

**KAJIAN EFEKTIVITAS PENGOLAHAN AIR *RETENTION POND*
MENGUNAKAN METODE FILTRASI DI PT PLN NUSANTARA POWER
UP REMBANG DESA LERAN, KECAMATAN SLUKE, KABUPATEN
REMBANG, PROVINSI JAWA TENGAH**

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INTISARI

Retention pond pada PT PLN Nusantara Power UP Rembang merupakan tempat menampung air hujan, air saluran drainase di perusahaan, serta hasil penyaringan unit *Circulating Water Pump* (CWP), yang belum terdapat layak untuk dimanfaatkan. Parameter salinitas bersumber dari hasil penyaringan air laut pada unit CWP, *Chemical Oxygen Demand* (COD) bersumber dari drainase saluran air kegiatan kantin, serta minyak dan lemak bersumber dari drainase unit utama yang membawa ceceeran oli. Tujuan penelitian terdiri dari menganalisis konsentrasi parameter salinitas, COD, minyak dan lemak air outlet *retention pond*; menganalisis kemampuan unit filtrasi dengan variasi waktu operasional berdasarkan nilai efektivitasnya; menganalisis pengaruh variasi waktu terhadap penurunan parameter terkait; serta memberikan rekomendasi arahan pengelolaan agar mampu mendukung kebutuhan air sebagai air baku kelas II terutama untuk mengairi pertanian.

Pengumpulan data terdiri dari metode pengamatan langsung dan analisis data sekunder. Proses pengambilan sampel air *retention pond* dilakukan dengan metode *grab sampling*. Metode analisis dan evaluasi dilakukan dengan analisis matematis regresi, perhitungan kapasitas adsorpsi, dan analisis deskriptif. Uji percobaan dilakukan dengan skala laboratorium unit filtrasi karbon aktif dan zeolit aktif dengan variasi waktu, yaitu 0 jam setelah kontak dengan media filter (2 menit); 1 jam; 2 jam; 3 jam; 4 jam; 5 jam; dan 6 jam.

Hasil uji laboratorium kualitas air outlet *retention pond* menunjukkan kadar salinitas sebesar 13‰; kadar COD sebesar 784 mg/L; kadar minyak dan lemak sebesar 2 mg/L; yang masih melebihi batas baku mutu. Metode filtrasi media karbon aktif dan zeolit aktif dengan variasi waktu dapat menurunkan parameter terkait hingga mendekati batas baku mutu dengan rentang nilai efektivitas penurunan sebesar 53,846%-89,158% dan waktu operasional optimal pada rentang 3–6 jam. Uji regresi linear sederhana menunjukkan pengaruh variasi waktu pada penurunan kadar salinitas sebesar 92,6%; kadar sebesar COD 25,4%; serta kadar minyak dan lemak sebesar 46,51%. Arahan pengelolaan direkomendasikan berupa desain unit filtrasi bermedia karbon aktif dan zeolit aktif berdimensi 89cm×178cm×230cm dengan debit inlet 0,174459 L/s, serta berjumlah 5 unit agar mencapai target efisiensi.

Kata kunci: *retention pond*, filtrasi, salinitas, COD, minyak lemak

**STUDY ON THE EFFECTIVENESS OF RETENTION POND WATER
TREATMENT USING FILTRATION METHOD AT PT PLN NUSANTARA
POWER UP REMBANG IN LERAN VILLAGE, SLUKE DISTRICT, REMBANG
DISTRICT, JAWA TENGAH PROVINCE**

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ABSTRACT

The retention pond at PT PLN Nusantara Power UP Rembang is a place to collect rainwater, drainage water in the company, as well as the filtering results from the Circulating Water Pump (CWP) unit, which aren't yet suitable for use. The salinity parameter comes from the results of seawater filtration in the CWP unit, Chemical Oxygen Demand (COD) comes from the canteen water which channel drainage, and oil and grease come from the main unit drainage which carries oil spills. The purpose of the research consists of determine the concentration of salinity, COD, oil and grease parameters at the retention pond outlet; determine the ability of the filtration unit with variations time based on its effectiveness value; analyze the effect of time variations on decreasing of related parameters; and recommendations for management direction to be able to support water needs as class II raw water, especially for irrigating crops.

Data collection consists of using direct observation methods and secondary data analysis. The retention pond water sampling process was carried out using the grab sampling method. The analysis and evaluation method is carried out using mathematical regression analysis, adsorption capacity calculation and descriptive analysis. Experimental tests was carried out on a laboratory scale with activated carbon and active zeolite filtration units with time variations, around 0 hour after contact with filter media (2 minutes); 1 hour; 2 hours; 3 hours; 4 hours; 5 hours; and 6 hours.

The results from laboratory tests on the water quality of the retention pond outlet show a salinity level of 13‰, a COD level of 784 mg/L, an oil and grease content of 2 mg/L, which still exceeds the quality standard limit. The activated carbon and activated zeolite media filtration method with time variations can process the related parameters with a reduction effectiveness value range of 53,846%-89,158% and an optimal residence time in the range of 3-6 hours. A simple linear regression test shows the effect of time variations on decreasing salinity levels by 92,6%; levels of COD by 25,4%; oil and grease content by 46,51%. The recommendation of management improvement approach is filtration with activated carbon and activated zeolite media a design dimensions unit 89cm×178cm×230cm with an inlet discharge of 0,174459 L/s, and totaling 5 units to achieve the efficiency target.

Keywords: retention pond, filtration, salinity, COD, oil and grease