

INTISARI

Air baku Waduk Sermo mengandung banyak alga yang disebabkan tingginya konsentrasi Nitrogen dan Pospbat dalam air. Alga mengakibatkan flok yang terbentuk pada proses koagulasi flokulasi menjadi ringan dan melayang. Flok yang melayang sulit menggendap di bak sedimentasi dan terbawa langsung ke bak filtrasi, sehingga meningkatkan beban filtrasi pada Instalasi Pengolahan Air (IPA) Unit Sermo. Unit sermo terdiri dari 3 IPA dengan kapasitas 10, 20 dan 30 l/s. Tujuan penelitian ini mengidentifikasi permasalahan pada proses koagulasi dan flokulasi dari segi kriteria desain dan operasional. Penelitian ini juga mencari alternatif bahan flokulan untuk mengatasi permasalahan alga dan flok melayang di IPA Sermo.

Metode untuk mengevaluasi kriteria desain unit koagulasi dan flokulasi berdasarkan SNI 6774 : 2008 tentang dan evaluasi operasional dan pemeliharaan unit tersebut sesuai SNI 6775:2008. Alternatif flokulan tambahan yang digunakan adalah *Polydadmac* dan lempung. Koagulan tambahan diuji dengan *Jartest* menggunakan variasi dosis antara PAC dengan *Polydadmac* dan PAC dengan lempung.

Hasil evaluasi kriteria desain IPA berdasarkan SNI 6774 : 2008 menunjukkan bahwa pada bak koagulasi gradien kecepatan tidak memenuhi. Pada bak flokulasi IPA 30 l/s dan IPA 20 l/s diperoleh waktu tinggalnya tidak memenuhi kriteria desain sesuai SNI. Operasional dan Pemeliharaan di unit koagulasi flokulasi IPA belum sepenuhnya sesuai SNI 6775:2008. Hasil pengujian *jastest* koagulan tambahan antara *Polydadmac* dan Lempung diperoleh bahwa yang paling baik adalah kombinasi PAC dengan *Polydadmac* dan dosis yang optimum adalah PAC 30 ppm ditambah *Polydadmac* 0,2 ppm. Pemakaian bahan flokulan tambahan akan berpengaruh terhadap intensitas pengurasan lumpur dan biaya operasional.

Kata Kunci : koagulasi, flokulasi, sedimentasi, koagulan dan flokulan

ABSTRACT

Raw water of Sermo reservoir contains a lot of algae caused by the element Nitrogen and Posphat in water. Algae caused flocs formed in the coagulation process flocculation becomes light and float. The floating flocks in the sedimentation basin are carried over directly to the filtration basin, causing the filtration load to rise in Water Treatment Plant (WTP). There were 3 WTP in Sermo Unit whit capacity of 10, 20 and 30 l/s. The purposes of research were to identified problems in the coagulation, flocculation and sedimentation process in WTP according to design criteria and operations maintenance. This study also looking for an alternative of flocculant to solve the problem of algae and floating flock in Sermo's WTP.

The method used is to evaluate the design criteria of coagulation and flocculation unit based on SNI 6774: 2008 and evaluated the operation and maintenance of the unit based on with SNI 6775: 2008. In this reserch also provided flocculant alternative to eliminate algae. Alternatives flocculant that be used are Polydadmac and clay. Flocculant were tested with jar test used variation dose of PAC added Polydadmac and PAC added clay. The results of Jar test measured by parameters of pH, turbidity, conductivity, TDS, phosphate, nitrate and nitrite. And then the measurement results are compared and determined the most optimum dose.

The evaluation of WTP design criteria based on ISO 6774: 2008 shows that in the velocity gradient in coagulation bath was less then requirement. In a flocculation of WTP 30 l / s and WTP 20 l / s obtained the detention time of the flocculation basin was less then requirement. Operation and Maintenance in the coagulation unit of IPA flocculation has not been fully comply with SNI 6775: 2008. The result of testing jastest additional coagulant between Polydadmac and Lempung found that the best combination was PAC with Polydadmac and the optimum dose was PAC 30 ppm plus Polydadmac 0,2 ppm. The use of additional flocculant materials will affect the intensity of sludge drainage and operational costs.

Keywords : coagulation, flocculation, sedimentation, coagulant and flocculant