

*The method used in this study is a quantitative method. Primary and secondary data were collected and obtained through surveys and mapping in the field, laboratory tests, and sampling methods. Determination of air samples by purposive sampling based on a long radius of the research area, which is 4 km with a division of every 2 km. Then, another 2 km radius was taken on the west and east sides of the power plant so that there were 4 air sampling points. Laboratory tests are used to calculate the concentration of particulates/TSP. Data processing is carried out by mathematical analysis for determining the concentration of 24-hour units and descriptively supported by the ArcGIS application. The parameters of this research are the concentration of TSP (particulates), wind speed, wind direction, air pressure and temperature.*

*The results showed that from 4 points of air sampling locations that had been converted to 24 hours with a quality standard of 230 g/Nm<sup>3</sup>. Location 1 is located 2 kilometers north of the power plant producing 370.866 g/Nm<sup>3</sup>. Location 2 is located 4 kilometers from the PLTU generating 192,905 g/Nm<sup>3</sup>. Location 3 is located 2 kilometers west of the power plant producing 412,980 g/Nm<sup>3</sup>. Location 4 is located 2 kilometers east of the power plant producing 247,923 g/Nm<sup>3</sup>. The management direction in this study recommends optimizing particulate/dust control devices in the form of an Electrostatic Precipitator (EP) and a green line design is carried out with several types of plants that have good effectiveness in controlling particulate distribution, one of which is Glodogan Tiang (*Polyalthia longifolia*) as an endemic tree in the research area.*

**Keywords:** Air pollution; Emission; Electrostatic Precipitator (EP); Green Line; Industry; Particulates; Steam Power Plant (PLTU).