

ABSTRAK

EVALUASI PENGOLAHAN AIR ASAM TAMBANG DENGAN METODE PENGOLAHAN AKTIF DI AMBROSIA POND, PT KALTIM PRIMA COAL

Oleh
Tiara Meylani Putri
NIM: 114210021
(Program Studi Sarjana Teknik Lingkungan)

Penelitian dilakukan di Kolam Ambrosia milik PT Kaltim Prima Coal yang mengelola air asam tambang (AAT) melalui pengolahan aktif menggunakan kapur tohor. Secara fisik, AAT tampak jernih namun berwarna kekuningan sehingga diperlukan analisis kualitasnya. Debit aktual per kompartemen dan debit limpasan berdasarkan luas daerah tangkapan hujan (DTH) belum teridentifikasi sehingga perlu dianalisis kuantitasnya. Hasil observasi menunjukkan pencampuran kapur kurang optimal dan sistem monitoring belum terjadwal sehingga diperlukan evaluasi kinerja kolam untuk menilai efektivitas pengendalian pH, logam berat, dan proses pengendapan partikel.

Penelitian ini menggunakan metode campuran pendekatan kuantitatif dan kualitatif. Metode kuantitatif digunakan untuk menyajikan data dalam bentuk numerik melalui perhitungan matematis untuk mengolah data yang didapatkan dari survei dan pemetaan lapangan serta hasil uji laboratorium. Sementara itu, metode kualitatif digunakan untuk evaluasi secara deskriptif terhadap kesesuaian kualitas AAT berdasarkan Perda Kaltim Nomor 02 Tahun 2011, serta menilai kesesuaian desain kolam pengendapan berdasarkan SNI 6778:2008.

Hasil penelitian menunjukkan luas sumber AAT sebesar 0,251 km² memiliki debit rencana sebesar 1,342 m³/detik. Adapun besar debit aktual secara berturut-turut mengacu pada 10 kompartemen labirin pada kolam sebesar 0,43; 0,35; 0,29; 0,31; 0,37; 0,34; 0,46; 0,51; 0,4; dan 0,57 m³/detik. Nilai pH, Fe, dan Mn pada inlet melebihi baku mutu namun pada outlet telah memenuhi baku mutu. Persentase pengendapan pada kolam memiliki nilai lebih dari 80%. Proses pengadukan kapur tohor dengan air asam tambang belum optimal. Beberapa aspek desain kolam, seperti kedalaman, rasio dimensi, waktu detensi, dan beban permukaan belum sesuai standar. Arahan pengelolaan yang direkomendasikan berupa penentuan dosis optimal kapur tohor sebesar 0,27 gr/L untuk pH 3-4; 0,13 gr/L untuk pH 4-5; dan 0,09 gr/L untuk pH 5-6. Selain itu, direkomendasikan redesain kolam dan pembuatan sistem bak pengaduk, penentuan waktu pengerukan kolam pada setiap kompartemen labirin secara berturut-turut setiap 31; 13; 25; 18; 19; 14; 13; 19; 18; 40; dan 124 hari/sekali, pendekatan sosial dan pendekatan institusi.

Kata kunci: Air Asam Tambang, Kolam Pengendapan, Kriteria Desain

ABSTRACT

EVALUATION OF ACID MINE DRAINAGE TREATMENT USING THE ACTIVE TREATMENT METHOD AT AMBROSIA POND, PT KALTIM PRIMA COAL

By

Tiara Meylani Putri

NIM: 114210021

(Environmental Engineering Undergraduated Program)

The research was conducted at the Ambrosia Pond owned by PT Kaltim Prima Coal, which processes acid mine drainage (AMD) through active treatment using quicklime. Physically, the AMD appears clear but has a yellowish color, requiring quality analysis. Actual discharge per compartment and runoff discharge based on the catchment area (DTH) have not been identified, requiring quantitative analysis. Observations indicate suboptimal lime mixing and an unscheduled monitoring system, necessitating a performance evaluation of the pond to assess the effectiveness of pH control, heavy metal removal, and particle sedimentation.

The research methods used quantitative and qualitative methods. Quantitative data were obtained from field surveys, spatial mapping, and laboratory testing, and were analyzed using mathematical calculations. The qualitative approach was used to evaluate the compliance of AMD quality with East Kalimantan Regional Regulation No. 02 of 2011 and to assess the alignment of the pond design with the technical specifications outlined in SNI 6778:2008.

The study identified the AMD source area as 0.251 km², with a planned runoff discharge of 1.342 m³/s. Actual discharges across the ten labyrinth compartments were recorded sequentially as 0,43; 0,35; 0,29; 0,31; 0,37; 0,34; 0,46; 0,51; 0,4; and 0,57m³/s. The inlet concentrations of pH, Fe, and Mn exceeded regulatory standards, whereas outlet concentrations met the required limits. Sedimentation efficiency was found to be above 80%; however, the lime mixing process was suboptimal. Several design aspects including pond depth, length-to-width ratio, detention time, and surface loading rate did not meet standard requirements. Recommended management actions include optimized lime dosing 0,27 gr/L for pH 3-4; 0,13 gr/L for pH 4-5; and 0,09 gr/L for pH 5-6, redesigning the pond structure, installing a dedicated mixing system, implementing a compartment-specific dredging schedule every 31, 13, 25, 18, 19, 14, 13, 19, 18, 40, and 124 days, and adopting both social and institutional approaches.

Keywords: *Acid Mine Drainage, Settling Pond, Design Criteria*