Kajian pemanfaatan limbah penambangan emas: studi kasus pemanfaatan tailing di PT. Antam UBPE Pongkor = Study of gold mining waste reuse: case study tailing reuse at PT. Antam UBPE Pongkor

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Abstrak

Tailing yang dihasilkan industri pertambangan menjadi perdebatan hangat karena volume yang dihasilkan sangat besar dan masih mengandung beberapa logam. Hal ini mengharuskan penempatan dan pemanfaatan tailing juga harus cermat. Volume tailing ini berpotensi menurunkan fungsi lingkungan. Selain itu tailing membutuhkan area khusus yang besar dan steril untuk lokasi penampungan yang dikenal sebagai tailing dam. PT. Antam UBPE Pongkor adalah salah satu penamambangan emas dengan sistem penambangan tambang bawah. Metode penambangan yang dilakukan di UBPE Pongkor ini adalah metode cut and fill yaitu pengambilan bijih, dan pengisian kembali rongga dengan tailing yang telah didetoksifikasi sebelumnya.

Tambang emas Pongkor menghasilkan 350 ribu ton tailing per tahunnya yang berasal dari proses pengolahan dan dari pekerjaan pengembangan tambang. Pemisahan dari penggunaan kembali tailings dibagi menjadi 2 kategori, dimana 60% material tailing dimanfaatkan dan sisanya dibuang ke tailing dam. Perlunya pemanfaatan kembali tailing ini adalah untuk mengurangi volume yang terbuang.

Untuk mengetahui konsentrasi logam yang tersisa, telah diambil sampel pada beberapa titik yaitu tailing dam, batako dan material filling. Sampel slurry kemudian dipisahkan menjadi sampel padatan dan sampel larutan. Sampel padatan dilarutkan dengan Aquaregia, kemudian kedua sampel dianalisis dengan AAS. Hasil pengukuran pada sampel larutan menunjukkan konsentrasi unsur Mn 0,86 mg/L, Fe 0,366 mg/L, Pb 0,035 mg/L, Cd 0,027mg/L, Zn 0,033 mg/L dan Cu 0,22 mg/L.

Hasil pengukuran sampel padat menunjukkan nilai Mn 6,68 mg/kg, Fe 61,96 mg/kg, Pb 0,28 mg/kg, Cd 0,01mg/kg, Zn 0,42 mg/kg dan Cu 0,31 mg/kg. Semua hasil pengukuran ini menunjukkan konsentrasi beada di bawah Baku Mutu. Selain itu dari uji LD50 dan TCLP yang dilakukan berkala oleh UBPE Pongkor menunjukkan nilai berada di bawah Baku Mutu. Kesimpulannya, tailing aman untuk dimanfaatkan.

Pemanfaatan tailing di Pongkor sebagai material filling mampu mengurangi volume tailing sebanyak 42,20% dari total produksi tahun 2007. Tingkat keefektifan backfilling ini hanya 70,20% dari target sebanyak 193.356 dmt. Sementara itu, pemanfaatan untuk batako hanya mencapai 1,8% dari seluruh total taling. Batako ini sampai saat ni hanya digunakan untuk keperluan internal tetapi memiliki potensi economic benefit untuk dimanfaatkan secara masal.

Selain pemanfaatan diatas, tailing juga dapat digunakan untuk pembuatan genteng bakar karena kesamaan struktur dengan lempung. Selain it juga dapat dimanfaatkan untuk penelitian lanjutan untuk mengetahui

besarnya economic benefit dan penyerapan tenaga kerja.
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Tailing produced by mining industries being an issue and debate because it has a huge volume and still remaining metals. Thats why the tailing placement and its reuse must be detail and persnickety. This huge volume of tailing is potentially caused an environmental descent function otherwise tailing need a steril spesific area for retain talling sludge that called as tailing dam. PT. Antam UBPE Pongkor is a gold mining company that use an undreground mining method. This method applyng a cut and fill system. Cut and fill is digging and supporting method that getting the gold ore, processing and filling the blank stope with tailing that detoxificate before.

The Pongkor gold mining field produce more than 350,000 tons tailing each year that derived from processing plant and mining development activity. This tailing is splitted into 2 categories in which 60% of tailing material going to reuse and the rest, placed into tailing dam. The important need to reuse tailing is to alleviating the tailing volume in tailing dam.

The goals of this research are as follow ; (1) To figure out the safety level of tailing reuse by analyzing metals concentration that remain in tailing, (2) To analyzing the combine of tailing reuse in UBPE Pongkor, (3) To find out effectivness of tailing reuse in UBPE Pongkor as brick, backfilling material and reclamation soil media in order to reduce tailing volume that dumped into tailing dam, (4) To analyzing impacts of tailing reuse in the field to environment and ecosystem sorrounding UBPE Pongkor.

This research is an expost facto method that conducted with descriptif analysis approach. Primary and secondary data were collected by taking samples in spesific place, measuring the metal concentration in samples with AAS, interview and documenting some of apropriate figure. To figure out the metal concentration in tailing, sample have been taken from tailing dam, tailing brick and also from filling material. Then all of these samples were analyzed with AAS. Another way finding out the volume that has been treated as reuse and the remains tailing, secondary data derived from Environmental Unit at UBPE Pongkor.

The measurement results are presented as follow, for example, the concentration of solutions sample are 0,86 mg/L, 0,366 mg/L, 0,035 mg/L, 0,027mg/L, 0,033mg/L and 0,22 mg/L for Mn, Fe, Pb, Cd, Zn and Cu respectively. Meanwhile the concentration of soids sample are 6,68 mg/kg, 61,96 mg/kg, 0,28 mg/kg, 0,01mg/kg, 0,42 mg/Kg and 0,31 mg/kg for Mn, Fe, Pb, Cd, Zn and Cu respectively. All of this metal concentration stated below the treshold limit. Meanwhile LD50 and TCLP test that have been done frequently by UBPE Pongkor show result all concentration below treshlod limit.

Conclusion is, tailing safe for reuse. The tailing reuse at the UBPE Pongkor for filling material has achieved only 42,20% from total tailing that produced in 2007 (193,356 dmt) or 70,22% from the target. Tailing reuse as tailing brick during 2007 only 1,8% from total tailing produced in 2007 and on for internal use only. The tailing brick hav a potentially economic benefit if only commonly in mass by people sourronded UBPE Pongkor area.

Except for reclamation media, backfilling material and tailing bricks, tailing also potentially as roof tile because having a similiarity texture and clays contents. In order to strengthened and durability longer, commonly brick klin added. Another potentially use for ceramics additive. The tailing bricks is better with deeply research especially involved with economic benefit and labour supply absorption.