PERANCANGAN INSTALASI PENGOLAHAN AIR LIMBAH (IPAL) DI AREA PENAMBANGAN BATUBARA PT THRIVENI INDO MINING SATUI COAL PROJECT, KALIMANTAN SELATAN

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INTISARI

Penelitian dilakukan di PT Thriveni Indo Mining Satui Coal Project, Kalimantan Selatan. Lokasi penelitian termasuk area kegiatan penambangan batubara yang menghasilkan limbah berupa air buangan tambang yang memiliki kadar *total suspended solid* (TSS) yang tinggi. Penelitian ini bertujuan untuk menganalisis karakteristik air limbah dan debit air limbah maksimum yang harus diolah *Settling Pond* 77, mengevaluasi *Settling Pond* 77 berdasarkan kualitas air limbah dengan parameter pH dan TSS serta kuantitas air limbah, menganalisis dampak yang ditimbulkan oleh *Settling Pond* 77 terhadap badan air penerima, serta merancang desain IPAL yang sesuai dengan perencanaan penambahan produksi batubara dari *Pit* Kressna.

Metode yang digunakan yaitu metode survei dan pengamatan untuk mengidentifikasi permasalahan di lokasi penelitian. Metode *purposive sampling* digunakan untuk pengambilan sampel air. Metode komposit *sampling* digunakan dalam pengambilan sampel tanah. Pengujian sampel air dilakukan dengan metode *grab sampling* untuk mengidentifikasi kualitas sampel air. Uji laboratorium air dilakukan dengan *jartest* untuk menentukan dosis koagulan yang sesuai dengan kolam yang akan dirancang. Uji laboratorium tanah dilakukan untuk menguji pH, tekstur, dan C-Organik. Analisis data dilakukan dengan analisis matematis untuk mengolah data serta analisis deskriptif untuk mengevaluasi kelayakan kolam pengendapan.

Hasil penelitian menunjukkan bahwa karakteristik air limbah memiliki kadar TSS sebesar 581 mg/L yang melebihi baku mutu. Debit air limbah yang masuk ke *settling pond* sebesar 1,21 m^3/s yang menyebabkan *settling pond* meluap. Kualitas air limbah yang diolah di *Settling Pond* 77 memiliki nilai TSS sebesar 55 mg/L dan pH sebesar 7. Kapasitas yang dimiliki *Settling Pond* 77 sebesar 16.344 m^3. Status mutu air sungai penerima air limbah hasil olahan *Settling Pond* 77 dalam kondisi baik dan memenuhi baku mutu. IPAL yang dirancang dibuat sebanyak 4 unit dengan rician 8 kompartemen *settling pond* berukuran 65 m × 45 m × 5 m dengan dilengkapi unit prasedimentasi berukuran 126,504 m × 21,083 m × 3,993 m, bak koagulasi berukuran 8,033 m × 4,017 m × 1,5 m, dan unit flokulasi berukuran 36,3 m × 20 m × 30 m. Biaya pembuatan seluruh unit IPAL sebesar Rp 1.001.433.407,00.

Kata Kunci: Air limbah pertambangan, IPAL, *Total Suspended Solid*

DESIGN OF WASTEWATER TREATMENT PLANT (WWTP) IN THE COAL MINING AREA OF PT THRIVENI INDO MINING SATUI COAL PROJECT, SOUTH KALIMANTAN

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ABSTRACT

The research was conducted at PT Thriveni Indo Mining Satui Coal Project, South Kalimantan. The research location includes an area of coal mining activities that produce waste in the form of mine waste water which has high levels of total suspended solid (TSS). This study aims to analyze the characteristics of wastewater and the maximum wastewater discharge that must be treated by Settling Pond 77, evaluate Settling Pond 77 based on wastewater quality with pH and TSS parameters and wastewater quantity, analyze the impact caused by Settling Pond 77 on receiving water bodies, and design a WWTP design that is in accordance with the planning for additional coal production from Kressna Pit.

The methods used were survey and observation methods to identify problems at the research location. The purposive sampling method was used to water sampling. The composite sampling method was used in soil sampling. Water sample testing was carried out using the grab sampling method to identify the quality of water samples. Water laboratory tests were conducted with jartest to determine the appropriate coagulant dose for the pond to be designed. Soil laboratory tests were conducted to test pH, texture, and C-Organic. Data analysis was conducted using mathematical analysis to process the data and descriptive analysis to evaluate the feasibility of the settling pond.

The results showed that the characteristics of wastewater had TSS levels of 581 mg/L which exceeded the quality standards. The wastewater discharge entering the settling pond is 1.21 m^3/s which causes settling pond overflowing. The quality of wastewater treated in Settling Pond 77 has a TSS value of 55 mg/L and a pH of 7. The capacity of Settling Pond 77 is 16.344 m^3. The water quality status of the river receiving the processed wastewater from Settling Pond 77 is in good condition. The d WWTP consists of 4 units with 8 settling pond compartments measuring 65 m × 45 m × 5 m equipped with prasedimentation measuring 126,504 m × 21,083 m × 3,993 m, coagulation units measuring 8,033 m × 4,017 m × 1,5 m, and flocculation units measuring 36,3 m × 20 m × 30 m. The cost of making the WWTP unit is IDR 1,001,433,407.00.

Keywords: Mining waste water, WWTP, Total Suspended Solid