Analisis dan Evaluasi Produksi Bersih pada Pengolahan Bijih Emas Kelompok Pertambangan Emas Skala Kecil (PESK) Hargorejo, Kokap, Kulon Progo, D. I. Yogyakarta

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INTISARI

Pemerintah Indonesia berkomitmen untuk menghilangkan metode amalgamasi dalam pengolahan bijih emas pada PESK dan menggantinya dengan metode sianidasi. Tujuan penelitian ini untuk mengevaluasi kelayakan metode sianidasi, mengidentifikasi setiap hambatannya, dan merekomendasikan opsi produksi bersih pada pengolahan bijih emas PESK Hargorejo. Metode yang digunakan yaitu analisis kualitatif dan kuantitatif dengan pendekatan konvergensi. Analisis dilakukan melalui: kuesioner skala *Likert*; uji lab karakteristik *tailing*; evaluasi kelayakan ekonomi; observasi dan *cross reference*; serta perangkingan produksi bersih. Hasil analisis menunjukkan persepsi penambang terhadap metode sianidasi baik secara teknis maupun ekonomi belum optimal. Sedangkan, secara lingkungan dinilai lebih baik dibandingkan metode amalgamasi. Karakteristik *tailing* berupa Cd 0,0065 mg/L; Zn 1,5054 mg/L; As 0,05 mg/L; Ni 0,0432 mg/L; Cr <0,0095 mg/L; dan CN^- 0,50 mg/L memenuhi NAB. Sedangkan, pH 12,6; TSS 936 mg/L; Cu 6,57 mg/L; dan Pb 1,14 mg/L melebihi NAB. Metode sianidasi layak secara ekonomi, dengan nilai NPV Rp126.867.631, IRR 26,61%, BEP Rp1.460.480.268, PbP 2 tahun 6 bulan, dan BCR 1,19. Layak dijalankan apabila harga jual emas sesuai rencana atau naik 10% dan tidak layak apabila harga jual emas turun 10%. Hambatan penerapan metode sianidasi yaitu: alat kominusi kurang efisien, butuh 4 hari untuk memenuhi *troughput* 2500 kg setiap produksi; kolam *tailing* tidak memadai, limbah yang dihasilkan setiap produksi sebanyak 2500 kg pasir halus dan 5 m^3 limbah cair; belum ada pengolahan *tailing*, beberapa parameter *tailing* melebihi NAB; serta belum menerapkan *good housekeeping* dan APD. Rekomendasi dan skala prioritas penerapan produksi bersih menurut hasil analisis kelayakan teknis, ekonomi, dan lingkungan, yaitu: (1) penerapan *good housekeeping* dan penggunaan APD; (2) pembuatan kolam *tailing*; (3) pengolahan *tailing*; dan (4) penggantian alat *trommel* dengan *ball mill*.

Kata kunci: Kelayakan Ekonomi, PESK Hargorejo, Produksi Bersih, Sianidasi, dan *Tailing*

Cleaner Production Analysis and Evaluation of Gold Ore Processing in Artisanal and Small-scale Gold Mining (ASGM) Group of Hargorejo, Kokap, Kulon Progo, D. I. Yogyakarta

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ABSTRACT

The Indonesian government has committed to replacing the amalgamation processing method with cyanidation for gold ore in ASGM. This research aims to assess the feasibility of the cyanidation method, identify any obstacles, and recommend options for implementing cleaner production in ASGM Hargorejo gold ore processing. The research involved qualitative and quantitative analysis using a convergent approach. The analysis included a Likert scale questionnaire, lab tests on tailings characteristics, economic feasibility evaluation, observation & cross-reference, and cleaner production ranking. The analysis results indicate that miners' perception of the cyanidation method, both technically and economically, is suboptimal. However, environmentally it is considered better than the amalgamation method. The tailings characteristics are as follows: Cd 0.0065 mg/L; Zn 1.5054 mg/L; As 0.05 mg/L; Ni 0.0432 mg/L; Cr <0.0095 mg/L; and CN- 0.50 mg/L meet the required standards. Meanwhile, pH 12.6; TSS 936 mg/L; Cu 6.57 mg/L; and Pb 1.14 mg/L exceed the required standards. The cyanidation method is economically feasible, with an NPV of IDR 126,867,631, an IRR of 26.61%, BEP of IDR 1,460,480,268, PBP of 2 years 6 months, and BCR of 1.19. It is feasible if the selling price of gold is according to plan or increases by 10%, but not feasible if the selling price of gold decreases by 10%. Barriers to implementing the cyanidation method include inefficient comminution equipment, taking 4 days to meet the throughput requirement of 2500 kg per production; inadequate tailings pond, resulting in the production of 2500 kg of fine sand and 5 m^3 of liquid waste per production; lack of tailings processing, with some tailings parameters exceed the required standards; and failure to implement good housekeeping and PPE. Recommendations and priority scale for implementing cleaner production according to the results of technical, economic, and environmental feasibility analysis are (1) implementation of good housekeeping and use of PPE; (2) construction of a tailings pond; (3) tailings processing; and (4) replacing the trommel with a ball mill.

Keywords: Economic Feasibility, Hargorejo ASGM, Cleaner Production, Cyanidation, and Tailing