

ABSTRACT

In the processing and extraction of gold at PT Nusa Halmahera Minerals through the Merrill Crowe process, several thickeners are required. Thickeners are utilized in both the pre-leach and counter-current decantation (CCD) processes. To optimize the performance of the thickeners, the selection of a suitable flocculant is necessary, taking into account the characteristics of the ore type being processed. This research aims to analyze the influence of flocculation processes, determination of optimal variations, and the effect of settling flux on variations in solid percentages, types of flocculants, flocculant dosages, and ore blending on the settling rate, turbidity, final solid percentage, and compaction in the thickener at PT Nusa Halmahera Minerals. The benefits of this research are in the form of recommendations for selecting the Powerfloc flocculant type with a flocculant dosage of 45 gpt and a solid percentage of 10% for both GY 20% and GY 40% in the gold ore processing and extraction operations at PT Nusa Halmahera, to achieve greater optimization.

This study conducted experiments using four types of flocculants. The variations tested included flocculant dosages of 15 gpt, 30 gpt, and 45 gpt, solid percentage variations of 13% and 15%, as well as ore blending variations of GY 20% and GY 40%. The optimization was carried out twice to analyze its effects on settling rate, settling flux, turbidity, and final percent solid. The first optimization process involved using the best flocculant and adjusting the pH to a range of 10.10-10.50. In the second optimization, the percent solid feed was reduced to 10% solid. The research process was conducted for two hours per batch settling test, with data collected at regular intervals.

The most optimal type of flocculant obtained for GY 20% and GY 40% ore blending, with solid percentages of 13% and 15%, was Powerfloc. GY20% showed a higher settling rate compared to GY 40%. As for the flocculant dosage, a significant increase was observed at a dosage of 45 gpt. Based on the overall analysis of the two optimization processes, the settling flux that could be applied in the plant for GY 20% ore blending was 1.19 Ton/m²/h, using Powerfloc at a flocculant dosage of 45 gpt, a maximum solid feed percentage of 15%, and pH adjustment of 10.10-10.50. For GY 40%, a settling flux of 1.12 Ton/m²/h was obtained using Powerfloc at a flocculant dosage of 45 gpt, a maximum solid feed percentage of 13%, and pH adjustment of 10.10-10.50.

Keywords: *Thickener, Flocculant, Settling Flux.*

ABSTRAK

Dalam pengolahan dan ekstraksi emas di PT Nusa Halmahera Minerals melalui proses *merrill crowe*, membutuhkan sejumlah *thickener*. *Thickener* digunakan baik pada proses *pre-leach* dan *counter current decantation* (CCD). Untuk mengoptimalkan kinerja *thickener*, diperlukan pemilihan *flocculant* yang cocok menyesuaikan karakteristik dari jenis *ore* yang akan diolah. Penelitian ini bertujuan untuk menganalisis pengaruh proses flokulasi, penentuan variasi yang optimal dan pengaruh *settling flux* pada variasi persen *solid*, jenis *flocculant*, dosis *flocculant* dan *blending* bijih terhadap kecepatan pengendapan, *turbidity*, *percent solid final* dan *compaction* pada *thickener* di PT Nusa Halmahera Minerals. Manfaat dari penelitian ini berupa rekomendasi pemilihan jenis *flocculant* Powerfloc dengan dosis *flocculant* 45 gpt, persen *solid* 10% baik pada GY 20% dan GY 40% dalam operasi pengolahan dan ekstraksi bijih emas di PT Nusa Halmahera sehingga dapat lebih optimal.

Pada penelitian ini melakukan uji coba empat jenis *flocculant*. Variasi yang digunakan yakni dosis *flocculant* sebesar 15 gpt, 30 gpt dan 45 gpt, lalu persen *solid* dengan variasi 13% dan 15% serta *blending ore* dengan variasi GY 20% dan GY 40%. Dilakukan optimasi sebanyak dua kali, untuk menganalisis pengaruhnya terhadap *settling rate*, *settling flux*, *turbidity* dan *percent solid final*. Proses optimasi pertama dilakukan dengan menggunakan *flocculant* terbaik dan *adjust pH* pada 10.10-10.50. Sedangkan pada optimasi kedua dilakukan penurunan persen *solid feed* menjadi 10% *solid*. Proses penelitian dilakukan selama dua jam tiap *batch settling test* dengan pengambilan data setiap interval waktu.

Didapatkan jenis *flocculant* yang paling optimal pada *blending ore* GY 20% dan GY 40% serta pada persen *solid* 13% dan 15% yakni Powerfloc. Dengan kecenderungan GY 20% lebih mudah diendapkan daripada GY 40%. Sedangkan terkait dosis *flocculant* yang mengalami peningkatan yang signifikan pada dosis *flocculant* 45 gpt. Berdasarkan analisis keseluruhan hingga dua kali optimasi proses, didapatkan *settling flux* yang dapat diaplikasikan di pabrik pada *blending ore* GY 20% sebesar 1.19 Ton/m²/h dengan menggunakan Powerfloc pada dosis *flocculant* 45 gpt, persen *solid feed* maksimal 15% dan *adjust pH* 10.10-10.50. Sedangkan GY 40% didapatkan *settling flux* sebesar 1.12 Ton/m²/h menggunakan Powerfloc pada dosis *flocculant* 45 gpt dan persen *solid feed* maksimal 13% dan *adjust pH* 10.10-10.50.

Kata Kunci: *Thickener, Flocculant, Settling Flux.*