

## ABSTRAK

Pengolahan emas di PT J Resources Bolaang Mongondow, Sulawesi Utara menggunakan metode *heap leach*. PT J Resources Bolaang Mongondow merencanakan pengolahan bijih emas transisi dengan proporsi 5 % atau 314.000 ton. Target ekstraksi emas pada bijih transisi di angka 82%. Tingginya kandungan mineral sulfida dan *base metal* pada bijih emas transisi menjadi salah satu penyebab rendahnya persentase ekstraksi bijih emas transisi. Oksigen berperan penting dalam sianidasi emas. Oksigen akan mengoksidasi logam emas dari unsur netral menjadi bermuatan positif agar dapat berikatan dengan sianida membentuk kompleks sianida  $\text{Au}(\text{CN})_2^-$ . Penelitian ini dilakukan untuk menganalisis pengaruh dari proses oksidasi, yaitu *pretreatment H<sub>2</sub>O<sub>2</sub>*, *pretreatment natural oxidation*, dan aerasi terhadap proses pengolahan bijih emas transisi. Diantaranya terhadap kemampuan mengekstraksi *base metal*, mengesktraksi emas, konsumsi sianida, dan *irrigation volume* yang dibutuhkan.

Bijih akan dianalisis untuk mengetahui *head gradenya* kemudian dilakukan proses *pretreatment* selama 7 hari dan *leaching* menggunakan *column test*. Untuk metode aerasi, dilakukan *inject* udara selama proses *leaching*. Pada *pregnant leach solution* dilakukan pengukuran pH, titrasi sianida, dan pengecekan kandungan logam menggunakan AAS setiap hari. Sampel akan dianalisis kadar emas dan *base metal* di *head grade* dan *tailing*. Dari kedua analisis tersebut akan diperoleh persentase ekstraksi logam berdasarkan *head assay* dan *back calculated*.

Hasil penelitian yang dilakukan dapat diketahui bahwa *pretreatment H<sub>2</sub>O<sub>2</sub>* menghasilkan persentase ekstraksi *base metal* dan emas tertinggi dibandingkan proses oksidasi lain (*pretreatment natural oxidation* dan aerasi) dan *direct cyanidation*. *Pretreatment H<sub>2</sub>O<sub>2</sub>* dapat mengekstraksi Cu sebesar 44%, Fe sebesar 17%, Zn sebesar 21%, dan Pb sebesar 1%. Sedangkan untuk ekstraksi emas sebesar 68% (AuFA) dan 81% (AuCN). Metode *pretreatment* dapat menurunkan konsumsi sianida. *Pretreatment H<sub>2</sub>O<sub>2</sub>* dan *natural oxidation* dapat menghasilkan konsumsi sianida sebesar 0,51 kg/t dan 0,48 kg/t lebih rendah dibandingkan dengan *direct cyanidation* sebesar 0,58 kg/t. Sedangkan aerasi menghasilkan konsumsi sianida lebih besar dibandingkan *direct cyanidation*, yaitu 0,79kg/t. *Pretreatment H<sub>2</sub>O<sub>2</sub>* juga menghasilkan total *irrigation volume* tertinggi sebesar 5,35 kL/t

**Kata Kunci:** Proses Oksidasi, *Heap Leach*, Persentase Ekstraksi.

## **ABSTRACT**

*The gold processing at PT J Resources Bolaang Mongondow, North Sulawesi uses the heap leach method. PT J Resources Bolaang Mongondow plans to process transitional gold ore with a proportion of 5% or 314.000 tonnes. The gold extraction target for the ore transition is 82%. The high content of sulfide minerals and base metals in transition gold ores is one of the reasons for the low extraction. Oxygen plays an important role in gold oxidation. Oxygen will oxidize gold metal from a neutral element to become positively charged so that it can bind with cyanide to form a cyanide complex  $Au(CN)_2^-$ . This study was conducted to analyze the effect of the oxidation process, namely  $H_2O_2$  pretreatment, natural oxidation pretreatment, and aeration on the processing of transition gold ore. Among them are the ability to extract base metals, extract gold, cyanide consumption, and the required irrigation volume.*

*The ore will be analyzed to determine its head grade, then pre-treated for 7 days and leached using a column test. For the aeration method, the air is injected during the leaching process. In the pregnant leach solution, pH measurements, cyanide titrations, and metal content checks were carried out using AAS every day. The samples will be analyzed for gold and base metal content at head grade and tailings. The two analyses will obtain metal extraction based on the head assay and backward calculation.*

*The results of the research carried out show that  $H_2O_2$  pretreatment produces the highest percentage of base metal and gold extraction compared to other oxidation processes (natural oxidation and aeration pretreatment) and direct cyanidation.  $H_2O_2$  pretreatment can extract Cu by 44%, Fe by 17%, Zn by 21%, and Pb by 1%. Meanwhile, gold extraction are 68% (AuFA) and 81% (AuCN). The pretreatment method can reduce cyanide consumption.  $H_2O_2$  pretreatment and natural oxidation can result in cyanide consumption of 0.51 kg/t and 0.48 kg/t lower than direct cyanidation of 0.58 kg/t. Meanwhile, aeration resulted in a higher consumption of cyanide than direct cyanidation, which was 0.79kg/t.  $H_2O_2$  pretreatment also resulted in the highest total irrigation volume of 5.35 kL/t.*

**Keywords:** *Oxidation Process, Heap Leach, Extraction Percentage.*