Studi Optimasi Sistem Pengolahan Lumpur Tinja Konvensional pada IPLT Duri Kosambi = Optimization Study of Conventional Sludge Treatment System at Duri Kosambi Sludge Treatment Plant

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Abstrak

Sistem pengolahan lumpur tinja yang baik mutlak diperlukan untuk menciptakan kondisi sanitasi yang ideal serta masyarakat yang sehat. Di area DKI Jakarta, total cakupan layanan sistem pengolahan air limbah domestik hanya mencapai 22,43% pada tahun 2021. IPLT Duri Kosambi merupakan salah satu IPLT di DKI Jakarta yang memiliki kapasitas desain 900 m3 /hari. Tujuan dari penelitian ini yaitu mengevaluasi sistem pengolahan konvensional pada IPLT Duri Kosambi dan memeberikan saran optimasi berdasarkan hasil evaluasi untuk mencapai hasil efluen yang memenuhi baku mutu. Evaluasi yang dilakukan mencakup parameter desain dan metode operasional, dengan parameter uji yang mencakup padatan total, padatan volatil, BOD5, COD, fecal coliform, pH, suhu, dan oksigen terlarut. Beberapa hasil yang diperoleh mencakup penyisihan padatan total dan volatil sebesar 92,82% dan 97%, penyisihan fecal coliform sebesar 1,82 log removal pada saringan & aerobic digester dan 3,52 log removal pada kolam stabilisasi. Permasalahan desain dan metode operasional mencakup level daya aerator kolam fakultatif yang melebihi batas, penempatan saluran outlet, ketiadaan media filter pada bak pengering lumpur, endapan lumpur pada kolam anaerobik dan fakultatif, kerusakan peralatan, serta filtrat bak pengering lumpur yang tidak diresirkulasi. Optimasi yang disarankan berupa penggunaan aerator sesuai kebutuhan oksigenasi, penempatan ulang saluran inlet dan outlet, revitalisasi media filter, serta pelaksanaan metode operasional yang sesuai standar.

.....A good sludge treatment system is essential to create ideal sanitation conditions and a healthy community. In the DKI Jakarta area, the total coverage of domestic wastewater treatment systems only reached 22.43% in 2021. IPLT Duri Kosambi is one of the wastewater treatment facilities in DKI Jakarta with a design capacity of 900 m3 /day. The aim of this research is to evaluate the conventional treatment system at IPLT Duri Kosambi and provide optimization suggestions based on the evaluation results to achieve effluent that meets quality standards. The evaluation includes design parameters and operational methods, with test parameters including total solids, volatile solids, BOD5, COD, fecal coliform, pH, temperature, and dissolved oxygen. Some of the results obtained include the removal of total and volatile solids by 92,82% and 97%, respectively, fecal coliform removal by 1,82 log removal in the screening & aerobic digester, and 3,52 log removal in the stabilization pond. Design and operational problems include the facultative pond aerator power level exceeding the limit, incorrect placement of outlet channels, absence of filter media in the sludge drying bed, sludge deposits in anaerobic and facultative ponds, equipment damage, and the non-recirculation of filtrate from the sludge drying bed. The suggested optimization measures include using aerators according to oxygenation needs, repositioning inlet and outlet channels, revitalizing filter media, and implementing operational methods that adhere to the standards.