

OPTIMASI *WATER BASED MUD CUTTINGS* SEBAGAI BAHAN ADITIF BATA MERAH DI PT. PERTAMINA HULU KALIMANTAN TIMUR

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INTISARI

Sumur Geo-13 dan Geo-14 Trayek 17½” melakukan kegiatan pengeboran yang menghasilkan limbah padat berupa serbuk bor (*cuttings*) yang bercampur dengan lumpur pengeboran, khususnya *Water Based Mud*. Limbah padat yang dihasilkan masih dikelola oleh pihak ketiga, yang mengakibatkan biaya pengelolaan cukup tinggi. Penelitian ini bertujuan untuk mengidentifikasi karakteristik toksikologis *Water Based Mud Cuttings* berdasarkan parameter TPH, TCLP, LC₅₀, dan LD₅₀, menganalisis dampak pengelolaan *Water Based Mud Cuttings* dari aspek teknis, keekonomian, dan lingkungan, mengkaji variasi pencampuran dengan metode stabilisasi dan solidifikasi terhadap mutu bata merah sesuai SNI 15-2094-2000, serta mengoptimalkan pemanfaatan limbah sebagai bahan aditif bata merah yang mendukung pengelolaan limbah secara berkelanjutan dan ramah lingkungan.

Jenis penelitian ini adalah penelitian terapan dengan pendekatan kuantitatif yang bersifat deskriptif evaluatif. Data dikumpulkan melalui survei lapangan, pemetaan, *grab sampling* untuk WBM *Cuttings*, tanah, dan air drainase di area penghamparan. Pengujian laboratorium meliputi parameter TPH, TCLP, LC₅₀, dan LD₅₀. Aspek teknis dan keekonomian pengelolaan WBM *Cuttings* dianalisis melalui metode *drilling waste handling* dan *simple comparison*.

Hasil menunjukkan bahwa WBM *Cuttings* tergolong Limbah Non B3 dengan nilai TPH <1%, konsentrasi TCLP dan/atau TK sama dengan atau lebih kecil dari TCLP-B dan/atau TK-B dan lebih besar dari TCLP-C dan/atau TK-C, LC₅₀ sebesar 281.748 ppm, dan LD₅₀ >5000 mg/kg. Pemanfaatan limbah sebagai bahan aditif bata merah pada rasio 1:3, 1:4, dan 1:5. Hasil pengujian menunjukkan bahwa kuat tekan berkisar antara 8,6 hingga 21,49 kg/cm², serapan air antara 14,92–21,86%, dan kerapatan antara 1,47–1,66 gr/cm³ yang artinya, belum memenuhi persyaratan untuk bata struktural.

Pendekatan ini juga mampu menurunkan biaya pengelolaan limbah hingga 85,95%,. Penelitian ini membuktikan bahwa pengolahan limbah WBM *Cuttings* menjadi bata merah merupakan inovasi pengelolaan limbah yang efektif, ramah lingkungan, serta mendukung konsep ekonomi sirkular.

Kata kunci: Bata Merah, Ekonomi Sirkular, Limbah Serbuk Bor, Pengelolaan Limbah, *Water Based Mud*

**OPTIMIZING THE USE OF WATER BASED MUD CUTTINGS AS AN
ADDITIVE IN BRICKS PRODUCTION AT
PT. PERTAMINA HULU KALIMANTAN TIMUR**

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ABSTRACT

Geo-13 and Geo-14 wells at the 17½" trajectory generate solid waste in the form of drill cuttings mixed with drilling mud, particularly Water Based Mud (WBM). Currently, this solid waste is managed by a third party, resulting in relatively high management costs. This study aims to identify the toxicological characteristics of Water Based Mud Cuttings through TPH, TCLP, LC₅₀, and LD₅₀ parameters, to analyze the impact of Water Based Mud Cuttings handling from technical, economic, and environmental aspects, to examine the effect of mixing variations using stabilization/solidification methods on the quality of red bricks in accordance with SNI 15-2094-2000, and to optimize the utilization of WBM Cuttings as an additive material in red brick production that supports sustainable and environmentally friendly waste management.

This is an applied research study using a quantitative, descriptive-evaluative approach. Data were collected through field surveys, mapping, and grab sampling of WBM cuttings, soil, and drainage water in the spreading area. Laboratory tests included TPH, TCLP, LC₅₀, and LD₅₀ parameters. The technical and economic aspects of WBM cuttings management were analyzed using drilling waste handling and simple comparison methods.

The results show that WBM cuttings are classified as non-hazardous waste (Non-B3) with TPH <1%, TCLP and/or TK values equal to or below TCLP-B and/or TK-B thresholds, and higher than TCLP-C and/or TK-C thresholds, LC₅₀ of 281,748 ppm, and LD₅₀ >5000 mg/kg. Utilization of the waste as a red brick additive was tested at ratios of 1:3, 1:4, and 1:5. The test results indicated compressive strengths ranging from 8.6 to 21.49 kg/cm², water absorption from 14.92% to 21.86%, and apparent densities between 1.47 and 1.66 gr/cm³, indicating that the bricks did not meet structural requirements.

However, this approach can reduce waste management costs by up to 85,95%. The study demonstrates that converting WBM cuttings into red bricks is an effective, environmentally friendly waste management innovation that supports the circular economy concept

Keywords: *Bricks, Circular Economy, Drilling Cuttings, Waste Management, WBM.*