

ABSTRAK

ANALISIS DAYA TAMPUNG DAN *TREATMENT* SETTLING POND D PADA KEGIATAN OPERASIONAL PELABUHAN DI *COAL PORT* SUNGAI PUTING, KALIMANTAN SELATAN

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Salah satu upaya penanganan air limbah pertambangan adalah dengan *settling pond* yang mempertimbangkan kapasitas dan efisiensi sistem pengendapan. Penelitian bertujuan untuk menganalisis daya tampung Settling Pond D berdasarkan debit rancangan hujan selama 10 tahun (2015-2024) yang disesuaikan dengan kapasitas eksisting dan kadar TS pada *inlet* agar diketahui karakteristik awalnya. Selain itu, penelitian ini juga mengidentifikasi nilai pH untuk mengetahui derajat keasaman dan kadar TSS untuk mengetahui kekeruhan pada *inlet*. Sehingga penelitian ini dapat memberikan arahan pengelolaan yang sesuai pada Settling Pond D.

Untuk menghitung debit rancangan hujan 10 tahun digunakan model mononobe, metode Log Pearson III, dan perhitungan debit limpasan menggunakan metode rasional. Untuk mendapatkan kadar TS dilakukan uji sampling sesuai SNI 6989.57:2008, nilai pH dilakukan sesuai SNI 6989.26:2019, kadar TSS dilakukan sesuai SNI 6989.3:2004. Kemudian untuk arahan pengelolaan dilakukan rancangan percobaan kimia penentuan dosis natrium karbonat (Na_2CO_3) untuk netralisasi pH dan poli aluminium klorida (PAC) untuk penurunan kadar TSS dengan metode *jar test* sesuai SNI 19.6449:2000.

Hasil perhitungan menunjukkan Settling Pond D memiliki kapasitas volume sebesar 364.230 L. Berdasarkan hasil uji sampling, didapatkan kandungan total padatan dalam air limbah sebesar 13,045 g/L atau setara 1,3045% dari total volume air limbah. Hasil perhitungan debit banjir rancangan dengan periode ulang 10 tahun menunjukkan debit maksimal air limpasan sebesar 70 L/detik. Sehingga didapatkan perhitungan umur daya tampung Settling Pond D yaitu selama 4,7 hari. Berdasarkan hasil uji sampling, didapatkan nilai pH terendah mencapai 5,37 (nilai baku mutu = 6-8) dan kadar TSS tertinggi yaitu 1000 mg/L (nilai baku mutu = 200 mg/L) dimana TSS tersebut mengandung partikel ultra halus (koloid) dengan densitas 308 g/L yang menunjukkan bahwa padatan di dalam air limbah sulit mengendap secara alami karena memiliki densitas yang lebih kecil dibanding densitas air (densitas air limbah = 997 g/L). Arahan pengelolaan yang paling efektif pada air limbah berupa penambahan koagulan natrium karbonat sebesar 0,50 g/L dan PAC sebesar 1,50 g/L pada *inlet* Settling Pond D. Mengingat umur daya tampung 4,7 hari, maka pengelolaan teknik berupa pembersihan dasar kolam dapat dilakukan secara rutin setiap 4 hari sekali.

Kata kunci: Air Limbah Pertambangan, Batubara, Curah Hujan, Koagulan, Kolam Pengendapan

ABSTRACT

ANALYSIS OF THE CAPACITY AND TREATMENT OF SETTLING POND D ON PORT OPERATIONAL ACTIVITIES AT COAL PORT SUNGAI PUTING, SOUTH KALIMANTAN

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One of the efforts to manage mining wastewater is through the use of a settling pond, which takes into account the capacity and efficiency of the sedimentation system. This study aims to analyze the storage capacity of Settling Pond D based on the design rainfall discharge over a 10-year period (2015–2024), adjusted to the existing capacity and total solids (TS) concentration at the inlet to determine its initial characteristics. In addition, this study identifies the pH value to determine the level of acidity and the total suspended solids (TSS) concentration to assess turbidity at the inlet. Therefore, this research provides appropriate management recommendations for Settling Pond D.

To calculate the 10-year design rainfall discharge, the Mononobe model and the Log Pearson Type III method were used, while runoff discharge was calculated using the Rational Method. The total solids (TS) concentration was obtained through sampling in accordance with SNI 6989.57:2008, the pH value was measured following SNI 6989.26:2019, and the TSS concentration was analyzed according to SNI 6989.3:2004. Management recommendations were then developed through a laboratory jar test, following SNI 19.6449:2000, to determine the optimal doses of sodium carbonate (Na_2CO_3) for pH neutralization and poly aluminium chloride (PAC) for TSS reduction.

The calculation results show that Settling Pond D has a total volume capacity of 364,230 L. Based on the sampling tests, the total solids concentration in the wastewater was found to be 13.045 g/L, equivalent to 1.3045% of the total wastewater volume. The calculated peak runoff discharge for a 10-year return period was 70 L/s, resulting in a storage lifespan of approximately 4.7 days for Settling Pond D. The lowest pH value obtained from sampling was 5.37 (standard quality range = 6–8), while the highest TSS concentration reached 1000 mg/L (standard limit = 200 mg/L). The TSS contained ultra-fine (colloidal) particles with a density of 308 g/L, indicating that the suspended solids in the wastewater are difficult to settle naturally because their density is lower than that of water (1000 g/L). The most effective management approach for the wastewater is the addition of 0.50 g/L of sodium carbonate and 1.50 g/L of PAC at the inlet of Settling Pond D. Considering the storage lifespan of 4.7 days, mechanical maintenance in the form of periodic cleaning of the pond bottom is recommended every four days.

Keywords: *Mining Waste Water, Coal, Rainfall, Coagulant, Settling Pond*