OPTIMALISASI INSTALASI PENGOLAHAN LINDI TPA SEMALI, KECAMATAN SEMPOR, KABUPATEN KEBUMEN

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ABSTRAK

TPA Semali berlokasi di Desa Semali, Kecamatan Sempor, Kabupaten Kebumen, Jawa Tengah. Saat ini Instalasi Pengolahan Lindi (IPL) TPA Semali tidak berfungsi secara optimal. Air lindi hanya dialirkan melewati bangunan IPL tanpa adanya pengolahan. Pengujian dan analisis kualitas air lindi perlu dilakukan untuk mengevaluasi dan mengoptimalkan kinerja IPL TPA Semali. Penelitian ini bertujuan untuk menganalisis kualitas air lindi TPA Semali ditinjau dari parameter pH, BOD, COD, dan TSS, mengevaluasi kinerja IPL TPA Semali, menganalisis kualitas badan air yang menjadi tempat pembuangan air lindi ditinjau dari parameter pH, BOD, COD, dan TSS, dan membuat arahan pengelolaan untuk optimalisasi kinerja IPL TPA Semali.

Metode penelitian menggunakan metode kuantitatif, meliputi survei dan pemetaan lapangan, sampling, dan uji laboratorium. Metode survei dan pemetaan dilakukan untuk memperoleh data primer berupa geofisik-kimia dan sosekbudkesmas. Metode sampling menggunakan metode *purposive sampling* dan *grab sampling* untuk sampling air lindi dan air sungai. Sampel air lindi dan air sungai digunakan untuk uji laboratorium, bertujuan untuk mengetahui kualitas air lindi dan air sungai berdasarkan parameter pH, BOD, COD, dan TSS. Metode analisis dan interpretasi data yang digunakan yaitu metode kuantitatif berupa metode matematis deskriptif.

Hasil penelitian menunjukan bahwa kualitas influen pada parameter COD dan efluen pada parameter TSS belum memenuhi baku mutu PerMen LHK Nomor 59 Tahun 2016. Evaluasi kinerja IPL TPA Semali menunjukan bangunan IPL pada kolam anaerobik, kolam fakultatif, dan kolam maturasi tidak sesuai dengan kriteria desain PerMen PUPR Nomor 3 Tahun 2013. Kualitas air sungai yang menjadi tempat pembuangan air lindi, ditinjau dari parameter pH, BOD, COD, dan TSS berturut-turut sebesar 8,1; 3,1 mg/L; 6,3 mg/L; 30 mg/L. Kualitas air sungai memenuhi baku mutu kelas IV PP Nomor 22 Tahun 2021, menunjukan bahwa pembuangan air lindi tidak berpengaruh besar pada kualitas air sungai. Arahan pengelolaan untuk optimalisasi kinerja IPL TPA Semali yaitu perancangan ulang unit IPL TPA Semali dan menambahkan unit *contructed wetland* sebagai unit pengolahan tersier, karena hasil pengujian air lindi yang fluktuatif pada parameter COD, BOD, dan TSS. Unit *constructed wetland* yang direncanakan memiliki panjang 5 m, lebar 2,5 m, kedalaman total 1,2 m, dan waktu detensi 0,5 hari. Nilai BOD keluar yang direncanakan sebesar 20 mg/L dengan efisiensi penyisihan 53%.

Kata Kunci: IPL TPA, Air Lindi, *Constructed Wetland*

OPTIMIZATION OF THE LEACHATE TREATMENT PLANT AT SEMALI LANDFILL, SEMPOR DISTRIC, KEBUMEN REGENCY

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ABSTRACT

The Semali Landfill is located in Semali Village, Sempor District, Kebumen Regency, Central Java. At present, the landfill's leachate treatment plant (IPL) is not operating effectively. Leachate is merely channeled through the IPL structures without undergoing any actual treatment process. Therefore, testing and analyzing the leachate quality are essential to evaluate and optimize the performance of the IPL at TPA Semali. This study aims to analyze the quality of leachate from the Semali Landfill in terms of pH, BOD, COD, and TSS parameters, evaluate the operational performance of the existing IPL, assess the quality of the receiving water body that serves as the leachate discharge point using the same parameters and propose management strategies to optimize the performance of the IPL at TPA Semali.

A quantitative research method was employed, consisting of field surveys and mapping, sampling, and laboratory testing. The survey and mapping were conducted to obtain primary data related to geophysical–chemical and socio-economic–cultural–public health conditions. Sampling was carried out using purposive and grab sampling methods for both leachate and river water samples. The leachate and river water samples were analyzed in the laboratory to determine their quality based on pH, BOD, COD, and TSS parameters. Data analysis and interpretation were performed using quantitative descriptive mathematical methods.

The results showed that the influent COD and effluent TSS levels did not meet the quality standards specified in PerMen LHK No. 59 of 2016. Evaluation of the IPL at TPA Semali indicates that the IPL structures—specifically the anaerobik pond, facultative pond, and maturation pond—do not comply with the design criteria stated in the PerMen PUPR No. 3 of 2013. The quality of the river water receiving the leachate, in terms of pH, BOD, COD, and TSS, was measured at 8.1, 3.1 mg/L, 6.3 mg/L, and 30 mg/L, respectively. These values meet the Class IV water quality standards stipulated in PP No. 22 of 2021, indicating that the leachate discharge does not significantly affect the river water quality. To optimize the performance of the IPL at TPA Semali, it is recommended to redesign the IPL units and add a constructed wetland as a tertiary treatment stage due *to fluctuating leachate quality in COD, BOD, and TSS parameters. The proposed constructed wetland is designed with a length of 5 m, a width of 2.5 m, a total depth of 1.2 m, and a detention time of 0.5 days. The planned effluent BOD concentration is 20 mg/L, with a removal efficiency of 53%.*

Keywords**:** *Leachate treatment plant*, *Leachate*, *Constructed Wetland*