

## Evaluasi dan Peningkatan Kapasitas Unit Filtrasi (Studi Kasus: Instalasi Pengolahan Air Legong Sistem Konvensional PDAM Tirta Asasta Kota Depok) = Evaluation and Upgrading of Filtration Unit (Case Study: IPA Legong Conventional System)

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### Abstrak

Kebutuhan air minum di Kota Depok yang semakin meningkat seiring dengan pertumbuhan penduduk yang meningkat setiap tahunnya. Untuk memenuhi kebutuhan air minum diperlukan instalasi pengolahan air minum. Mengacu pada Rencana Tata Ruang Wilayah (RTRW) Kota Depok yaitu pengembangan IPA, salah satu program yang dilakukan yaitu dengan meningkatkan kapasitas pengolahan IPA Legong Sistem Konvensional dari 320 L/detik menjadi 1000 L/detik. Penelitian dilakukan dengan mengevaluasi unit filtrasi IPA Legong Sistem Konvensional dari kriteria desain, kinerja, kualitas air effluen filtrasi, dan menyusun tahapan peningkatan kapasitas unit supaya dapat mengolah debit rencana upgrading 1000 L/detik. Hasil evaluasi menunjukkan dimensi filter dan laju filtrasi memenuhi kriteria desain. Hasil perhitungan ukuran efektif media antrasit tidak memenuhi kriteria desain sehingga dilakukan perbaikan. Durasi filter run rata-rata sebesar 23,49 jam yang tidak memenuhi kriteria desain. Laju backwashing memenuhi kriteria desain. Kualitas air baku tidak memenuhi standar baku mutu. Kualitas air influen dan air effluen filter telah memenuhi standar baku mutu dengan parameter kekeruhan, warna, besi, dan mangan. Efisiensi penghilangan parameter unit filtrasi eksisting mempunyai persentase yang besar. Tahapan yang dilakukan untuk upgrading unit filtrasi yaitu kedalaman media, penambahan sistem air scouring, penambahan sistem underdrain, dan penggunaan sistem declining-rate filter. Modifikasi media filter dilakukan berdasarkan perhitungan teoritis dengan kedalaman media pasir silika sebesar 50,8 cm dan media antrasit sebesar 25,4 cm. Terdapat modifikasi lapisan gravel menjadi 6 lapisan untuk menopang lapisan media filter.

.....The increasing demand for drinking water in Depok City is increasing with population grows every year. To fulfill the needs of drinking water, water treatment plant is required. Refers to Regional Spatial Plan (RTRW) of Depok City for development Water Treatment Plant (WTP), one of the program is to increase the capacity of Legong WTP from 320 L/s to 1000 L/s. The research was conducted by evaluating filtration unit at IPA Legong Conventional System in terms of design criteria, performance, effluent quality, and arranging the stages to increasing capacity filtration unit in order to process discharge from 320 L/s to 1000 L/s. Based on the evaluation results, it was found effective size of the anthracite media does not meet the design criteria so that improvements are needed. The filter run duration was found to be an average of 23,49 hours which does not meet the design criteria when doing research. Backwashing rate still meet the design criteria. Raw water quality does not meet quality standard. The quality of influent water and filtered effluent water has meet quality standards with parameter of turbidity, color, iron, and manganese. The efficiency of removing parameters from the existing filtration unit with result was large. To upgrading filtration unit, steps are taken by adjusting the evaluation results from the existing filter unit. The steps taken to upgrading filter unit are media depth, adding an air scouring system, adding an underdrain system, and using a declining rate filter system. Modification of filter media is based on theoretical calculations with a thickness of silica sand layer 50,8 cm and anthracite layer with a thickness 25,4 cm. Modification of the gravel layer into 6 layers to

support filter media.